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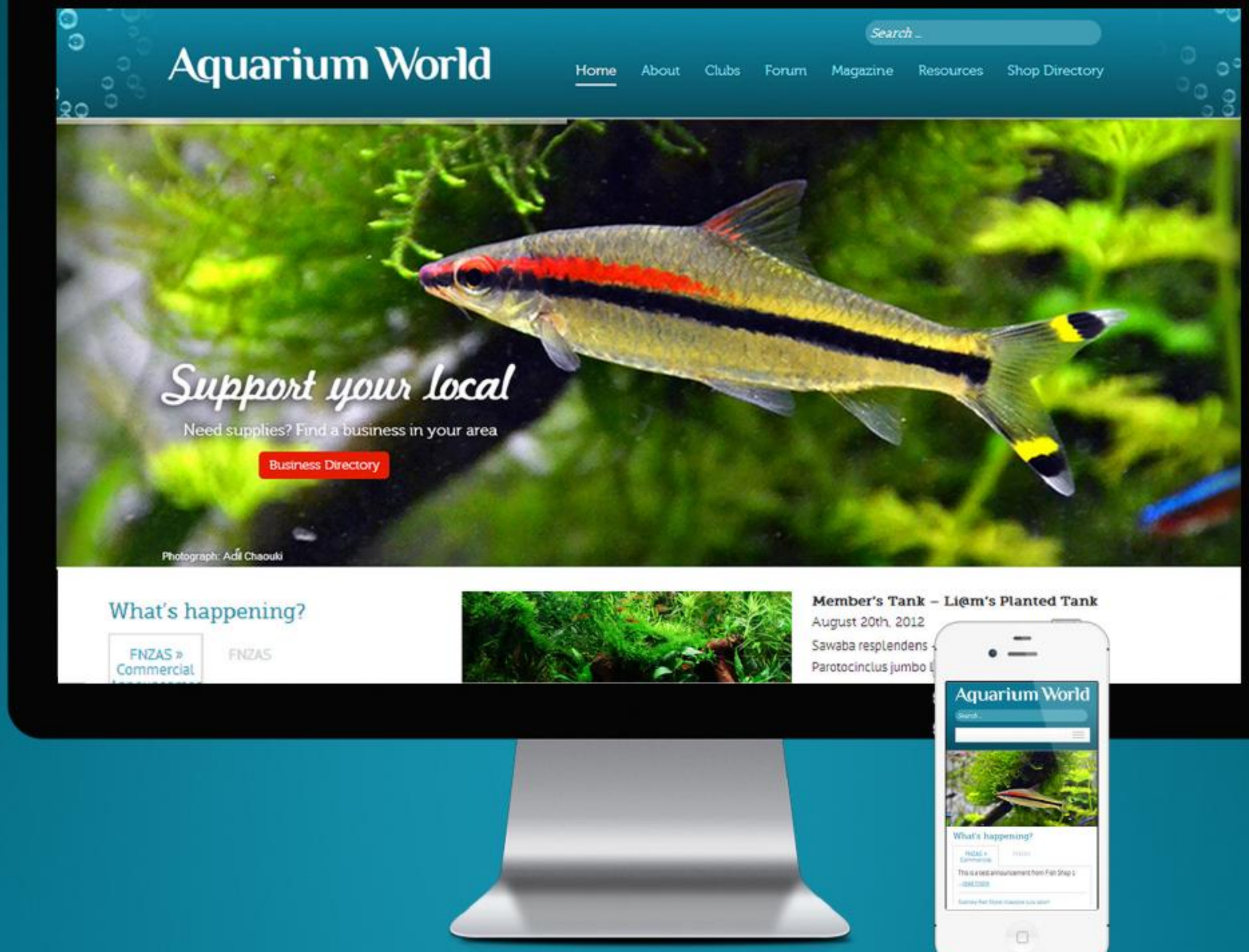

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Volume 60 Issue 4 2014

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COVER
Dwarf neon rainbowfish
Melanotaenia praecox
Photo: Edison Javier

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EDITORIAL

Welcome to a new edition of the Aquarium World Magazine. This is my first issue as editor and I would like to thank Jennifer Hamlin for her editorial work over the past year. Jennifer and her editorial team have helped shape the magazine to showcase our hobby with a distinctly New Zealand flavour. A special thanks also to Diane Wilkie, our artistic director, for producing such a high quality layout and to the many writers who have contributed material.

Being a long sufferer of multiple tank syndrome I can certainly appreciate the desire for a larger tank or two. If you are a fan of planted aquaria then large tanks allow you to aquascape on a grand scale and you can introduce large feature plants such as swords (*Echinodorus* species) or tiger lotus (*Nymphaea* lotus) – a feature plant in this issue. They also enable you to keep larger fish species which ultimately require plenty of space. Some large species have an attitude and may only be suited to sparsely furnished tanks with other strong willed tank mates. However there are some great options for large planted aquaria and in this issue we will cover two such options.

A mixed school of rainbowfish is a stunning sight and a gang of Botiine loaches clowning about is an amusing and colourful diversion. In this issue we present a range of rainbowfish and botiine loaches for larger and on occasions smaller tanks.

Discus are another great option for larger planted tanks and deservedly have a loyal following. The quality of New Zealand discus has increased significantly over the past few years and this is in no small part due to the efforts of some very capable Auckland discus breeders. In this issue we feature Ken Wong who is has achieved remarkable success with discus in only three years.

New Zealand's freshwater fish are rarely kept by aquarists although they do have a small but loyal following. While they may not be as colourful as many tropical freshwater species there are a number of native freshwater gems that offer a great coldwater alternative to goldfish. In this issue we feature one such species: the freshwater torrentfish, our very own fast water specialist, along with its surprising close relative – the marine blue cod.

And finally in our How-to Article we address the delicate subject of fish euthanasia. This is often a difficult decision but as responsible fishkeepers it is important that we know how to euthanise a fish humanely should the need arise.

Darren

Darren Stevens
FNZAS Editor

Young Discus
Photo: Ken Wong

CONTRIBUTORS

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.

Robert Beke

Robert was born in Serbia and moved to New Zealand where he worked in the pet industry. Although his background is in chemistry he has been working as a professional fishkeeper since 1996. He currently has one tropical fish tank at home. His interests include ichthyology and particularly fish macro photography.

Adrienne Dodge

Adrienne has been in the hobby for 32 years. She has bred betta splendens and currently has a high tech planted rainbow 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 the FNZAS Secretary and MAC member.

Darren Stevens

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

Shayne Mechen

Shayne runs a carpet cleaning business and is interested in computers/video editing, filming and DVD production, AV setups and running, and fish keeping. He has around 50 tanks housing a variety of angels, whiptails, corys and other catfish, fairy cichlids and plants.

Amelia Morris

Amelia is a Christchurch based 22 year old aquatics enthusiast with a particular interest in community and biotope tanks. Starting the hobby only 3 years ago, she has taken a keen interest in planted tanks and aquascaping. She currently maintains a South American cichlid tank, a South East Asian Biotope community and Tanganyikan shell-dweller tank..

Jennifer Hamlin

Jennifer has been keeping fish since she was a child & has a passion for planted tanks. She has 20 years' experience in veterinary practice and is now in academics as a senior lecturer and programme manager of veterinary nursing. She trained and qualified overseas obtaining a degree in Chemistry, majoring in Neurobiology, Physiology & Behaviour. She is consultant editor for a UK veterinary nursing journal and is president of the FNZAS.

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BACK ISSUES Caryl Simpson caryl@simtronics.co.nz

Photo: Gregory Taylor

Rainbowfish

a colourful addition to a planted aquarium

by Adrienne Dodge

Boseman's Rainbowfish
Photo: Nathan Rupert

Rainbowfish are relatively small and often colourful, and are great subjects for planted aquariums. They are found in Northern and Eastern Australia, New Guinea, Cenderawasih Bay (Indonesia) and the Raja Ampat Islands (New Guinea), where they live in a wide range of freshwater habitats, including lakes, rivers and swamps. Some wild rainbowfish populations have been severely affected by introduced fish (eastern mosquitofish and tilapia cichlids), habitat destruction, and pollution. Rainbowfish spawn all year round but they lay the greatest number of eggs at the beginning of the local rainy season. The eggs are adhesive and are scattered during spawning where they stick to nearby vegetation. The eggs hatch 7–18 days later. Rainbowfish are normally less than 12 cm in length although one species can grow to 20 cm *Melanotaenia vanheumi*. They are omnivores, feeding on insect larvae, brine shrimp, daphnia, algae and small crustaceans. Rainbowfish are enthusiastic feeders, always on the lookout for food, and because of this it is easy to overfeed them.

Rainbowfish are generally peaceful and can be kept in a community aquarium with other peaceful species. However when kept in large groups, adults of the larger species can be aggressive towards each other, and smaller species are best kept with other smaller peaceful fish. As young fish, rainbowfish look very dull. The majority of rainbowfish sold in the shops are quite young and their colours have not yet developed.

Rainbowfish are a schooling fish and are best kept in groups of six or more. A large school of rainbowfish is stunning to look at and keeping several males together will also make them develop stronger colours as they compete for the attention of females. When keeping rainbowfish the length of the aquarium is more important than the depth as rainbowfish spend most of their time near the surface. An open space for swimming is important for these fish as they are very active and rarely remain still. A dark substrate and strong lighting will help bring the colours of the fish out. Plants are often abundant in their natural habitat and they will appreciate a well planted aquarium. The biggest plus with rainbowfish, apart from their colour, is that they leave plants alone. Lids are also important to stop these fish from jumping out of the water.

True rainbowfish belong to the family Melanotaeniidae which includes seven Genera; *Cairnsichthys, Chilatherina, Glossolepis, Iratherina, Melanotaenia, Pelangia* and *Rhadinocentrus*. In this article I will cover the more commonly available rainbowfish in New Zealand. I have also included a couple of the related blue eyes (Pseudomugilidae) which are also commonly called rainbowfish or blue eye rainbowfish, and the Madagascan rainbowfish (Bedotiidae).

Boeseman's rainbowfish *Melanotaenia boesemani* were introduced to the aquarium hobby by Heiko Bleher in 1983. They are found mainly in Lake Ayamaru in a mountainous region of West Papua. The lake is about 22km^2 with a mud bottom and a white shoreline and has a pH of 6.4–7.8 and temperature of 26–27°C. This fish is listed as 'Endangered' in the IUCN Red List of Threatened Species.

The colour pattern of male Boeseman's is very different to other rainbowfish. There are several colour varieties but generally the front half of the body is blue-grey and the back half is bright orange-red with alternating light and dark vertical bars in between. Males can reach a size of 15 cm and are deeper bodied than the females. Females have a wide dark mid lateral stripe and a series of orange-red and yellow stripes.

These fish are suited to larger tanks with a water temperature of 25–30°C and a pH of 7.2–8.0. Young Boeseman's tend to be more sensitive to chlorine than mature fishes. Provide a varied diet as while this fish will survive on dry food only, it will not thrive and can lose its vibrant colours.

Boeseman's rainbows are normally bred in groups of at least two to three females for each male. Feed the fish well with live foods and provide dense Java moss and/or spawning mops. Males can be very aggressive to the females during breeding. A female Boeseman's rainbow can release up to 20 eggs each day and they will not normally eat their own offspring. Eggs take up to two weeks to hatch.

Axelrod's or Lake Tebera rainbowfish *Melanotaenia herbertaxelrodi* is endemic to the Highland drainage systems of the Kikori and Purari Rivers in Papua New Guinea where it can be found around the shoreline among tall grasses or sub-surface vegetation. The body is bright yellow and is decorated with a bluish to black mid-lateral line. Males develop a high forehead and strongly angled breast profile. The caudal fin is bright red, while the dorsal and anal fins are a yellow red.

Axelrod's rainbowfish can grow to least 12 cm and therefore adults require a large tank. The recommended temperature is 21–25°C and the pH 7.6–7.8. Feed a mix of live foods and high quality

Axelrod's Rainbowfish
Photo: Gregory Taylor

algae based foods. When courting the male will develop a white or bluish stripe on his forehead. Females can release 20–30 eggs each day, which will hatch after 7–10 days.

Lake Kutubu rainbowfish *Melanotaenia lacustris* live in central Papua New Guinea and are only found in Lake Kutubu and the Soro River which connects to the lake. The lakes are clear and still with most water coming from underground sources. The pH is 8.5–9.0 and the lake has rich underwater plant life. The Lake Kutubu rainbowfish is listed as 'Vulnerable' on the IUNC Red List of Threatened Species, with the main threats being gill nets and outboard motors in the lake, along with oil drilling and logging in the area. This species was first collected in 1955, but it was not until 1983 before this species was collected again.

The Lake Kutubu rainbowfish can reach a length of at least 12 cm. The body colours vary from brilliant turquoise blue to more greenish shades on the upper half of the body while the lower half is white. Sometimes the back can have a golden shine.

This fish is an active species and can be kept in species only aquariums or combined with non-aggressive species of similar size in an aquarium at least 120 cm in length. Include both plants and rocks along with plenty of hiding spaces. Lake Kutubu rainbowfish can be quite skittish and are best kept in a shoal of at least eight fish. Water temperature should be 21–25°C and pH from 7.1–9.0. Breeding these fish is not difficult as long as you provide dense Java moss or spawning mops. The eggs should hatch between 10–12 days. The fry can be difficult to raise and require infusoria type food as they stay very close to the water surface.

Dwarf neon rainbowfish *Melanotaenia praecox* are a striking fish with a blue or red neon body and contrasting red dorsal, anal, and caudal fins. They inhabit streams in the Mamberamo region of West Papua New Guinea. These streams have clear and swift flowing water with a temperature of around 28°C and a pH of 6.5.

Dwarf Neon rainbowfish can grow to 8 cm in length but are more commonly reach 6 cm. Captive strains are highly inbred and not as hardy as some species. These fish prefer more acidic water than many other rainbowfish and should be kept at a pH of 6.5–6.9 and a temperature of 24–28°C. When attempting to spawn your dwarf neon rainbowfish provide them with spawning mops or densely grown Java moss. The eggs should hatch within 10 days.

Lake Kutubu Rainbowfish
Photo: Gregory Taylor

Dwarf Neon and Red Rainbowfish
Photo: Gregory Taylor

Red rainbowfish *Glossolepis incisus* are only found in Lake Sentani, at the NE tip of West Papua. This lake is 104 km^2 with a surface temperature of 29–32°C and a pH of 6.2–6.8. This fish is listed as 'Vulnerable' on the ICUN Red List of Threatened Species.

Red rainbows are a popular aquarium species and have been kept continuously by aquarists for at least forty years. The females have an olive body with a gold iridescence on the scales and clear fins. The male's entire body and fins are a bright salmon red. Some of the scales have a silvery sheen, which creates an amazing effect over the red background. Young red rainbowfish are olive green but begin to develop their adult colours at 4–5 cm. Males develop a deeper body than females and have a high rounded back. They also grow larger, reaching 15 cm while females are normally less than 12 cm.

Red rainbows are best kept in groups of at least five specimens in a tank of 150 litres or more with a temperature of 24–28°C and a pH of 7.2–8.0. They are quite active and can be territorial, more so than many of the other common species. They can also nip at similarly sized males of any species. Red rainbows should be bred in groups or trios (1 male + 2 females). Keeping them in a well-planted aquarium with dense Java moss or spawning mops will encourage spawning. Feed more live food than normal. The female can release up to 50 eggs per day. Eggs should hatch after six days.

Western rainbowfish *Melanotaenia australis*. These fish are called Nigrans rainbowfish in New Zealand. Western rainbowfish were originally collected in the early 1870s from a stream in Western Australia. They are widespread in lakes, pools in drying streambeds, marshes, marshy lagoons, creeks and rivers in northern West Australia. These environments are often highly affected by seasonal variations. Western rainbowfish can reach a length of 11 cm and are

Western Rainbowfish
Photo: Ryan Francis

characterised by a pair of zigzagging black lines on the lower body, right above the anal fin. The main colour and the mid lateral stripe vary a lot between populations. Many fishes exhibit narrow red striping between the horizontal scale rows.

Melanotaenia australis is a very popular rainbowfish that is easily kept in a 120 cm planted aquarium, at temperatures of 23–32°C and a pH from 6.5–7.7. Captive strains are not as hardy as some species. If you wish to breed these fish a 54 litre aquarium is large enough and eggs are deposited every day, over a period of several weeks. In a tank with thick Java moss the eggs will not need to be removed.

Eastern or Australian rainbowfish *Melanotaenia splendida splendida* were originally collected from the Fitzroy River in central Queensland. They are widespread in north-east Australia and abundant in almost every kind of freshwater habitat, from slow-moving streams, swamps and lakes to clear flowing rivers east of Queensland's Great Dividing Range. Their natural environment has water temperature variations of 12–36°C, pH 5.0–9.2 and a considerable variation in hardness.

Eastern rainbowfish vary a lot in colour, but they generally have a pale bluish-green to yellowish body becoming white on the belly, and a series of narrow yellow, green, blue, red or faded black stripes on the side. The dorsal, caudal and anal fins can be red to yellow, may be spotted with bright red, and have faint black edges. Colour will also depend on the mood, water conditions and diet. Females and juveniles have plain silvery bodies and fins that are either translucent or faintly coloured.

Eastern rainbowfish grow to approximately 14 cm in length and therefore require a minimum tank size of 200 litres and a temperature of 20–29°C. They reproduce easily when provided with a java moss or spawning mops, releasing eggs normally in the early hours of the morning. These fish only release one to three eggs at a time. At a temperature of 24°C fry should hatch between 6–7 days. Fry should be fed an omnivorous diet starting 24 hours after they hatch.

Threadfin rainbowfish *Iriatherina werneri* are among the most attractive of the rainbowfish and are named for their long flowing fins. They are native to swamps and thick vegetated areas of flowing water in tropical Australia, the West Papuan region of Indonesia and Papua New Guinea. They can grow up to 5 cm in length without including the tail but more commonly to 4 cm.

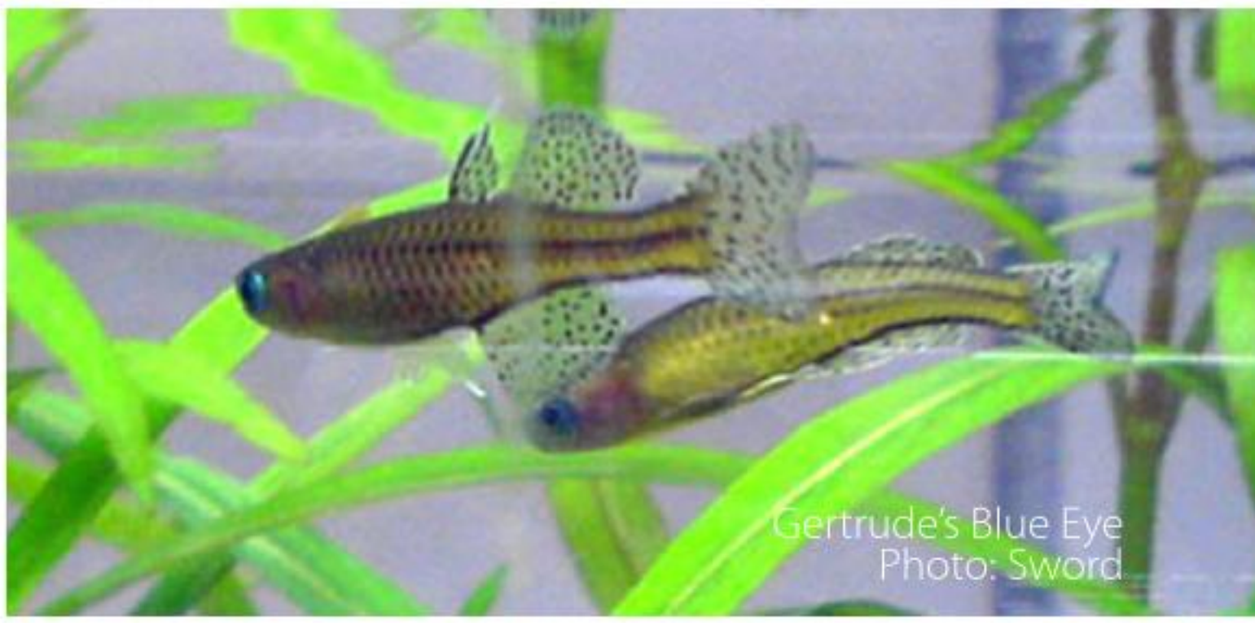
Males have much larger and more intensely coloured fins than the females, and develop thread like filaments. It is common for the male to have a yellow


Threadfin Rainbowfish
Photo: Mike S

or red first dorsal fin and red or reddish caudal fin lobes. When displaying to other threadfins their fins spread right to the splitting point and they twist and turn in total co-ordination with the other fish. In the aquarium they are normally peaceful and should be kept in groups of six or more. Due to their long fins they should not be kept with fin-nippers. Threadfin rainbowfish do best in a species only tank of 40 litres or more, and enjoy a pH of 6.0–7.0 and a temperature of 23–29°C. Try to mimic their natural habitat by heavily planting your tank. When spawning the eggs are scattered among fine leaved plants and take 8–12 days to hatch. Because of their tiny mouths the fry can be difficult to feed however they do well on live food such as Baby Brine Shrimp and the micro larval diets.

Gertrude's blue eye *Pseudomugil gertrudae* are found in northern Australia and Papua New Guinea where they inhabit small creeks, swampy marshes and heavily shaded rainforest streams. They are a small and slender fish, growing to about 3.8 cm, with large blue iridescent eyes, hence their common name. Their body is whitish or greenish yellow and decorated with a delicate pattern formed by narrow, dark scale outlines. Their dorsal, anal and caudal fins are yellow with small black dots. Males are more colourful and have longer fins with more spots. They have two dorsal fins, very close together, the first much smaller than the second. There are three known forms in northern Australia which differ in the colour of their upper pectoral fin rays. These can be blue, red or orange.

Gertrude's blue eye are best kept in a densely planted species only tank with 6–8 fish per 40 litres of water. They stay close to the surface so appreciate floating plants. They can be kept in temperatures of 23–30°C and a pH of 5.2–7.5.


Gertrude's Blue Eye
Photo: Sword

This fish should be spawned in groups with a ratio of 2–3 males to 8–10 females. Water pH should be around 7.5 and hard. The female releases 5–10 eggs every 24 hours, preferring to place her eggs within 10cm from the bottom of the aquarium and releasing three or less eggs at a time. These eggs will hatch in 10–12 days.

Forktail Blue Eye
Photo: Dirk Godlinski

Red furcatus or Forktail blue eye *Pseudomugil furcatus* were originally collected from Peria Creek, in eastern Papua New Guinea. They are generally found in small, clear rainforest streams with slow to moderate flowing water and abundant vegetation. All red furcatus in the hobby originate from a single wild collection in 1981. They feed mainly on suspended zooplankton, phytoplankton and invertebrates in the wild so in the aquarium they require food of a similar size, such as Daphnia, microworms, and baby brine shrimp.

Red furcatus are a small species, growing to a length of 5–6 cm. They have two dorsal fins, the first much smaller than the second and a body that is yellow-green in both males and females. The males have transparent dorsal and anal fins which have narrow yellow margins.

A tank with a minimum size of 60 x 30cm is the smallest size that these fish should be kept in and should be densely planted with some floating plants and driftwood to diffuse the light entering the tank. The tank needs to be established as red furcatus are susceptible to swings in water chemistry and the temperature should be 24–28°C with a pH of 7.0–8.0. As this fish is a shoaling species a group of at least 8–10 is recommended and tank should be at least 60 x 30 cm.

This fish is sexually mature by four months of age and will spawn in either Java moss or spawning mops. Eggs are released in the early morning and only a few at any time. The eggs will hatch after 2–3 weeks.

Madagascan rainbowfish *Bedotia madagascarensis* were first introduced to the aquarium hobby during the 1950s as the species *Bedotia geayi* and are still often misidentified and traded under this name. They are found in clear flowing streams and the lower reaches of rivers, in eastern Madagascar. The water is extremely soft and they are often found among vegetation along the margins where they feed mainly on terrestrial insects and other small invertebrates. This fish is listed as 'Vulnerable' on the ICUN Red List of Threatened Species.

Madagascan rainbowfish are not true rainbowfish but are placed in their own family (Bedotiidae). They are much slimmer than *Melanotaenia* rainbows and the females are deeper bodied than the males. Adult males have bright orange/red fins and can grow to 15 cm, while females are darker coloured and grow to

about 10 cm. Both sexes have a dark stripe running through the middle of their body.

Madagascan rainbowfish are a very active species and require at least a 200 litre aquarium. They are a schooling fish and are best kept in groups of at least 6 fish. They are generally fairly peaceful but can be aggressive and may fin nip. To thrive they require very clean, well oxygenated water and appreciate good water flow. Water temperature should be 23–32°C and a pH of 4.5–7.5. Madagascan rainbowfish are not difficult to breed as long as you provide dense Java moss or spawning mops. They should be spawned in pairs or in a group with one male and two or three females. The eggs should hatch in 7–10 days and the fry can be raised on infusoria or very fine powdered food followed by brine shrimp nauplii.

Adrienne Dodge

Madagascan Rainbowfish
Photo: Jennifer Hamlin

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Lake Sentani
Photo: ©Kiko Turtleiny

FISH FAMILY PROFILE

Botiine Loaches

the Clowns of the Freshwater Aquarium

by Amelia Morris

A school of loaches dancing and darting around a planted aquarium is truly a spectacle. When maintained appropriately botiine loaches are a joy to keep and provide hours of entertainment as they tumble lazily across the substrate, jam themselves into the strangest spots imaginable and even sleep upside down –fooling many aquarists into thinking they are dead! Unlike almost all other fish, *Botia* are even able to express their delight in a series of audible clicks.

Botia come from a family of fish called Cobitidae which arise from all over Asia. Like carps, minnows and many other popular aquarium fish, loaches are cyprinids. There are many different varieties of loaches in the wild and in the aquarium hobby and Botiine loaches are just one genus amongst many. Some commonly available non-botiine

Dwarf Chain loaches - *Ambastaia sidthimunki*
Photo: Robert Beke

loaches are kuhli, horseface and hillstream loaches. Botiine loaches have a unique feature -- a subocular spine. This is a spine which protrudes from under the fish's eye and remains hidden except when it feels stressed or threatened. Care should be taken when catching *Botia* as the spines can cause them to become tangled in nets, puncture fish bags, or even draw blood from the aquarist if he or she is not careful when handling these fish!

As a rule, *Botia* prefer soft acidic water and should not be kept in any pH higher than 7.4, preferably under 7. Most loaches prefer water in the 24–28°C range. They are a river dwelling fish and a decent flow would be

appreciated, as well as low organic wastes being essential. Sand substrate is preferred but not essential. If gravel if used it must be smooth rounded pebbles and kept clean. If detritus is allowed to build up in the substrate the loaches' delicate barbels are prone to infection. The decor should be free from anything with sharp edges and the tank securely lidded as loaches are expert jumpers. Botia can be shy and appreciate subdued lighting and multiple "bolt holes" or hiding places.

All botiine loaches are schooling fish and should under no circumstances be kept in solitude. A school of 6+ individuals is preferred. *Botia* can be quite aggressive amongst themselves and groups which are too small may result in one member of the group being picked on excessively, whereas larger groups spread aggression throughout the ranks without any one member being bullied too much. When schools are too small there is also a risk that aggression will spill from the group out to other occupants of the tank. Each group of *Botia* has an "Alpha" loach, usually the largest in the group. *Botia* have quite a complex social structure and it is fascinating to watch them interact, especially in larger groups.

Tank mates for *Botia* should be selected with care. Ideal tank mates for loaches would be other loach species or robust schoolers such as tiger barbs, danios or larger tetras. Rainbowfish could also be mixed with success, although these prefer a higher pH than that liked by loaches. Long finned fish such as bettas or angelfish have been mixed with *Botia* with varying levels of success. While some groups of loaches may ignore their long finned tank mates, others have been known to nip fins on occasion.

Clown loach - *Chromobotia macracanthus*
Photo: CE Timothy Paine

Yoyo Loach - *Botia almorhae*
Photo: Kyle D

Loaches are also very boisterous when they play and feed and this can cause stress for some slower moving fish. Care should be taken especially when mixing *Botia* with other bottom-dwellers. When keeping loaches with *Corydoras* catfish I noticed the loaches would repeatedly frighten the docile cories away from food and stress them to the point where they hid almost constantly, however other aquarists have kept cories and loaches together peacefully.

Loaches are generally very unfussy eaters and will eat just about anything. A good quality sinking pellet type food should be provided as a staple, but can be supplemented with a range of live or frozen foods such as mosquito larvae or brine shrimp, and vegetables such as cucumber or courgette. My loaches also enjoy sinking algae wafers and get particularly excited over carnivore pellets. Snails are also greatly appreciated and will be eagerly de-shelled and eaten. Only Malaysian Trumpet Snails seem to be able to survive an onslaught of hungry loaches.

Clown Loach - *Chromobotia macracanthus*

Easily the most popular and frequently sold loach available in New Zealand, clowns are also the most unsuitable for the average aquarists tanks. Reaching 30cm or even larger, clown loaches should be considered a specialty fish and really require a tank with a 1800mm x 600mm footprint minimum as their adult housing -- preferably larger. They are slow growers however, and a 1200mm tank is suitable for growing out juveniles. Clown loaches are often sold to beginners as a cure for a snail problem, or simply because of their striking orange and black colouring, and many unwary buyers are oblivious to this fish's impressive full size

and demanding tank requirements. Despite their size clowns are one of the more docile botiine species and get on well with most peaceful community fish in a large enough tank.

Yoyo Loach - *Botia almorhae*
My personal favourite, yoyo loaches are so named for their juvenile pattern which looks similar to the letters "Y" and "O". As they age their striking markings change drastically and become tightly reticulated -- patterns vary greatly and no two yoyos are quite the same! Also sold under the name "Pakistani Loach", or under the outdated Latin name *Botia lohachata*. Yoyos rarely exceed 15cm and should have a tank no smaller than 1.2m long. Yoyos are one of the more aggressive species of loach and should definitely not be mixed with anything long finned or sensitive.

Polka Dot Loach - *Botia kubotai*
Also known as the Angelicus (after the *Angelicus Synodontis* catfish which sports similar markings) or Burmese border loach. Juvenile Polka Dots display distinct black bars on a white background. As they mature the black fills in to form an attractive polka dot appearance -- hence the name. Polka Dots reach a maximum of 15cm but closer to 12cm is more common. Generally a peaceful species, although like all loaches they can squabble amongst themselves and care should still be taken when selecting tank mates. A 1.2m long tank is the smallest that should be considered.

Polka Dot Loach - *Botia kubotai*
Photo: Rafael Medina

Striata Loach - *Botia striata*
Known alternatively as the zebra or candystripe loach, striatas are probably the loach which is most suitable for the average aquarist's setup. In my experience it is the most peaceful member of the botia family and grows to a sensible 10cm. Due to their peaceful nature striatas are much easier to stock in a community tank, but even these can prove too boisterous for very sensitive or slow fish. It sports attractive narrow gold and black alternating stripes.

Skunk Loach - *Yasuhikotakia morleti*
Though technically no longer a Botiine loach since it was removed from the *Botia* genus and moved to *Yasuhikotakia*, I feel skunk loaches still deserve a mention. Skunk loaches reach only 10cm in size with attractive skunk-like markings. These fish pack a punch however and are NOT suitable for the average community aquarium. Notorious for being relentless fin nippers and hounding their tank mates to the point at which they die of stress. Probably really only suitable to be kept with other more robust loach species such as Yoyos or Blue Redtail Loaches (*Y modesta*, a cousin of the skunk loach which is relatively uncommon in dealers tank and attains an adult size similar to that of the clown loach).

Striata Loach- *Botia striata*
Photo: Robert Beke

Dwarf Chain Loach - *Ambastaia sidthimunki*

Like skunks, dwarf chain loaches - or simply dwarf loaches - are no longer technically considered a botiine loach. Originally placed under the Botia genus, then moved to the *Yasuhikotakia* genus before being placed in the *Ambastaia* genus. They reach a diminutive 6cm and are much more suitable for smaller tanks than their larger cousins. However I would still recommend a minimum for 900mm swimming space to keep this active swimmer content. Dwarf loaches have the interesting habit of shoaling out in the open mid-water, unlike other loach species which prefer to hang out on the bottom. I found dwarves to be much less shy than other loach species and made up for in activity what they lacked in size. As with other species, beware anything long finned or overly docile -- I found my dwarf chains particularly interested in harassing my cories. Sadly dwarf chains are nearly extinct in the wild and individuals in the hobby are usually captive bred -- although how is a mystery, as there is no record of dwarf chains ever breeding in the home aquarium.

There are several other species of *Botia* occasionally available in the hobby which I have not mentioned such as the Golden Zebra Loach *Botia histrionica* and the Queen Loach *Botia dario*

NZ NATIVE

Torrentfish (Māori: Panoko)

Torrentfish - *Cheimarrichthys fosteri*
Photo: Blueether

As their European name suggests, torrentfish *Cheimarrichthys fosteri* often live in swift flowing rapids. They are superbly adapted to life in fast water with a flattened head and very large pectoral fins, which help to keep them on to the bottom, and a powerful square tail to enable them to dart from stone to stone. Torrentfish are a relatively small (commonly to 100-125mm) typically grey to grey-brown fish with a dark band through the eyes, three diagonal dark bands on the body, and a fourth just in front of the tail. Their cryptic colouration and fast water habitat means they are seldom seen but they are widely distributed, and at times common, in low elevation stony rivers and streams throughout mainland New Zealand. Torrentfish eat mainly aquatic insects and they are thought to move to quieter waters at night to feed. Their life history is not well understood but adult female torrentfish tend to live further upstream than males so they must migrate to spawn. They are thought to spawn in freshwater near the coast and the resulting larvae carried out to sea by the current. Over spring and summer small juvenile torrentfish (20-25 mm) move into river mouths where they are sometimes captured by whitebaiters.

These delightful fish can be kept in freshwater native aquaria providing a strong current is provided. There is excellent information on how to keep torrentfish in 'The New Zealand Native Freshwater Aquarium' by Stella McQueen.

Darren Stevens

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NZ
NATIVE

Blue Cod
a saltwater cousin of the Torrentfish

Blue cod
Photo: Peter Marriott, NIWA

It may seem hard to believe but the freshwater torrentfish and the saltwater blue cod or *Parapercis colias* (Māori: Pākirikiri, Rāwaru) are related and were formerly placed in the same family Pinguipedidae (sand perches or weevers) - a family of almost exclusively bottom living marine fish. Torrentfish are now sometimes placed in their own family (Cheimarrhichthyidae) but nevertheless they share a number of common characters.

Blue cod are also only found in New Zealand and are one of our best known recreational and commercial fish species with over 2000 tonnes being landed commercially each year. They are found throughout much of New Zealand from shallow water out to about 150 metres and are usually found on or

alongside open reef areas. They are more common and larger south of Cook Strait and can grow to about 60 cm in length and around 4 kg in weight. Blue cod can live for up to 32 years, although fish over 15 years of age are rare. They eat a wide range of bottom living animals and small fishes. Their colour varies with size and sex. Juveniles (to about 10 cm) are whitish with two broad brown to black bands along their sides. As they grow these bands fade to pale brown and become less distinct. Larger adults are often blue-grey with a white belly. Large blue cod can be strongly territorial and not all blue-grey fish are males. Interestingly some females can change their sex to become males although not all males start their life as females.

Blue cod are inquisitive and will often approach divers and bite their fingers or ears and dive gear. Smaller specimens are great subjects for large saltwater aquaria and they can become remarkably tame.

There are two other sand perches known from New Zealand waters. The yellow cod *Parapercis gilliesi* grows to about 35 cm and is found only in New Zealand waters. It is uncommon but widespread in

Yellow cod
Photo: Peter Marriott, NIWA

50 to 400 metres depths. The smaller rarely observed redbanded weever *Parapercis binivirgata* has paired reddish-brown bands along the body and yellow fins. It is found in 100 to 300 metres in northern New Zealand and southeast Australian waters and grows to about 20 cm.

Darren Stevens

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Ken Wong

A passion for discus'

by Adrienne Dodge

I first met Ken early this year when on the search for a White Diamond discus.

Ken moved to New Zealand from Hong Kong with his parents ten years ago. New Zealand seemed like a good country to come and live in and they had family over here.

Three years ago Ken decided he was going to keep, and hopefully breed, beautiful discus. Fishkeeping was totally new to him; in his homeland he had never ever kept fish. When I asked why he chose discus, as they are not generally regarded beginners fish, Ken told me that in New Zealand discus are very easy to look after and breed. The water here is very good compared to the water in Hong Kong and the fish are happy. They grow well and are healthy. He also has a friend here who keeps and breeds these fish and who was happy to help and teach him along the way.

Photo: Ken Wong

Ken and his father converted their garage into a fishroom. It is not lined with polystyrene as many fish rooms are - it is still the original concrete block wall. Polystyrene is only placed over the small windows to stop natural light getting in to the room. On the day I visited it was a cool 11°C outside, yet the room itself was about 26°C and humidity was at 75%, with two large dehumidifiers keeping the moisture level down.

There are 26 discus tanks in the fishroom, all sitting on wooden powder blue stands, built and painted by Ken and his father. Sponge filters provide the filtration in most of the tanks. Water changes are done 2-3 times a week and are semi automated. Each tank has piping leading from it to a central pipe line, with taps allowing individual tanks to be emptied one at a time if required. Re-filling is done from a large barrel via a pump and hose.

Ken has a variety of discus in his fishroom; Rose Red, Blue Turqs and Blue Diamonds to name a few. Some of his breeding pairs are around 15 -16cm in size. He says his breeding pairs spawn constantly, but after raising each lot of fry he separates and conditions the adults before returning them to their tank to spawn again. Fry of varying sizes are kept in smaller tanks and there are a number of larger grow-out tanks in the room, some with discus up to 10cm in them.

For a still relatively new fishkeeper, Ken has certainly achieved his aim of keeping and breeding beautiful discus.

Photo: Ken Wong

Photo: Ken Wong

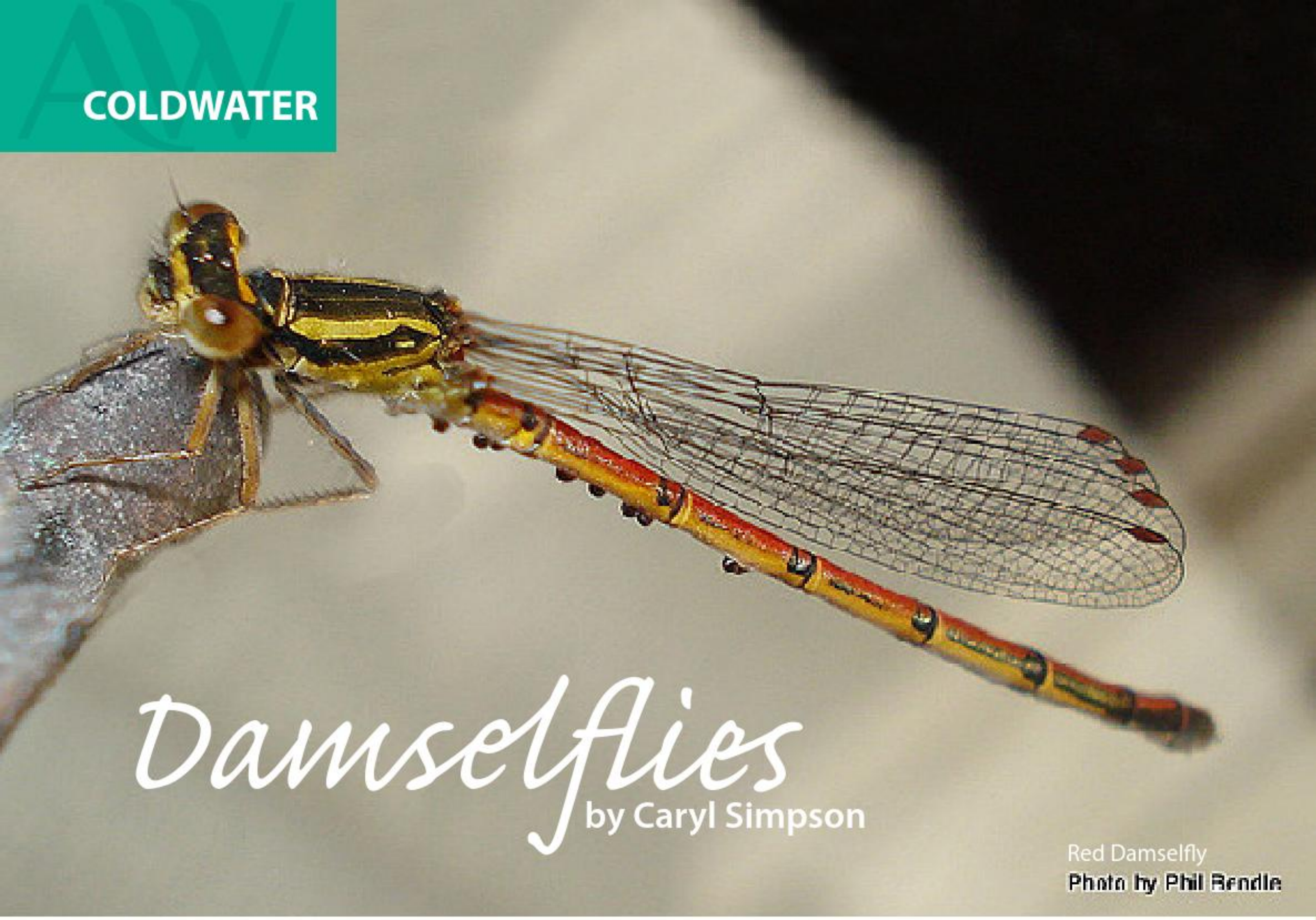
Beautiful but Deadly

The black spotted puffer *Arothron nigropunctatus* is found in tropical waters from the Indian Ocean to the central Pacific Ocean where its lives in lagoons and on reef edges to about 25 metres depths. It grows to about 30 cm and feeds on a wide range of invertebrates, including crustaceans and molluscs, sponges, algae, and coral-like *Acropora* polyps – the latter habit makes it not suitable for reef tanks. Black spotted puffers are highly variable in colour and can range from grey to blue to white to yellow. As with all puffers (family Tetraodontidae) the black spotted puffer can inflate its body and also secrete an extremely toxic poison, tetrodotoxin, to protect it from predators.

Photo: Ali Majdfar

Damselflies

by Caryl Simpson



Red Damselfly
Photo by Phil Rendle

While not technically a fish, damselflies are a common pond inhabitant. They are a delight to look at and their nymphs also provide a good food source for fishes.

New Zealand has 6 native damselflies but the most common is the red damselfly or Kihitara *Xanthocnemis zealandica* and it is found throughout the country. The largest we have is the blue damselfly or Tiemieme *Austrolestes colensoni*.

The Order Odonata is divided into two suborders, the Anisoptera containing the dragonflies, and the Zygoptera containing the damselflies. Odonata insects closely resemble the oldest flying insects known from fossils and some of these were very large, with one species having a 71cm wingspan!

Only the male blue damselfly is actually blue, the female is greener.

The Order Odonata is divided into two suborders, the Anisoptera containing the dragonflies, and the Zygoptera containing the damselflies. Odonata insects closely resemble the oldest flying insects known from fossils and some of these were very large, with one species having a 71cm wingspan!

It is easy to tell a damselfly from a dragonfly by the way they hold their wings - damselflies fold them up over their body when they land while dragonflies hold them open. Dragonflies are also larger, with a very rapid flight, and can have a wing span up to 13cm but the most common species are smaller and measure about 8cm across the wings. Damselflies are smaller again and more slender in the body with hind wings similar to the forewing. The hind wing of a dragonfly broadens near the base at the body. Damselflies are weaker fliers than dragonflies, and their eyes are separated.

The nymphs of the two look different too. Damselfly nymphs have gills that look like 3 fins at the end of the abdomen but dragonfly nymphs suck water into their abdomen and move it over their internal gills.

Damselflies are found around ponds and lakes and lay their eggs into, or close to, water. They are not good indicators of water quality as they are common in both polluted and unpolluted waters.

The nymphs are aquatic, with only a few exceptions. They are carnivorous, feeding on daphnia, mosquito larvae, and various other small aquatic organisms and are easy to spot as they look like wingless damselflies wriggling through the water.

A damselfly lifecycle is termed an incomplete metamorphosis, or hemimetabolism, because it does not have a pupal stage. It simply climbs out of the water when it is ready to fly, and after a drying out period its outer skin splits down the middle and the insect wings are revealed. This is why the immature forms are referred to as nymphs. A nymph's overall form resembles that of the adult and never enters a pupal stage whereas larvae do not resemble the adults and do have a pupal stage. The nymphs of aquatic insects are also called naiads which is the ancient Greek name for mythological water nymphs.

Damselfly nymph
Photos: Caryl Simpson

The adults are expert predators that often capture prey while flying. Damselflies eat flies, mosquitoes and other small insects. They are very territorial, chasing other damselflies from their territory.

The adult stage has a pre-reproductive period that may last up to three weeks. At this stage the colour of the wings and body may change and the adults may disperse from their emergence point. Damselflies will also change their colour to regulate their body temperature, going darker to receive more warmth, and 80% of their brain power is devoted to processing visual images. The

Blue (left) and Red Damselflies
Photos: Phil Bendle

reproductive phase may involve males establishing territories which are protected against other males of the same species.

Damselflies mate in flight and united pairs flying in tandem are often seen over water. Copulation involves the male grasping the female by her neck using his tail claspers and the two then fly in tandem. They alight on a leaf and the female then curls her abdomen up under the male's body and attaches it to his second abdominal segment where the sperm is stored (having been manufactured in a segment near the tip). The female's body pulsates while the sperm is transferred from one to the other. When the sperm is safely within the female she uncoils her abdomen and the two fly off, still joined, to lay the eggs in the stems of aquatic plants, on logs, or directly into water.

Egg laying involves the complete submergence of the female underwater while still joined to the male, who just manages to keep his head above water. The resultant nymphs live in water and only the adult stage is non-aquatic.

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FISH MINI PROFILE

White cloud mountain minnows

White cloud mountain minnows *Tanichthys albonubes* or WCMM are an attractive, popular and easy to keep fish. They grow to about 4 cm and are native to small streams in China. They are endangered in the wild but thankfully they are easily bred in captivity. WCMM are best kept in schools with other small peaceful fish and do well at temperatures of 18–26°C. They can survive for short periods in temperatures as low as 5°C although this is not recommended. They are also available in golden and rosy varieties and all varieties can be long-finned. Photo: Robert Beke

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FISH PROFILE

Paracanthurus hepatus

Photo: Wayne Lilley

Paracanthurus hepatus **(Regal Tang, Blue tang, Blue hippo tang, Blue Surgeonfish)**

Classification Order: Perciforme

Family: Acanthuridae

A member of the surgeonfish family, the blue tang has been popularised by the movie "Finding Nemo" in which the character, Dory, was a regal tang. The surgeon name refers to two sharp spines that stick out of the caudal peduncle. These spines are easily tangled in nets.

The body is a beautiful blue with a black swirl. The caudal fin is yellow with a black edge along its margins.

Distribution: Found throughout the Indo-Pacific and seen in the reefs of East Africa, Japan, Samoa, New Caledonia and the Great Barrier Reef at depths between 10 - 40 metres, the blue tang is one of the most popular marine fish throughout the world. Although they are not common in any one area this species has such a wide range that the IUCN does not consider them in danger.

Juveniles tend to be found between 1 - 3 metres over the reef in areas with *Pocillopora eydouxi* as they use the branches of this coral as hiding places.

Habitat: On the coral reefs with high water currents, the blue tang rests in narrow holes and crevices protected from predators such as tuna and tiger groupers. These reefs also provide plant algae, necessary as food.

Maximum Length: 30cm

Life Span: 5 years or longer

Aquarium Size: A minimum sized tank of 285 litres is required for a single blue tang, as these fish love to swim. Provide plenty of live rock as cover as these fish are used to hiding among coral branches.

Paracanthurus hepatus

Maintenance: The Blue Tang is a popular aquarium fish despite it having a reputation as being fairly fragile and prone to parasitic infections and lateral line disease - making it a fish that is not suitable for beginner marine keepers. It is important to acclimate new fish properly. There is quite a bit of debate about whether you should quarantine your new blue tang, which causes further stress. Many marine keepers will suggest that you choose your new fish carefully, picking one that looks alert, does not look thin, and is over 7.5cm in length.

Water Conditions: These fish will not do well in a tank that is not fully cycled before their introduction. Mature, very clear and highly oxygenated water is a must so extra powerheads may be required to increase surface agitation.

Temperature: 22 – 25.5°C

pH: 8.1 – 8.4

Hardness: dkH 8 – 12°

Diet: As a juvenile, its diet consists primarily of plankton. As an adult it becomes omnivorous eating meaty foods along with the other fish in the aquarium and will also feed on plankton and graze on algae. A source of spirulina is required, the most common being marine seaweed attached to the side of the tank using a vege clip. This will help the fish retain its colour, strengthen its immune system and improves its overall health. Mysis shrimps, grindal worms, brine shrimp and flake food can be fed. It is best to feed small amounts several times a day. Poor nutrition is a major reason for losses.

Behaviour and Compatibility: The *Paracanthurus hepatus* is one of the more peaceful tangs and may be picked on by other tangs in the tank. These fish do not do well with other surgeonfish, particularly other blue tangs, so if you wish to keep more than one provide a tank with a minimum size of 380 litres and introduce all the fish at the same time. Be prepared however to have to separate the fish so have spare tanks handy. A lot of territorial aggression can be reduced if the tank size is large enough. In a natural habitat mature blue tangs are solitary fish, only forming small 'harem' groups for mating.

Sessile invertebrates and snails in the tank will be largely ignored by the blue tang, as will most other species available. Sea horses and pipefish will not.

Reproduction: The blue tang reaches sexual maturity at 9 – 12 months of age. It is very difficult to determine the differences between males and females. Spawning normally occurs in February or March during the late afternoon or evening. This event is indicated by a change in the male's colour from dark blue to pale blue and the female's black colour fades to grey. Males are aggressive in their courting of the females, which leads to an uphill rush, at which time eggs and sperm are released in to the water. The eggs are small, less than 1mm, and are pelagic, each containing a small drop of oil for flotation. The eggs hatch in 24 hours.

To date there are no known successful breedings in a home aquarium.

Adrienne Dodge

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www.reefkeeping.com
www.liveaquaria.com
www.theaquariumwiki.com

HOW TO

When it's time to say goodbye

At some point, most fishkeepers will have to deal with caring for a sick or injured fish, and if recovery is unlikely, we may also have to consider making a decision to end its life. While this is not always an easy decision, it is an important part of being a responsible fishkeeper so it is useful to know about how to provide a humane and dignified death.

The term used to describe ending the life of a pet fish is known as euthanasia and it is also used when describing assisted death in zoo or research animals. In contrast, the term slaughter is used to describe ending the life of fishes destined for human consumption and an additional term humane killing is used to refer to ending the life of fishes captured for sport, eradication or sampling.

There are many circumstances when we might consider euthanising a fish including ending perceived suffering of a sick or injured fish, minimising cross contamination between sick and healthy fish, or even reducing workload and expense if the fish is unlikely to get better but is taking extra time and money to care for.

Caring for pet fishes is a significant responsibility and there is legislation in the form of the New Zealand Animal Welfare Act 1999 that outlines owner obligations to meet the physical, health and behavioural needs of captive animals in accordance with both good practice and scientific knowledge (Ministry for Primary Industries, 1999). Fishes are included in the Act (Section 2.1a) so assertions about welfare and humane treatment of captive animals also extend to fish (Parliamentary Counsel Office, 2014).

Unless exempted, all animals covered by the Act have a right to:

- proper and sufficient food and water;
- adequate shelter;
- the opportunity to display normal patterns of behaviour;
- appropriate physical handling; and
- protection from, and rapid diagnosis of, injury and disease.

In addition, the Act also covers some points about assisted death:

- It is illegal to kill an animal in a manner that causes unreasonable or unnecessary pain or distress (Section 12c)
- Injured or sick animals should be euthanised without delay to minimise pain and suffering (Section 138)

Many methods are used for euthanising fish but even some of the most common methods may be deemed inhumane according to national and international standards. One challenge with establishing set recommendations for euthanising fish lies in the differing ways that fishes are treated depending on whether they

are for human consumption, sport, research, etc. In addition, the low economic value of many fish combined with disinformation and insufficient knowledgeable aquatic veterinary services means that many hobbyist fishkeepers are unlikely to seek veterinary attention for fish when euthanasia is needed. Instead, fishkeepers often turn to advice from other aquarists, who may also be misinformed of correct methods and technique.

Another problem with establishing clear euthanasia guidelines for fishes is due to an uncertainty about how fishes experience pain. Scientifically, there is still a great deal of debate on whether fishes feel pain. We know that fishes don't feel pain as humans do, but we also do not fully understand how they experience pain, so it is possible that they are capable of suffering in a different way (ScienceDaily, 2013). What is certain is that there is considerable scientific evidence verifying some pain perception in fishes so it is appropriate to consider euthanasia methods which reduce pain and suffering (p.68 AVMA 2013). The vast majority of animal welfare laws around the world support this assertion.

In terms of what methods are best for euthanising fish, in New Zealand we must look abroad as the New Zealand Veterinary Association (NZVA) does not include fishes in their Guide to Euthanasia (NZVA 2005). However, the NZVA does refer readers to the comprehensive American Veterinary Medical Association (AVMA) Guidelines for the Euthanasia of Animals 2013. This guide extensively details the benefits and drawbacks to each euthanasia method (AVMA 2013).

The AVMA Guidelines stipulate euthanasia of fishes should be carried out rapidly and with the minimum amount of pain and distress possible. Choosing a quiet, darkened environment is best to reduce stress. If water will be used for transport or an immersion method, stress can be reduced by using similar water to what the fish was living in (e.g. tank water, assuming it was habitable).

There are a number of suitable methods available summarised in Table 1.

In addition to acceptable euthanasia methods, the guide outlines methods that are not acceptable under any circumstances. These include:

- Flushing of fishes down the toilet, depositing them down the drain, or releasing them into waterways – not only can these methods lead to prolonged suffering of the fish, but they can also increase the risk of introducing pathogens to aquatic organisms in waterways.
- Slow chilling or freezing of unanaesthetised fishes is not humane and leads to unnecessary prolonged suffering which is an offence under the Animal Welfare Act.
- Suffocation due to removal from water/ desiccation – as above, this leads to unnecessary prolonged suffering which is an offence under the Animal Welfare Act.
- Unnecessary exposure to caustic chemicals - leads to unnecessary prolonged suffering which is an offence under the Animal Welfare Act.
- Any method that employs prolonged traumatic injury prior to unconsciousness

Whether your reasons for euthanasia are to remove an infectious risk from your tank, or to end the fish's suffering, it is important to take the task seriously and use the best method. Considering the varied techniques and skill required for many of the acceptable methods, in this article, we will focus on one of the easiest and most reliable methods which is immersing the fish in a solution of clove oil (eugenol, isoeugenol).

Clove oil is an essential oil commonly used in human dentistry as an anaesthetic. It is readily available over the counter at pharmacies, is relatively low cost, and the bottle lasts a long time as very little is used each time. Only a few drops are required and the procedure is quick and non-eventful. The concentrated oil is a skin irritant so take some care when handling, but otherwise the oil is safe and not hazardous to human health.

Procedure for euthanising a fish using clove oil (eugenol)

1. Obtain a suitable container to hold the fish in the clove oil solution. The container should not be one that will be reused for human food and it should be of dimensions to allow the fish to rest upright and swim around briefly.
2. Fill the container with just enough water to hold the fish upright. The water should be similar temperature and chemistry to tank water. Aim for about 1 litre of water per 3-4 cm of fish length. You can use more water for thicker bodied fishes but will have to add more clove oil as well.
3. Immerse the fish into the water, then, add about 3-4 drops of clove oil for each litre of water in the container.* The oil will slowly dissolve into the water and the fish will quietly and slowly become sedated. Cover the container to prevent the fish jumping out during this time and avoid bumping the container as stress will prolong the sedation time.
4. Leave the fish in the liquid for an hour. After the first 10 minutes the fish will stop swimming and have trouble keeping upright but will be responsive to stimuli. After 10-20 more minutes, the fish will stop responding to stimuli and opercular/gill movement will cease (an indication of no breathing). The fish may also become dark in colour and may float upside-down. About 10 minutes after breathing stops, there will be brain death. As fish vary in their physiology, it is best to keep them in the liquid well past signs of any movement.
5. Once the hour is up, remove the fish, wrap it in paper and dispose of it in the rubbish. Pour the leftover clove oil down the drain and rinse out the container.

*The dose of eugenol required to euthanise a fish is approximately 100mg/L and achieving this depends on a number of factors. It is generally accepted that high quality clove oil contains about 1 gram of eugenol per millilitre. Assuming an average of 10 drops per millilitre, and the fact that eugenol is not very water soluble, 3-4 drops of clove oil per litre should be more than enough to deliver a lethal dose.

Jennifer Hamlin

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Table 1: AVMA approved methods of euthanasia in fishes			
Method	**Requirements**	**Procedure**	**Limitations**
Injectable medications	Pentobarbital, ketamine, etc.	Overdose injection of anaesthetic agents	Veterinary-only
Immersion method	MS 222 (Tricaine), Aqui-S (isoeugenol), Clove oil, etc.	Add medication to a small amount of tank water and immerse the fish into the mixture until the fish loses consciousness and eventually stops breathing.	Medications are veterinary-only with the exception of clove oil. The fish must be left in the solution long enough to establish brain death.
Physical method (blunt force trauma)	Instrument to apply rapid blunt force	Cranial concussion with an accurately placed blow to the head, followed by pithing of the brain.	A blow to the head may only cause unconsciousness, not death, especially in larger fishes, so pithing should always take place afterward and this requires training to do properly.
Physical method (full or partial decapitation)	Sharp knife to sever the head	The fish's head is partly or completely severed from the body followed by pithing of the brain.	Decapitation doesn't always cause instant brain death, especially in fishes that can tolerate low oxygen levels, so pithing should always take place afterward and this requires training to do properly.
Physical method (maceration)	Suitable sized macerator	The fish's entire body is pulverised and the brain is killed instantly	Produces instant death but the size of the macerator is important as it must be large enough to pulverise the fish's brain instantly
Physical method (captive bolt)	Captive bolt gun	The brain is shot with a bolt to cause instant brain death	Bolt guns are used with livestock and very large fishes
Physical method (hypothermal shock)	Ice water 2-4 C	Immerse fish in ice water bath that is between 2- 4 degrees Celsius.	Water must be cold enough to make the fish unconscious immediately.
Secondary method (adjuct method)	Varied	Decapitation, freezing, pithing or other physical method	Unconsciousness must take place first before the secondary method is used to produce death.

INTERESTING IMPORTS

Kuhli loach
Photo: Robert Beke

The following are a selection of the more unusual or rarely imported fish on the importers lists. As with any new fish purchase it is worth doing some research first.

If you thought you might give rainbowfish a go after reading our feature article then why not try a western (red-tailed) rainbow, red furcatus (forktail) blue eye, or Gertrude's blue eye. And if loaches are more to your liking then kuhli (banded, half banded or giant black), zodiac *Mesonoemacheilus triangularis*, or horseface *Acantopsis choirorhynchos* loaches are nice options.

Killifish can be hard to get hold of, Foers notho *Nothobranchius foerschi*, Patrizi's notho *Nothobranchius patrizi* and Clown Killies *Pseudepiplatys annulatus* are now on the importers lists.

Clown killiefish
Photo: Diane Wilkie

Gouramis are available in a wide range of colours and sizes. Banded and thick-lipped (in orange and marigold varieties) gouramis are a little different, or if you are after a challenge try a chocolate gourami.

Dwarf cichlids have a loyal following. Rams *Mikrogeophagus ramirezi* are available in blue, golden and electric blue, or as gold head or electric blue balloons, or long-finned veiltails.

Male Blue Ram
Photo: Diane Wilkie

Also on the importers lists are two lovely *Apistogramma*: double red agassizi and super red cockatoos, and the striking blue neon Nannacara.

On the catfish front, the tiny active shoaling Rio Salinas cory *Corydoras habrosus* and rarely imported Aldolfo's cory *C. adolfoi* are available, as are the diminutive and unusual Indian moth catfish *Hara hara* and the robust hoplo cats *Megalechis thoracata*. And finally if you are after something special and have a very large tank then the spectacular carnivorous leopard cactus pleco (on the Feb 2014 cover) are now available.

The editorial team

Apistogramma agassizi
Photo: Jennifer Hamlin

Blue Neon Nannacara
Photo: Craig Hewson

Tiger Lotus - *Nymphaea lotus*

Red and Green Tiger lotus
Photo: Jennifer Hamlin

Many people will have seen water lilies in outdoor ponds. These are hardy *Nymphaea* hybrids developed primarily for their beautiful flowers and can be grown throughout most of New Zealand. There are also a few impressive tropical water lilies, one of which the tiger lotus (*Nymphaea lotus* – sometimes also called *Nymphaea maculata*) is small enough to be kept in larger tropical freshwater aquaria. They are native to West Africa and despite their common name they are not a lotus (Genus *Nelumbo*) but a water lily. Tiger lotus come in two varieties: the regular green-leaved tiger lotus, a beautiful plant in its own right, and a much rarer red-leaved variety. Under good lighting the leaves of both forms are flecked with maroon, red, purple, or brown (presumably hence the common name) while the undersides are purple. Although not as robust as the more commonly seen hardier varieties they can tolerate temperatures of 21°C to 29°C and pH's of 5 to 8 although they prefer softer water. Under good conditions they can grow to over 60 cm in height and the surface leaves can grow to well over 20 cm across.

Like other water lilies as they grow they will soon send leaves to the surface. If you prefer a more compact plant then remove the surface leaves. This will encourage the plant to send out shorter stemmed leaves. If you are happy to let the leaves go to the surface then the plant will get a lot more light, increase in size, and may produce a beautiful aromatic but short-lived white flower with a yellow centre.

I have been keeping regular tiger lotus for several years and I still enjoy seeing them flower. I don't prune the surface leaves unless they are starting to look tatty and I use slow release JBL fertiliser balls to encourage growth and flowering. I remove the flowers once they are past their best otherwise the plant will use a lot of energy producing a seed pod. If you want to try growing them from seed let the seedpod develop. It will eventually open into the water and cover the substrate in small seeds, and you will end up with a carpet of small seedlings.

I tried keeping the red-leaved variety but unfortunately my tiger plecos (*Panaqolus* sp. L002) found it very tasty and it ended up an expensive snack. My tiger plecos don't do much damage to regular tiger lotus, mainly nibbling on the older leaves, and being algal and wood eaters they produce a lot of topsoil which no doubt benefits the tiger lotus.

I keep my tiger lotus in a relatively small tank (140 litres) with a deep bed of gravel and T5 fluorescent lighting (2 x 24 watt tubes). Despite a relatively confined space my tiger lotus produces regular pups, flowers fairly regularly, and covers the water surface with large leaves and the gravel bed with an impressive network of roots. The mother plant is potted in a hydroponic pot filled with coarse gravel. Hydroponic pots are great as they have numerous small slots which allow the lotus to send roots out of the pot as it grows. If I need to strip down the tank I just pull the pot out of the substrate, trim the tips of any damaged roots, and replant it in a new tank. It's tough love but mature plants seem to handle it. However pots look a little crude in a nicely panted tank so if you have a good bed of substrate that should be fine.

Darren Stevens

References:

Hiscock, P. (2003). Encyclopedia of Aquarium Plants. Barron's Educational Series. 208 p.
Wikipedia https://www.wikipedia.org
Tropical Fish Hobbyist Magazine http://www.tfhmagazine.com

Photo: Darren Stevens

FNZAS Conference 2014

dunedin

APRIL 12 & 13

This year's FNZAS conference was hosted by the Dunedin Aquarium and Pond Society (DAPS). Our thanks go out to DAPS club member Shona Downs who billeted one of the executive and did much of the organizing for what was a very enjoyable and productive conference. She also helped write this article.

Conference started on Friday night when attendees 'got together' at Shona and Stephen's house. Not surprisingly, much of the conversation revolved around fishkeeping. The weather was a bit on the chilly side (ask Darren!) which did not interfere with attendance numbers.

The next morning the AGM and executive meeting were held at Animal Attractions, a local pet shop. This can be verified by all those members on Skype who commented on the chattering (screaming) of a parrot in the background! Many thanks to Animal Attractions' owner Judi for the use of the premises and for kindly supplying morning tea and lunch. We had a good attendance from the Dunedin club plus four delegates, Jennifer Hamlin, Adrienne Dodge, Darren Stevens, and James Butler. James arrived and departed by goods train after confusing us all as to how he caught a train to Dunedin. This has to be one of the more unusual forms of transport used to attend the conference. A number of other executive members and delegates were able to 'attend' the meeting via Skype.

After a productive AGM and executive meeting, we headed off to the Otago Museum for a visit, which was well received by all, and then on our mystery tour of the Department of Zoology at the University of Otago. Thanks to Kim Garrett who kindly agreed to give us the tour. The Zoology Department holds a number of aquatic species including southern bell frogs, large striped leeches, freshwater crayfish and giant kokopu (the adult form of one of the whitebait species). Giant kokopu are being bred at the Zoology Department as part of their research. A number of long-finned eels were also housed in several circular fibreglass tanks, a project

which is the responsibility of Mark Lukman (a former member of the Dunedin club). Mark has been able to breed these eels in captivity.

After our visit to the Zoology Department Darren was given a guided tour by Shona to Rotary Park (views of Otago Harbour and Forsyth Barr covered stadium) plus a closer look at the stadium. Darren was also shown where the Hyde Street party was in progress then out to St. Kilda and St. Clair beaches. The evening meal was at Robbie's Bar & Restaurant. All who attended enjoyed the meal and evening. Entertainment in the evening was with the Silver Peaks Country Music Club (of which Shona and Stephen are members).

Sunday morning saw a sunny day for all departing visitors. Darren was once again given a personal tour, this time of Mosgiel and Taieri on the way to Dunedin Airport.

The Dunedin Aquarium and Pond Society would like to thank everybody who had an involvement in the conference. The Dunedin club found a positive in what the Federation has to offer clubs in New Zealand. Clubs will still be there, irrespective of any new conference format. Our thanks to all those 'fishy people' who give their time to run, and be a part of, the Federation.

Happy Fishkeeping,

Shona & Colin

Photos: Liam Slattery

SHOP TOUR

Photo: Craig Hewson

The Pet Centre Lower Hutt

28 Rutherford Road
Lower Hutt
04 569 8861
http://thepetcentre.co.nz

Hours: 9am – 5:30pm daily (open to 9pm Thursdays)

Facilities: 17 tropical freshwater tanks
9 cold freshwater tanks
4 tropical marine tanks

The Pet Centre, Lower Hutt is one of four 'Pet Centres' in the Wellington Region: the others being Porirua, Upper Hutt and the recently opened Thorndon shop. The Lower Hutt pet shop is the largest of the four shops and is located in the Harvey Norman Centre just off the Melling Bridge. The shop stocks a good range of pets and pet supplies in a spacious, well laid out, and tidy store. The tanks always look clean and well maintained and they have a fish keeper on every shift.

The coldwater section holds a good variety of goldfish, white cloud mountain minnows, axolotyls, and frogs (and/or tadpoles). The small bell frogs are nicely displayed in a well planted terrarium and information is provided on their lifecycle and care. The tropical marine tanks are alongside the cold water tanks and include a small red sea max display tank. Although relatively small, the marine section stocks a good selection of corals including frags, fish, and a few invertebrates.

The freshwater tropical section comprises 15 x 200 litre tanks in 3 tier racks and includes the majority of the fish in the store. Along with a great range of popular community tank species (guppies, platies, swordtails, mollies, danios, rasboras, tetras, etc.) the shop has a tank with mainly African lake cichlids and another with larger cichlids species (including *Geophagus*, redhead cichlids, and blue jack dempseys). There are also two large 1000 litre display tanks: one showcasing a great range of larger discus and angels, and the other housing the more boisterous larger species including a large jack dempsey, some good sized African cichlids, an


Photo: Craig Hewson

extra-large banded leporinus, and the odd large sailfin pleco (i.e common, red spot or goldspots). If you are after something special then they also have a few rarer and/or oddball species. On the day I visited they blue neon Nannacara, cuckoo catfish, silver and marbled hatchetfish, Indian moth catfish (*Hara hara*), and a few fancy plecos including a royal pleco, queen gold nugget, blue phantom, king tigers (L066) and chocolate zebras (L270). If you are after something they don't have then ask and they may be able to get it in for you.

The Pet Centre also has a good range of tropical plants available and a good selection of aquarium supplies that will cater to most needs. If you are in the area, this shop is well worth a visit. They have a great range of fish and the staff are friendly, helpful, and happy to answer questions.

Interesting species

Smudge spot cory *Corydoras similis* $22
Rams (several varieties) $25–$42
Silver and marbled hatchetfish $36
Blue neon Nannacara $38
King tiger pleco *Hypancistrus* sp. L066 $49.90
Discus (several varieties) $75–$208
Queen gold nugget *Baryancistrus xanthellus* $189
Picasso clownfish *Amphiprion percula variant* $130
Naso tang *Naso lituratus* $145

Darren Stevens

Rank	
Tropical fish	★ ★ ★ ★ ★
Catfish	★ ★ ★ ★
Cichlids	★ ★ ★ ★
Oddballs	★ ★ ★ ★
Coldwater fish	★ ★ ★ ★
Marine fish	★ ★ ★
Marine inverts	★ ★ ★
Marine corals	★ ★ ★ ★
Display tanks	★ ★ ★ ★
Pond plants	★
Tropical plants	★ ★ ★ ★ ★
Dry goods	★ ★ ★ ★
Pond supplies	★ ★ ★

SHOP TOUR

Wet Pets

729 Tremaine Ave
Palmerston North
06 357 8177

Hours: 8:30am – 5:30pm daily

Facilities: 38 tropical freshwater tanks
15 cold freshwater tanks
3 tropical marine display tanks
10 tropical freshwater and cold freshwater display tanks
3 turtle tanks

Wet Pets is part of 'Wet Pets and Country Pets Ltd.' which was set up by the owner Eric Lister 26 years ago (1988). Eric has been involved with fish keeping for nearly 40 years and is always happy to chat and offer advice.

The store is located on Tremaine Avenue and there is plenty of off-street parking down the side and back of the shop. The first part of the store houses small animals with kittens and puppies on the right and birds on the left. A little further into the shop on your right you can cast your eyes over a good range of fish tanks. This is only the start of the experience and you are soon in front of 6 six foot display tanks giving prospective fish keepers an insight into what they could do with their own tanks.

Wet Pets has a wide selection of fish, from cold water to tropical freshwater fish, and also a couple of tropical marine display tanks. They stock a good variety of community tank species (sword tails, guppies, angels, *Corydoras*, tetras, etc.), and gold fish along with a number of different cichlids and rainbowfish. If you are after something special they also stock several varieties of discus, a few fancy plecs, and a few unusual species such elephant nose, mono angels, and a silver arowana. They don't sell tropical marines but their display tanks are well worth a look.

They also have a good range of plants - real and plastic, and a great range of dry goods (fish food, canister filters, heaters, air pumps, medications, etc.). If there is anything they don't have in stock, just ask, and they will try to get it in for you.

The staff are helpful and welcoming and most days they have 2 staff working in the store to look after your needs.

They are constantly looking after the tanks to make sure that the fish stock is maintained and the fish are healthy.

Wet Pets is a good old fashioned fish store with a nice selection of stock and an abundance of display tanks.

Interesting species

Rams (blue, gold, and veiltail) $24–36
Silver arowana $180
Elephant nose $120
Mono angels $70
Discus (several varieties) $75–220

Shayne Mechen

Rank	
Tropical fish	★ ★ ★ ★ ★
Catfish	★ ★ ★ ★
Cichlids	★ ★ ★ ★ ★
Oddballs	★ ★ ★ ★
Coldwater fish	★ ★ ★ ★
Marine fish	N/A
Marine inverts	N/A
Marine corals	N/A
Display tanks	★ ★ ★ ★ ★
Pond plants	★
Tropical plants	★ ★ ★ ★
Dry goods	★ ★ ★ ★
Pond supplies	★ ★ ★

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The Federation of New Zealand Aquatic Societies is a group of aquarium societies/clubs that are dedicated to the improvement of the aquarium and...

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FNZAS

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 13 affiliated aquarium clubs around New Zealand:

AUCKLAND FISHKEEPERS ASSOCIATION
Contact: Liam Winterton 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: William Gibson william.gibson@live.co.uk

HAWKE'S BAY AQUARIUM SOCIETY INCORPORATED
Contact: Chris Drake cdrake@paradise.net.nz

KAPI-MANA AQUARIUM CLUB
Contact: Dominique Hawinkels kmacnz@yahoo.co.nz

MARLBOROUGH AQUARIUM CLUB
Contact: Deidre Wells deeken@xtra.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: Amy Curtis ayglitch@gmail.com

WAIKATO AQUARIUM SOCIETY
Contact: Trevor Collins trevorjoshcollins@gmail.com

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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 Membersip card at the time of purchase.

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

36 Frost Rd. Mt. Roskill Ph 09 620 5249
10/2 Tawa Drive, Albany Ph 09 415 4157
www.hollywoodfishfarm.co.nz

The Bird Barn - **10% discount on fish and accessories**

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New Pupuke Aquarium Centre - **10% Discount**

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Cnr Anglesea & Liverpool Sts. Hamilton. Ph 07 834 3426 Fax 07 834 3424

Goldfish Bowl Aquariums - **10% discount on everything.**

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Animal Antics - **10% discount**

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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):

Animalz Petone - **15% off all fish and fish related products**

376 Jackson St. Petone. Ph 04 380 9827 www.animalz.co.nz

CareVets@Johnsonville Pet Centre - **10% discount**

31 Johnsonville Rd. Johnsonville Ph 04 478 3709

CareVets 'N' Pets - **10% discount**

Porirua Mega Centre, 2 - 10 Semple 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, Harvey Norman Centre, 28 Rutherford St. Lower Hutt. Ph 04 569 8861
Upper Hutt, 82 Queen St, Upper Hutt Ph 04 974 5474
Porirua, 3/16 Parumoana St. Porirua Ph 04 237 5270

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