

Redfish

Issue #4, October 2011



Venomous beauty

Lionfish care and keeping!

Tropical



a new Rainbowfish!

Coldwater



the iconic Red-Cap Oranda!

Marine



Exploring the Triggerfishes!

COOL IT!

Maintaining a stable aquarium is one of the keys to ongoing success with marine aquariums. The Aqua One Arctic Chiller uses a titanium coil for efficient cooling, with a microprocessor driven digital control unit to make control easy and accurate!

Features & Benefits:

- Super refrigeration can decrease the water temperature rapidly by up to 7-8°C.
- The micro-computerised control system allows easy operation and accurate control.
- The over current and overheat auto protection system make it safe and reliable.

Arctic Chillers Technical Information

		 HP	 MAX L	 WxDxH
1/6HP	800-2200L/h	1/6HP	300L	39x32x46cm
1/3HP	1200-3600L/h	1/3HP	650L	46x39x52cm
3/5HP	1800-4800L/h	3/5HP	1000L	48x52x52cm



Aqua One products are widely available at most quality pet retailers. To find your nearest retailer, visit www.aquaone.com.au

Redfish contents

redfishmagazine.com.au



- 4 About
- 5 Off the Shelf
- 6 Reader's Tanks
- 9 *Corydoras trilineatus*
- 10 Rainbowfish in Outback Australia
- 15 Oddballs
- 20 Competitions
- 22 Choosing a substrate for the reef aquarium
- 27 Community listings
- 30 *Tubastrea - The Sun Coral*
- 31 Scorpionfish, Morays and Triggerfish
- 39 Classifieds
- 42 Red-Cap Oranda
- 43 Aquarium Basics: Part 3

Redfish is:
Jessica Drake, Nicole Sawyer,
Julian Corlet & David Midgley

Email: enquiries@redfishmagazine.com.au
Web: redfishmagazine.com.au
Facebook: facebook.com/redfishmagazine
Twitter: @redfishmagazine

Redfish Publishing. Pty Ltd.
PO Box 109 Berowra Heights,
NSW, Australia, 2082.
ACN: 151 463 759

This month's Eye Candy Contents Page Photos courtesy:

(Top row. Left to Right)
'Fish' by belgianchocolate
'Starfish macro' by Damien du Toit
'Breede jellyfish' by Damien du Toit
'Koi fish pond' by Eustaquio Santimano
'Copperband Butterfly Fish on blue' by Jerry Frausto

(Bottom row. Left to Right)
'Hawaiian Spotted Pufferfish' by Laszlo Ilyes
'Bottom Feeder' by Dave Gough
'Rock Beauty' by Laszlo Ilyes
'Oscars' by Elma
'Gullfiskur' by Elma



General Advice Warning

The advice contained in this publication is general in nature and has been prepared without understanding your personal situation, experience, setup, livestock and/or environmental conditions.

This general advice is not a substitute for, or equivalent of, advice from a professional aquarist, aquarium retailer or veterinarian.

Distribution

We encourage you to share our website address online, or with friends. Issues of Redfish Magazine, however, may only be distributed via download at our website: redfishmagazine.com.au

Opinions & Views

Opinions and views contained herein are those of the authors of individual articles and are not necessarily those of Redfish Publishing.

Ownership and copyright

Redfish Magazine is © 2011
Redfish Publishing. Pty Ltd.
PO Box 109 Berowra Heights,
NSW, Australia, 2082.
ACN: 151 463 759

About Redfish

Redfish is a free-to-read magazine for fishkeeping enthusiasts.

At Redfish we believe in the free exchange of information to facilitate success by aquarium and pond hobbyists. Each month Redfish Magazine will bring you dedicated sections on tropical, coldwater, marine and ponds.

Redfish was founded in early 2011 by Jessica Drake, Nicole Sawyer, Julian Corlet and David Midgley.

We hope you enjoy this, the fourth issue of Redfish.

古池や蛙飛込む水の音
ふるいけやかわづとびこむみずのおと

OFF THE SHELF

Aqua One Pharmaceuticals



Aqua One's NEW Pharmaceuticals range is just what the doctor ordered for your aquarium!

With the new extensive pharmaceuticals range providing all the necessities to keep your aquarium at optimum peak, finding what you need to keep your occupants happy is now simpler than ever!

The range includes:

- Water Conditioner Health +
- Ammonia & Chlorine Neutraliser
- Clarify
- Bio Starter
- pH Up & pH Down
- Plant Fertiliser
- Iron Supplement
- Calcium & Magnesium Supplement
- Marine Iron Supplement
- Iodine Supplement
- Trace Element Supplement

Aqua One products are widely available at most quality pet retailers. To find your nearest retailer, visit www.aquaone.com.au

Aqua One EcoLite LED Aquarium Light

Lighting is an important part of your aquarium and is highly recommended for any aquarium set up. Aqua One Ecolite LED Aquarium Light is a must for all aquariums. Not only does it provide an aesthetic appearance to your aquarium, but it is vital for the life within the aquarium, from the fishes to the plants!

Features & Benefits

- Provides optimum outputs for most aquarium depths dependant on reflector to tank size ratio
- Provides ideal light requirements for most popular plant species
- Comes with a 3 switch cycle that can alternate between 5W, 8W and both. This allows greater control over brightness to suit the environment in your aquarium, and also can save energy if used at a lower watt
- Sleek and stylish design
- Mounting Kit provided
- Energy efficient lighting option
- Comes in 3 sizes
- LED lighting lasts up to 50,000 hours



Aqua One products are widely available at most quality pet retailers. To find your nearest retailer, visit www.aquaone.com.au

Reader's Tanks

4'x2'x2' Custom background by Kristy-Anne Davies

Firstly, I would like to state that this background was built using an old school method. There are newer products available, however, I wanted to build this background the way I had seen in the past. I was warned when I started researching the construction of this background, that the paint/sealer I used can cause fin damage to some fish (particularly barbs). I have not tested this out on all types of fish as I have only had a variety of tropicals (of which I will list below). This was the first time I have made one of these backgrounds.

Living in Cairns and often exploring Rainforest areas, I wanted to design a showpiece aquarium for our living area for which the design was based upon rocks & tree root systems that I have seen in nature.

MAKING THE BACKGROUND

The background was built using scrap polystyrene (thicker polystyrene is easier to work with). I glued it together with silicon then carved out the shapes using a sharp Stanley knife. I then fine-tuned it with a wood shaver to sculpt the rock shapes.

Once I was happy with the design I cut the background into manageable pieces. I then used a bitumen based sealer (Ormonoid). I found I needed to paint in small sections as the sealer can melt the polystyrene if used to cover a large area too quickly. As I painted an area I then pressed sand into it to create the texture. I sourced a variety of coloured sands including silver sand used for bird cages, red desert sand used for



reptiles, grey sand used for gardening & yellow sand from Bunnings). Once it had dried, I rinsed the background very thoroughly several times and left it outside in the rain & sun to age before placing it in the tank. Once the background was aged I used silicone to seal it to the tank.

Please see the following Facebook link for photos of the construction process of the background:

<http://www.facebook.com/media/set/?set=a.430109542491.207518.620942491&type=1>

TECHNICAL SPECIFICATIONS

- * Filter: Pro Aqua CF 2200 Canister
- * Light: Double T5 Light & tubes (HFL1200) on a timer for 15 hours per day (6am till 9pm). I take my time with cycling & introducing fish. I use Prime as my neutraliser. I water change roughly every two weeks and only reduce quantity by 1/3. Feeding is daily or every second day with flake (Aqua One), discus pellets (Sera) & sinking algae wafers (Aqua One). As we live in a tropical climate, the tank is heated only during winter. The heater is removed in summer as it gets too hot in the house and this is also why I don't overstock the tank and have an open hood. The only algae problem I have is a small amount of string/hair algae on the val when it starts getting too long and is getting a lot of light.

Please see the following Facebook link for photos of the setup of the tank:

<http://www.facebook.com/media/set/?set=a.459530587491.258121.620942491&type=1>



AQUASONIC PTY LTD

Leading Aquarium Supplies from Australia and Around the World

Creating a Natural Environment



Email: sales@aquasonic.com.au Web: www.aquasonic.com.au

P.O. Box 311, 14 Commerce Street, Wauchope, NSW 2446 Phone: (02) 6586 4933 Fax: (02) 6586 4944

SUBSTRATE AND PLANTINGS

- * Thin & Giant Val (which I have difficulty getting to throw runners, it tends to only grow upwards)
- * Amazon Sword (growing very happily) in substrate
- * Aponogeton crispus (prefers to grow upwards so is a bit scraggly at the base)
- * Various Anubius on logs
- * Bolbitus on log (has since suffered a bit of die back since the photo was taken)
- * Echinodorus ozelot (this took a long time before it started to take off)
- * Gravel: mixture of 1mm, 3mm & 5mm red gravel mixed with laterite

FISH

- * 2 x Discus - Both not the best quality. They came with a 3 foot tank I purchased. I think the background may have caused a bit of fin damage on these guys. Both are very personable fish though, eat well & seem reasonably happy.
- * Tetras - Mixture of cardinals, rummynose, black tetras & rosy tetras. I initially had about 6 of each, however, numbers have dropped to between 2-4 of each variety (I think deaths were caused by aggressive gouramis)
- * Catfish - Corydoras: Albino, Pepper, Julii & Schwartzii & Glass Catfish.
- * Gouramis - Pair of Platinums (male was too aggressive so I removed him & housed him in a smaller tank until the female had grown enough and only recently put him back in) and a pair of Lace Gouramis.
- * Kribensis - Currently breeding every 3 weeks or so (I have made no attempt to separate or raise fry). Both parents do a magnificent job of schooling their babies and keeping the entire rest of the tank herded away in a corner. At this point in time I have no interest in trying to raise the fry or encourage the breeding (I am just letting nature take its course).
- * Apistogramma Double-Red Cacatoides - I did have a pair of these in the tank for about 3-4 months. The male beat up & killed the female while we were away on holidays and only recently the male has unfortunately disappeared. He was thriving, however, possibly the Kribensis have killed him off.

Please see the following Facebook link to some photos of the current fish (this album also contains photos of other fish in our other tanks):

<http://www.facebook.com/media/set/?set=a.10150253360187492.348838.620942491>

* Tank was initially set up in October 2010. Needed to pull apart and perform a repair on the background (the centre piece detached from the back, I think due to being front heavy and the polystyrene floated quite quickly).

* The tank was re-set up in a matter of a week in March 2011.

Got a great aquarium to share?
Email us a photo at:
enquiries@redfishmagazine.com.au

Corydoras trilineatus

Keeping and breeding the Three-Line Cory

Habitat: *C. trilineatus* is widespread in the Amazon basin, occurring from the west in the Peruvian Amazon, through the Central Amazon to drainages in coastal Suriname.

Misidentification: In the aquarium trade the species is frequently sold, wrongly, as *Corydoras julii*. *C. julii*, however, has spots (not reticulation). Compared to *C. trilineatus*, *C. julii* is comparatively rare and significantly less hardy. If you're looking to breed Corydoras, keep the two species separate as they can hybridise.

Husbandry: Keeping *Corydoras trilineatus* is without problem for intermediate level aquarists. While not as hardy as Bronze Corydoras (*C. aeneus*) or Peppered Corydoras (*C. paleatus*), the species is quite tolerant under most aquarium conditions. Ideally, the species should be kept in a densely planted aquarium with plenty of cover to allow hiding. Compared to the aforementioned Bronze and Peppered Corys, *C. trilineatus* is a shy fish that doesn't as readily venture into the open. Somewhat counter-intuitively, cover in the form of dense plantings actually encourages the species to venture out into the openwater. Similarly, the use of ditherfish (tetras, small cherry barbs and the like) makes *C. trilineatus* more bold. In small aquariums, the inclusion of suitably-sized dwarf cichlids (such as *Aristogramma*, or *Pelvicachromis* species) should probably be avoided as they tend to

dominate these shy little catfish. In aquariums with sufficient floor space, however, there's no reason not to mix the two groups. Aquarium water should be relatively soft and acidic-to-neutral in pH. If you have hard, alkaline bore water then this probably isn't the species for you. The species should be considered an obligate schooling fish. The more individuals you can house, the more naturally the species is likely to behave.

Breeding: Suitably conditioned pairs should be identified (females are larger and broader in the body), then removed to a specialised breeding aquarium. Cues for spawning are variable. Possible triggers include low barometric pressure, "rain" (which can be simulated by water changes) and the like. The species is an egg-scatterer without brood care, so once spawning is complete the pair should be returned to the display aquarium. Fry can be fed newly hatched baby brine shrimp, greenwater insufaria and when a little larger powdered flake foods and microworms.

Looking for a Cory that's beautiful and interesting? Look no further. 



COLLECTING RAINBOWFISH in Outback Australia

Story and photos by Dave Wilson
<http://www.aquagreen.com.au/>

Collecting small native fishes in remote areas is a fantastic pastime. Combine that with a ride in a Helicopter on Aboriginal owned land to a place where only a couple of non-indigenous people have been before, as well as a different looking rainbowfish and you have a recipe for a good yarn.

BACKGROUND

One of the advantages of living in the Northern Territory is the opportunity to work with some very interesting people. The Charles Darwin University were doing research on the fishes of our waterways and in particular the Daly River region and its tributaries. This project has the acronym TRACK (Tropical Rivers and Coastal Knowledge). Two Ichthyologists, some technical officers from NT Fisheries and Charles Darwin University hired a Jet Ranger helicopter and went to the upper regions of the Katherine River where there are no roads. They have been cataloguing the fish species throughout the area.

One of the members of the scientific team sent me some photos of an interesting gold and grey looking rainbowfish with the message:
“Your fish keeping mates might like this one”.



Planning activities commenced soon after and about two years later a trip was organised. It was a trip organised by and under the supervision of the Traditional Owners of the area, The Werenbun Association.

The Author has some arrangements with Traditional Owners of various areas. These arrangements include the collection of aquatic creatures for use in an aquaculture project then a payment of a percentage return from the farm gate sales back to the Traditional Owners for them to use within the "Caring for Country" projects.

This type of use of natural resources is a sustainable use of natural resources. That is, the natural resource is exploited in a way that does not deplete it from its natural range. The sale of the natural resource supplies an income to the producer and the owner of the land where the natural resource originates. This gives it a commercial value, enhances its environmental value and also has a social value.

A similar proposal has been put forward to Government as an extinction prevention method for small species of fish on the threatened species lists. It has been suggested that a few specimens



We crossed over the South Alligator River on the way



At the Upper Katherine River looking for a good spot



The Upper Katherine River is mostly shallow but with the occasional deep pool



Ahead we spotted the clearing to land the helicopter



Coming in to land



Ready to start fishing

be brought into captivity, bred into large numbers, sold with their story of the threats to their existence, including habitat degradation due to urban sprawl or invasive species.

The monies from sales of these species can be divided between the land owner, the conservation body responsible for the species recovery and the fish farmer. All parties concerned gain an advantage, the species is spread around the aquarium community with its story raising public awareness. It has a commercial, an environmental and a social outcome that is the triple bottom line the economists talk about.

On a chilly July morning in 2009 we loaded up a Robinson R44 helicopter at the Mary River Road House. Tony the pilot made sure all the gear was secure and the weight was OK. We took off and flew about 110 km in a straight line to a spot described to us by the fish scientists, it was on the shallow rocky section of the river with plenty of wide flat areas for the helicopter to land.

Once on the river it took a couple of hours to find about 40 or so of the rainbowfish with the dark fins. They were caught in a small mossy mesh net then



Collection's done and ready to go



The Mary River Roadhouse

placed in a deep bucket with shallow water so they could not jump out.

We kept them in a bucket, changing the water every ten minutes or so until it was time to leave. We packed them into several plastic bags and into the bucket. All the gear was stowed in the helicopter and we took off back to Mary River Roadhouse.

After our arrival back at the roadhouse we used the water from the Mary River to conduct more water changes before the three hour drive back to Howard Springs.

The little greyish rainbowfish with the black fins were only young, we did not find any large specimens and put this fact down to not landing exactly where the others did their survey.

They were put into a photographic aquarium back at the fish farm and allowed to settle into life in captivity. Within a few days quite a few started to develop a fungal infection that defied all the treatments that were trialled. About half died from this ailment.

After a few weeks the colours



Hunting for Rainbowfishes in pools on the Upper Katherine



A male Upper Katherine River, Black-Finned Rainbowfish



Another beautiful male



A pair investigate a spawning mop

started to change with the young males developing more orange on their bodies and darker fins. The females were still light greyish with short fins. The fish scientists suggested they may be Western Rainbowfish but the molecular scientists have a slightly different idea. I call them the Upper Katherine River Black-Finned Rainbowfish. 

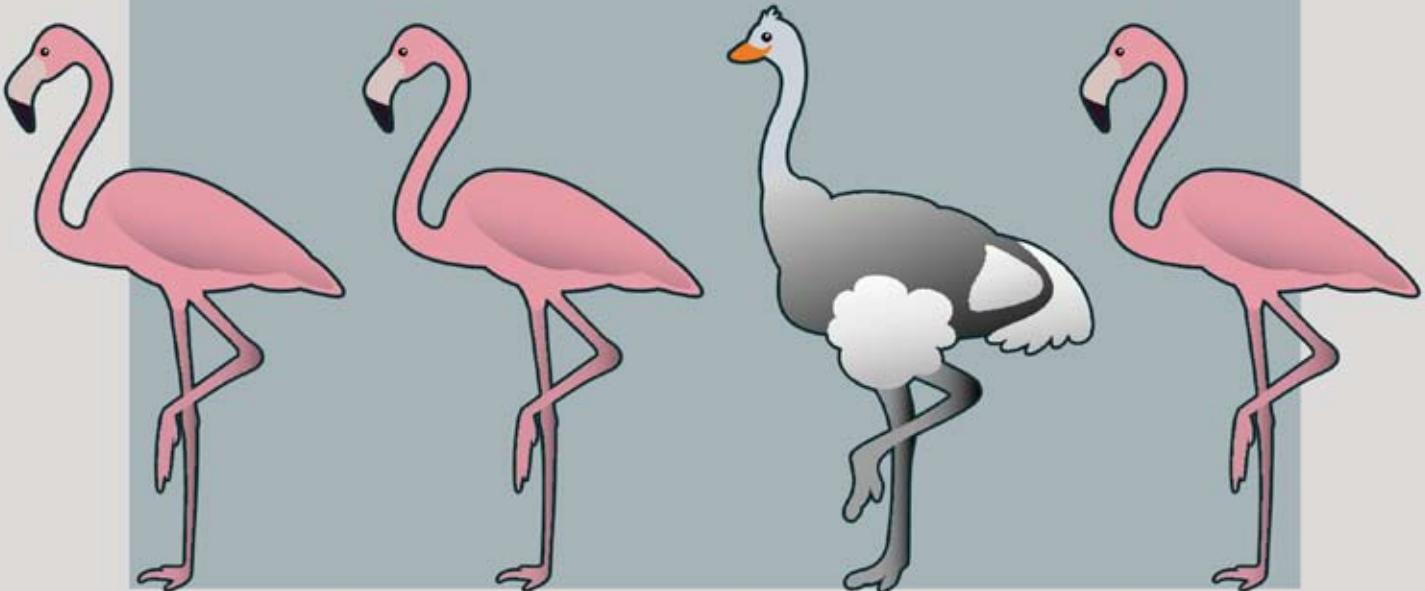


Dave Wilson

In 1995 Dave and Robyn Wilson started a small business called Aquagreen. The aim was to produce a few plants for a local Darwin aquarium shop. Aquagreen is a small licensed Aquaculture facility located at Howard Springs in the Northern Territory producing common and native plants and fishes for the aquarium Industry. Dave is an expert in Australian native fishes and plants and was Manager of the Territory Wildlife Aquarium Park, the largest freshwater public aquarium in Australia, from 1992-2001.

ODDBALLS

BECAUSE BEING DIFFERENT IS BETTER.



For a lot of fishkeepers, choosing fish for an aquarium often comes down to selecting colourful ornamental species of fish. In this article we're going to take a look at some tropical freshwater fish species that are a little bit "different". They may not be brightly coloured but their unusual body shapes and behaviours have made them popular as oddities that can really add some interest to the right type of aquarium set-up.

BLACK GHOST KNIFEFISH

The Black Ghost Knifefish (*Apteronotus albifrons*) is an intriguing member of a whole family of oddballs, the ghost knifefishes. There are many things that are unusual about this species, starting with the shape of the body which is compressed laterally and is more like a knife than a fish! These fish have no dorsal fin and have a highly developed anal fin that extends most of the length of their body. They are able to use this fin in an undulating rhythm to swim backwards as well as forwards – something most fish species can't do. Their jet black, smooth scaleless skin with distinctive white tail markings adds to the mystique.

The natural habitat for this species is fast flowing streams in the Amazon Basin. They are efficient nocturnal hunters, mostly of insect larvae which they find using a secret weapon. If you look at a Black Ghost Knifefish you'll notice that their eyes are quite small and don't appear to be particularly well developed. It's likely that their eyesight is quite poor, but then they don't use their eyes to find their prey. Instead, these interesting fish are actually able to produce a weak electric field around their entire body. Sensitive electro-receptors on their skin pick

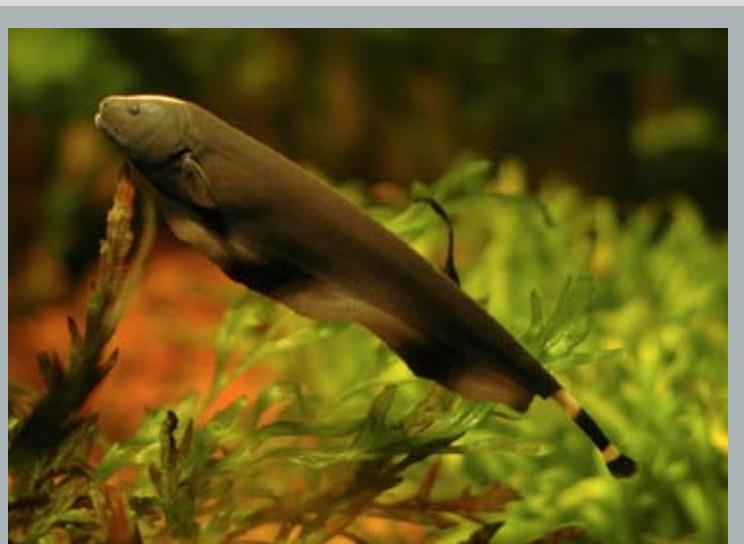


PHOTO BY PER ERIK SVILAND.



PHOTO BY OWEN STICKLEY.

up the minute changes in this electric field which occur when live prey is near and thus they can find food in pitch darkness. They can also communicate with others of their own kind and detect predators that may be nearby. This electric field is not noticeable to us – you won't get any sort of electric shock from these fish.

This species is relatively hardy and fairly easy to care for, but they are not a beginner's fish and do have some special requirements which need to be taken into consideration before purchasing one. You'll usually see them available as small and cute specimens,

but keep in mind that they do grow to about 50cm (20") in length so an aquarium with a length of at least 120cm (4') is recommended. Their preferred pH range is approximately 6.5-7.5, and good water quality is needed to keep them healthy. As they are nocturnal, they will of course be more active at night, but keeping them in a set-up which is either dimly lit or has plenty of cover from bright lights may tempt them to be more active during daylight hours. They particularly appreciate having a decent cave or plastic tube to rest in during the day and may become stressed if they're not given an appropriate hiding place.

When it comes to tank mates they will get on well with most fish but there are some rules. Firstly, remember that they are predatory – they will eat anything which will fit into their mouths. Fortunately the mouth of a Black Ghost Knifefish is relatively small compared to its body size, but if you keep small fish such as guppies or neon tetras with one of these you will find that they disappear at night time, one by one. Whilst they are predatory, they are not generally aggressive towards other medium to large fish. They will generally get on well with Clown Loaches, Synodontis catfish, Angelfish and adult Bristle-nose catfish, to name a few potential tankmates. There can be problems however, with keeping them with other Black Ghost Knifefish. It's generally recommended to keep just one to a tank as when they are kept in a confined space they can be territorial and aggressive towards others of their own kind, although some do get on well with other Black Ghost Knifefishes.

Most specimens are not particularly fussy eaters and will accept most types of food, but they do relish live food such as blackworms and bloodworms and will be happier and healthier if offered live food on a regular basis. When the basic conditions for keeping this species are met they can be quite long lived and are a very rewarding and interesting fish to keep.

AFRICAN BUTTERFLY FISH

The African Butterfly Fish (*Pantodon buchholzi*) is a very unusual and highly adapted fish which is unique enough that it is the only member of its family (Pantodontidae). Everything about this fish is designed to make it a very specialised surface predator. This fish comes from areas of West Africa where there are large bodies of stagnant, standing water. In these calm, very slow moving waters this fish hunts by hanging at the very surface of the water, often using floating plants as cover, waiting for insects and other prey to land close enough for the fish to snatch them.

This patient stalker has everything it needs to lie in wait in the right spot for its prey. It has a specially adapted swimbladder which helps it to stay suspended at the surface of the water and which also allows it to breathe some atmospheric air. The eyes are turned slightly upwards and are always watching for small movements from above, while its upturned mouth is perfect for quickly grabbing anything



PHOTO BY BUDI LUKMAN.

which is within reach on the surface of the water. The elongated tail and anal fins stabilise the fish in the water and also act as a security system, allowing it to sense movement from below which might come from the threat of a larger predatory fish. Its well developed pectoral fins are wing-like and are what give this fish the “butterfly” name – these fins help the fish to glide smoothly and effortlessly around without any disturbance to the surface water, which might give it away.

Although they may seem to be slow and ponderous fish they are actually capable of quite a burst of speed when threatened and are known to be able jump out of the water and even glide above it for a short distance to escape predators. For this reason, tight-fitting aquarium lids are a must when keeping these fish, as they are known jumpers. They are generally very hardy fish but do have some special requirements which should be met. In their natural environment the water is slightly acidic, in aquaria they are happy when kept in a pH range of 6.5-7.2 and prefer the water to be slightly soft. As they are so highly adapted to floating at the surface of still waters, this should be replicated in the aquarium – make sure that outflows from filters or air pumps cause only minimal surface water disturbance. It's a good idea to also provide some floating plants too, as these fish do feel quite stressed if there is no surface cover at all. They do not get particularly large – at a maximum size of about 10cm (4") in length they may be kept in an aquarium of a minimum size of 40L (10 gal) (if they are the only fish present).

Tank mates should be carefully selected. This fish generally does not like to share its top-dwelling space with others and will also eat anything which fits into its mouth, which is certainly large enough to fit neon tetras, guppies, rasboras and other small schooling fish! It is best kept with medium sized, non-aggressive mid-water and bottom dwellers such as Clown Loaches, Corydoras catfish or peaceful gouramis. Fin-nipping fish must be avoided as they are likely to go for the long trailing fins of the butterfly fish.

Feeding can sometimes be problematic as some individuals will only accept live food. Others may be trained on to floating pellets, but food needs to be accessible at the surface for these fish to be interested. Live food is accepted readily by all specimens though and can consist of live crickets (some fish may accept canned



PHOTO BY BUDI LUKMAN.

crickets), small feeder fish or a basket of live black worms suspended at the surface for accessibility.

ELEPHANT NOSE FISH

Elephantnose fish are strikingly shaped and instantly recognizable oddballs from the Mormyrid family which are available in the aquarium trade fairly regularly. The species usually seen for sale is Peters' Elephantnose fish (*Gnathonemus petersii*). Like the African Butterflyfish, these are also found in the West and Central African basin areas, where they have a very wide distribution. The Elephantnose fish is found in muddy, slow moving rivers where visibility in the water is usually low. Thus, like the Black Ghost Knifefish, it has become adapted to finding its food in these



PHOTOS BY BUDI LUKMAN.

conditions and does so in a similar way. Like the Knifefish, it has poorly developed eyes and does not really use visual cues to find food. It also has electroreceptors all over its body and produces a weak electric field to assist in locating prey and for navigation and communication with others of its own species. The wonderful "nose" is actually a flexible extension of the lower lip and is used to probe around in the substrate or under logs and stones to find small worms and other invertebrates.

One of the most important requirements for keeping an Elephantnose fish is to use a soft nonabrasive substrate such as a fine river sand. As these fish constantly poke around with their "noses" in the substrate coarse or sharp gravels should not be used as these quickly cause quite bad abrasions of the "nose" which in turn cause the fish to become stressed and have difficulty feeding. Whilst these fish do adore being fed live worms they usually adapt quickly to dried foods such as sinking pellets. Their mouths are relatively small so the food should be appropriately sized. Their preferred pH range is around 6.5-7.2, with slightly soft, slightly acidic water being ideal. They are quite sensitive to poor water quality, to the point that they have actually been used at some commercial water treatment plants to measure water quality. Small changes in water quality cause a difference in the

electric field of the fish and this can be detected with special equipment. From this use of the fish in the commercial field we know that they are easily stressed by poor water conditions, so in the aquarium they should be kept with a properly functioning filter and a commitment to regular water changes.

These fish are most comfortable in a fairly dark and sheltered environment with plenty of cover and hidey-holes. When kept in a brightly lit, bare aquarium they become quite stressed, but if given a hollow log or two to shelter in and a variety of plants to provide shady areas they will actually be more active and keen to venture out to explore. Elephantnoses are generally peaceful fish which are unlikely to be aggressive towards most other tankmates. Like the Knifefishes though, they may be territorial towards others of their own kind. This is not a hard and fast rule and depends on the individual. Some Elephantnoses will get on well with others or even in small groups, others can only be kept on their own. They may also not tolerate other weakly electric fish (such as Knifefish) and vice versa. However as peaceful mostly bottom dwelling fish they can be kept with the African Butterflyfish. If you do want to try to keep more than one Elephantnose, or keep another weakly electric fish with them, then the aquarium should be at least 400 L (100 gal) in capacity, to allow the fish to have their own territories.

Conclusion

These three species of "oddball" fish are extremely interesting additions to the right type of aquarium. All of these fish have some special requirements which should be considered before purchasing the fish, but which are usually not too difficult to achieve in many situations. They're not beginner's species, but are good choices for those who have some prior fishkeeping experience and who are looking for something out of the ordinary to keep. 

FISHTANK

Aquarium

MASSIVE FISH CLEARANCE



 GOLDFISH 99C Normally \$2.99 SAVE 65%	 NEON TETRA 99C Normally \$1.99 SAVE 50%	 BRISTLENOSE \$3.99 Normally \$9.99 SAVE 60%	 FLAME ANGEL \$49.99 Normally \$89 SAVE 45%	 YELLOW TANG \$49.99 Normally \$89 SAVE 45%
 ELECTRIC YELLOW \$9.99 Normally \$14.99 SAVE 30%	 CLOWN LOACH \$5.99 Normally \$11.99 SAVE 50%	 PLANTS 3 FOR \$10 Normally \$4.99 each. SAVE 35%	 ANGELFISH \$3.99 Normally \$12.99 SAVE 70%	

EXPERIENCE MAKES THE DIFFERENCE!

Expires 18/11/11



UNIT 3C/27 VICTORIA AVE,
CASTLE HILL, NSW.
02 9899 9944

REDFISH MAGAZINE PHOTOCONTEST 2011

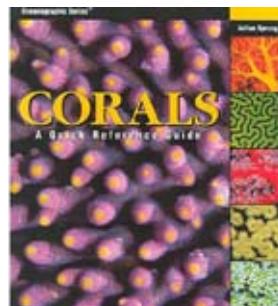


REDFISH MAGAZINE PHOTO CONTEST. OCT 2011 - DEC 2011

Redfish Magazine is pleased to announce the second of its quarterly Aquarium Photo Contests for 2011-2012. Each month we'll publish our favourite reader submitted photos, and in January 2012, we'll announce the winners for this round.

The theme this quarter is:
"My fish and I"

This quarter we are pleased to be able to offer Julian Sprung's excellent book: *Corals: A Quick Reference Guide* as a prize!



CODEWORD: LIONFISH



ENTERING THE PHOTO CONTEST

Entering the photo contest is simple.

Email your name, the codeword, postal address and a high res. version of your photo to competitions@redfishmagazine.com.au.

Please check the rules and regulations prior to entry.

"Waiting for Separation" by Hamid Najafi.



RULES AND REGULATIONS

Photo must be your own work. Post processing of your own images is allowed. You must be over 18 years of age to enter the competition.

Detailed rules and regulations are available at:

www.redfishmagazine.com.au/competitions/2011_photo_comp_1

"Untitled" by D. Sharon Pruitt.

NEED INSPIRATION?

Here are some amazing aquatic images from flickr!



"One girl in an aquarium" by Antara



"Enoshima Aquarium" by Kazunori Matsuo



"wonder"
by Markus Mindaugas Urban



"Freediving the Ocean - Into the Light"
by Jayhem



REDFISH WINNERS

Congratulations to our photo contest entrants

The staff of Redfish Magazine would like to thank everyone who submitted photographs for the first Redfish Magazine Photo Competition. Judging the entrants wasn't easy but after much deliberation we've narrowed down the field to our four winners.

They are:

Top left , Luis Gonzalez

Top right, Tomas Diaz

Bottom left, Hadrien Brassens

Bottom right, Adilson Borszcz

Congratulations!
The Redfish Team.



TO ENTER OUR NEXT PHOTO COMPETITION,
SEE DETAILS ON PAGE 20

TECHNICAL

CHOOSING A SUBSTRATE FOR THE REEF AQUARIUM

BY SARA ALYN MAVINKURVE

PART I

One of the most important decisions marine aquarists make before setting up a new aquarium is what substrate to use (or if they will use substrate at all). This article is an introduction and overview of the most popular choices aquarists make, the pros and cons of each, and what you should think about before deciding what you want for your system.

POINTS TO CONSIDER

The subject of substrate choice has been met with a lot of heated debate amongst marine aquarists, causing many aquarists to feel very strongly about deep sand beds (DSB) verses bare bottoms (BB). Friendships have been tested, hearts broken, cyber wars waged! Well, not to get too melodramatic, but it's been a hot topic to say the least. Before you get caught up in the "politics" of the matter, think about what you personally want. What looks good to you? What purpose do you want your substrate to serve? Will it be a habitat for life? Will it be an additional source of filtration? Will it serve an aesthetic purpose? Then there are the practical questions. Do you want something easy and low maintenance or do you enjoy spending a lot of time with your aquarium? How big is the system you are planning? What kind of animals do you plan to keep? One should consider all these questions before deciding on a substrate. As you'll read below, each choice has its advantages and disadvantages.

But before I begin this discussion of pros and cons of different substrates, I want to point out that, in my opinion/observations, there are three basic types of points that tend to influence the decisions we make and opinions we form about our aquariums and the world in general. There's experimental evidence, anecdotal (or empirical) evidence and theory. Aquarium keeping can be extremely frustrating in that what we might expect to happen theoretically doesn't seem to happen actually or experimentally (and vice versa). Then there are always those anecdotal experiences we have as aquarists for which we have no explanation at all and appear to happen only to us. Thoroughly discussing all points made in science, theory and/or anecdote on marine aquarium substrate choice could easily fill a book. Since I'm limited here to a few thousand words, I can only give you a cursory review of these topics and hope that by the end of it I've sparked your interest and inspired you to do your own further research and reading.

BARE BOTTOM

Bare Bottom Advantages:

We'll start with the simplest choice: no substrate. There are a lot of potential advantages to a bare bottom tank. Firstly, they are low maintenance in comparison to substrate containing systems. It's always convenient to be able to simply siphon up debris with every water change. Secondly, for reef or coral containing systems, it's easier to get intense water flow without having to worry about "sand storms" or piles of substrate gathering in one corner of the tank. Corals can suffer significantly from sediment damage. This happens in aquariums when sand lands on or rubs against the delicate soft tissue of any coral. Not having to worry about this problem alone is incentive enough for many reef aquarists to forego the use of substrate altogether (especially for many SPS coral keepers who've been dying to try out a 5HP Pacer SE2JL HYC supplied surge device if only they could get the building permit).

Bare Bottom Disadvantages:

The disadvantage of a bare bottom system is that you won't have the additional niches for life that substrates add to a marine aquarium. You won't be able to keep any animals that require a substrate to bury and/or borrow in. In short, anything that you might gain from having a sand bed (or other substrate), you won't have in a bare bottom tank. Aesthetically, some people find bare bottom tanks visually unappealing. This writer disagrees with this last contention. There are some fun things you can do with a bare bottom tank to make it just as visually exciting (or even more so) as any tank with a sand bed. Use of starboard

is one option. An even more intriguing look is to grow soft corals along the bottom. A “carpet” of star polyps, xenia, and/or zoanthids can look very cool at the bottom of a reef tank. Having a hefty population of soft coral polyps along the bottom of the tank might even provide some help with the “clean up” of uneaten food and fish waste.

SAND

There are several different ways to use sand as a marine aquarium substrate, but I'll focus on the few most common ways.

Deep Sand Bed

Defining “DSB”

Before we can discuss deep sand beds, we have to define the term. Though the very definition of “Deep Sand Bed” can be a hotly debated issue in and of itself, I'm going to give it what I perceive as the most common and practical definition. Commonly understood, a DSB is any layer of sand three or more inches deep, with a grain size no larger than “sugar fine.” If the grains of sand are much larger than granules of sugar, you're starting to get into “crushed coral” or “crushed aragonite” substrates that don't quite function the same way as finer grained substrates.

THE NITROGEN CYCLE REFRESHER COURSE

In essence, the Nitrogen Cycle is the infinitely complicated path, set of paths, overlapping and diverging paths, twisted and sinister paths, etc. by which Nitrogen circles around and through the earth, air and water. Thank goodness we don't need to know all that much about it. I painfully recall, and perhaps some readers of this article do too, being required to memorize the basics of the Nitrogen Cycle in school. I can also remember rolling my eyes thinking “when am I ever going to need to know this?” Huh, well, believe it or not, here it is again. The breakdown of nitrogenous wastes (largely from animals), occurs via the Nitrogen Cycle. This is not unique to aquariums. I'm sure any self-respecting farmer could tell you just as much or more about the in-soil manifestation of the Nitrogen Cycle as any DSB-loving reef aquarist could tell you about the in-aquarium manifestation of this process. Grossly over-simplified, it's the pathways by which:

1. Ammonia is fixed (by nitrogen fixing bacteria) to make Ammonium.
2. Ammonium is converted into nitrogen oxides (nitrites and nitrates) by nitrifying bacteria.
3. Nitrogen oxides are converted into nitrogen gas and water.

Aerobic bacteria accomplish the first two steps. Anaerobic bacteria accomplish the third. Anaerobic bacteria absolutely need an oxygen depleted space in order to live and do their thing. In a DSB, the goal is to have the top layer be aerobic (containing oxygen), with oxygen concentration gradually declining to zero down into the sand bed. In this way, a DSB can become an excellent natural filter. Essentially, all biological aquarium filters work this way (with an aerobic zone in juxtaposition to an anaerobic zone). However, in all such filters, the biological filtration capacity is limited by the surface area available for bacterial colonization. In a DSB, this surface area is truly immense. If you do the math, the surface area can get up to an acre or more in the average DSB!

Of course, as with any over-simplification of a biological process, I'm leaving out countless side reactions and other by products. For example, hydrogen sulfide is a significant by product of denitrification which is toxic to fish if it doesn't exit the system in the form of gas (which it is at room temperature). When hydrogen sulfide precipitates iron sulfides, this is what turns areas of sand substrate black. This phenomenon is why some zealous bare bottom advocates call DSBs “ticking time

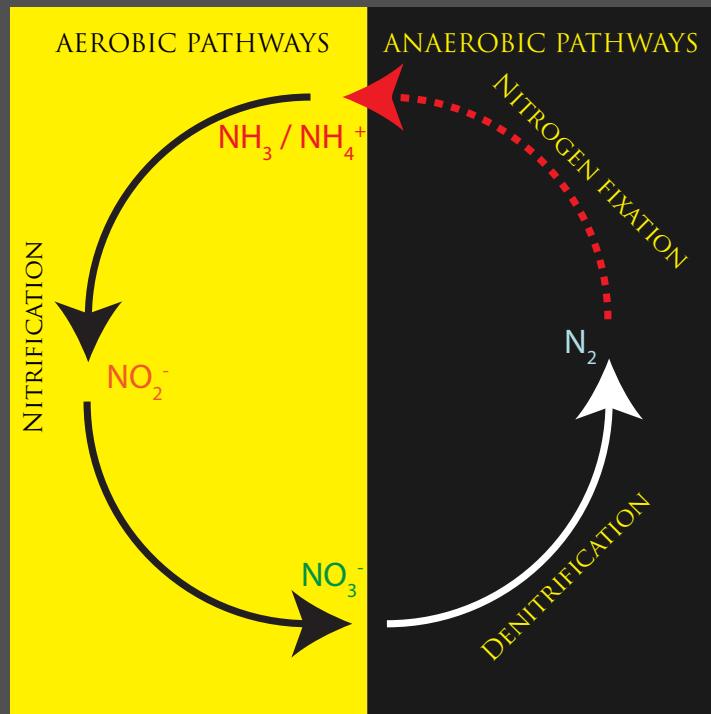




photo by Khantipol

LOOKING FOR MORE **IMPACT?**

CONTACT REDFISH FOR ADVERTISING THAT REACHES YOUR MARKET.

REDFISH MAGAZINE

EMAIL: ENQUIRIES@REDFISHMAGAZINE.COM.AU

WEB: REDFISHMAGAZINE.COM.AU

FACEBOOK: [FACEBOOK.COM/REDFISHMAGAZINE](https://facebook.com/redfishmagazine)

TWITTER: [@REDFISHMAGAZINE](https://twitter.com/RedfishMagazine)

bombs." According to the ticking time bomb theory, the anaerobic layer of sand in a DSB accumulates toxins and will eventually "erupt" in a sudden cataclysmic release of a myriad of denitrification by products (such as hydrogen sulfide), causing a total tank "crash" (sudden death of all live stock). While I suppose it's possible for such a thing to happen, I doubt that it often does. For one thing, as mentioned, hydrogen sulfide is a gas. Thus, so long as the DSB is well populated with benthic organisms and the aquarium system employs good circulation and gas exchange, hydrogen sulfide should bubble out along with nitrogen gas and carbon dioxide, etc. More poignant for myself personally, I had an experience with one of my own systems that caused me to seriously question the DSB time bomb idea.

ANECDOTE: The following is a mere anecdote and should not be taken more or less seriously than any other anecdote. I once had the good fortune of watching my 250 L (65 gal) aquarium start to leak along the bottom rim. It started as a drip, then a steady stream. Well, you know how this goes. In less than an hour, I was forced to drain the tank (water, sand and all). I'm embarrassed to admit that I was terribly unprepared for such an undertaking and did not have nearly enough pre-mixed water or anywhere for the livestock to go except a few empty aquariums of various sizes and plenty of spare Maxi Jet power heads. When I got down to my DSB (about 4 inches deep), I started to scoop it out in 20oz slushy-cup-fulls at a time. The rotten egg smell was room-filling and noxious. The sand just an inch or two below the surface was black. There was every sign that at least parts of my DSB had turned into an all-out hydrogen sulfide toxic waste dump. How long it had been this way, I don't know. Regardless, all my fish, corals and invertebrates had no choice but to sit in that same water and sand for at least 3 days before I could replace the leak tank. And yet, nothing died. Of course, this is, as forewarned, a mere anecdote. While I was happy to see that my sand bed had, obviously, a significant anaerobic zone, I was not happy to see so much evidence of hydrogen sulfide (and iron sulfide). This is not ideal. Thus, having learned of what was going on in my sand bed, I made a concerted effort to obtain more benthic organisms (worms, micro-crustaceans, seed shrimp, etc.) which would provide the necessary subtle movement in the sand to allow hydrogen sulfide to more readily exit the sand bed. So while I'll concede that a poorly maintained sand bed with insufficient benthic life can result in significant hydrogen sulfide production, I'm not ready to concede that DSBs (even at their worst) are "ticking time bombs" that will (or could) crash your tank and kill your animals at any time.

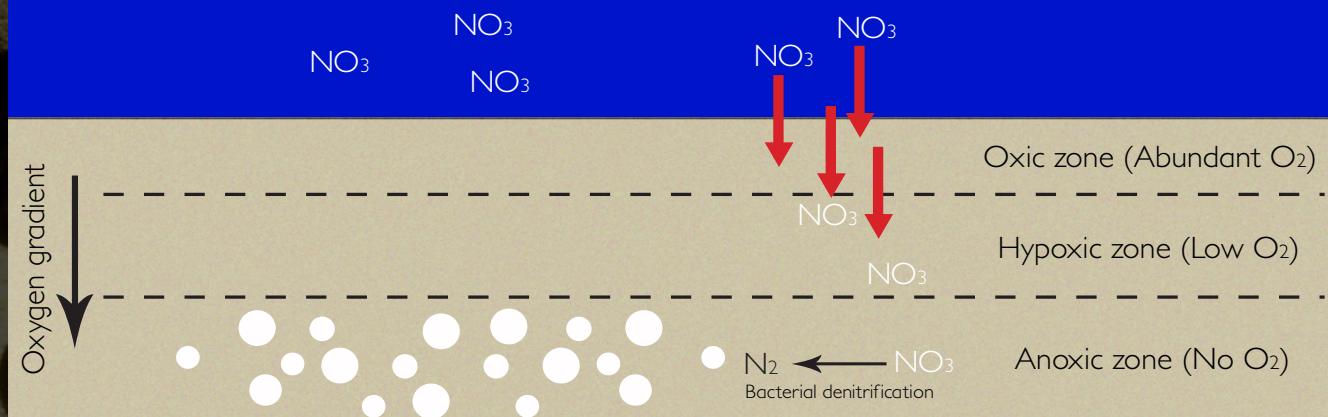
The Significance of Grain Size, Grain Composition and Sand Bed Dimensions

Grain Size:

Arguably, even sugar-fine is likely too large a grain size to get the full functionality of a sand bed as a source of nitrogenous waste filtration. The reason for this is, the functionality of a sand bed as a biological filter is dependent on the existence of an anaerobic zone where anaerobic, denitrifying bacteria can carry out denitrification (in large part, the conversion of nitrogen oxides into nitrogen gas and water). The coarser the sand, the less anaerobic space there will be. To understand this concept, ask yourself; "would I rather be buried under marbles or mud?" Buried under marbles, you might stand a chance of survival since all the spaces between the marbles allow at least some air to get through. Buried under mud, you'd suffocate in a minute or so (depending on how long you could hold your breath). By the same general principle, a sand bed of coarse sand is going to be more oxygenated all the way through even if left undisturbed. With a sand bed of sugar fine sand (i.e. a grain size of ~0.5mm), at the bottom of 4 inches, you'll likely get at least some anaerobic zones, but not nearly as much as with finer sand. I'll note here that this might be the actual advantage of some "mud" products sold as substrates for marine aquariums. Marine mud is, after all, just very fine sand/substrate.

All this said about the theoretical importance of grain size for creating anaerobic environments, I must tell you that some denitrification will occur even if you use marbles for substrate. But there's even more to this issue of grain size. The truth is that a lot of benthic (sand dwelling) organisms are very picky about the range of sediment grain size they will tolerate. Some of them are picky to an extreme such that they will not reproduce or live a normal life span if stuck in sediment of a grain size even just 0.01mm outside of their preference. Some organisms will just refuse to live in finer or coarser substrate. And unfortunately, you just can't make everybody happy. Dr. Shimek opines that a sand grain size of 0.125mm is likely a good middle ground compromise for enough benthic organisms. Alternatively, some equally intelligent aquarists recommend using substrate of mixed grain sizes, with grains occurring across a range of 0.05mm to 0.5mm in size. For those who wish to know more about this topic of sand grain size and the functionality of sand beds, I refer you to many articles on the subject written by Dr. Ron Shimek, Dr. Robert Toonen and others.

SUMP OR AQUARIUM



In short, the thought is that finer the sand, the more effective the sand bed will be as a processor of nitrogenous waste. Keep in mind though, that, no matter how fine or coarse your sand might be, the filtration capacity of your sand bed will not appreciably increase beyond a depth of about 5 or 6 inches. In fact, there's likely not much to be gained by having a sand bed deeper than even four inches.

Sand Bed Dimensions:

Generally speaking, the dimensions of the "foot print" (length x width—not depth) of a DSB should be at least ~4.5 square feet (or roughly the footprint of a 40 gal breeder). Unfortunately, this recommendation is routinely given and taken without much explanation. Generally, it's thought that this is the threshold dimension needed to maintain a healthy population of benthic organisms. Empirically, for whatever reason, it looks like the filtration and other benefits of a DSB aren't so apparent when the dimensions are much smaller than this. Also, again, if you want to make your sand bed bigger, make it longer and/or wider (rather than deeper).

Grain Composition:

When it comes to substrate composition, marine aquarists often find themselves choosing between aragonite and silica. Though aragonite is usually favored, marine substrate does not necessarily have to be aragonite. There's reason to believe, theoretically, experimentally and anecdotally, that aragonite provides *localized* alkalinity benefits which might be advantageous for any number of reasons. For example, it might aid in phosphate precipitation and/or denitrification. However, any potential contribution (if any) it makes to the overall alkalinity and/or pH balance of the system as a whole is not likely significant. Even with a sand bed of fine aragonite, you will still need to balance your system's calcium and alkalinity by some other means. If you want to use silica sand (or "quartz sand") and you're worried about soluble silicates, I would advise rinsing the sand *a lot.* While quartz (SiO₂) itself will not add silicates to your water (since pure quartz is virtually insoluble in water), you might be hard pressed to find 100% pure quartz sand. Less than pure quartz sand will inevitably have some contaminates of soluble silica compounds. However, it should be easy enough to rinse away any contaminant that's water soluble.

If space permitted, I could discuss different commercial sources for substrate of different grain sizes and compositions in detail. Instead I'll just note here that there are places outside of your local aquarium store or pet store where you can find cheap substrate suitable for marine aquariums. In addition to browsing your local aquarium store's substrate selection, don't hesitate to venture into a hardware store and/or construction supply store. However, do be sure you know what you're getting and what you're putting in your aquarium (potential contaminates and all).

Continued in Part II: In November's issue of Redfish Magazine, Sara discusses the advantages and disadvantages of deep sand bed filtration, briefly discusses the plenum of the 1990s and its use in modern reefkeeping. She discusses the use of shallow substrates and crushed coral rubble. Finally, she covers remote DSBs, for those aquarists wanting the filtration a DSB provides without some of the aesthetic issues.



Sara Allyn Mavinkurve is a WetWebMedia crew member who has authored a range of articles on corals and marine aquariums for international and US fishkeeping magazines. She's a special guest at the Marine Aquariums of South Africa. When she's not writing about fish, Sara is an attorney who SCUBA dives in her ever-shrinking amounts of free-time.

Community Directory

INTERNATIONAL

Advanced Aquarist
Salty Tank
American Livebearer Association

<http://www.advancedaquarist.com>
<http://www.saltytank.com>
<http://livebearers.org/>

CANADA

Betta Breeders Canada

Alberta

Calgary Aquarium Society
Edmonton Aquarium Club

British Columbia

Vancouver Aquatic Hobbyist Society
Wet Coast Aquarium Society

Ontario

Brampton Aquarium Club
Peel Aquarium Club
Brant Aquarium Society
Chatham-Kent Aquarium Society
St Catharines & Area Aquarium Soc.
Durham Region Aquarium Society
Ottawa Valley Aquarium Society
Hamilton & District Aquarium Society
Forest City Pond Club
Kitchener/Waterloo Aquarium Society
London Aquarium Society
Sarnia Aquarium Society
Toronto Willowdale Aquarium Society

Manitoba

Aquarium Society of Winnipeg

Nova Scotia

East Coast Aquarium Society

Saskatchewan

Saskatoon Aquarium Society
Regina Aquarium Society

Quebec

Montreal Aquarium Society
La Societe des Aquariophilie de Montreal
Ass. Reg. des Aquariophiles de Quebec

<http://www.bettabreederscanada.com>/

<http://www.calgaryaquariumsociety.com>/
<http://www.fish-club.org>/

<http://vahs.ca>/
<http://wetcoastaquariumsociety.ca/wetcoast>/

<http://www.bac-on.org>/
<http://www.peelaquariumclub.org>/
<http://www.brantaquariumsociety.ca>/
<http://www.cichlidae.com/forum/viewforum.php?f=103>
<http://www.scaas.info/index.html>
<http://www.dras.ca>/
<http://ovas.ca>/
<http://www3.sympatico.ca/ps.mcfarlane/home.htm>
<http://www.freewebs.com/fcpc>/
<http://www.kwas.ca>/
<http://www.londonaquariasociety.com>/
<http://www.geocities.com/sarniaaquariumsociety>/
<http://www.torontoaquarium.org>/

<http://www.asw.ca>/

<http://www.eastcoastaquariumsociety.ca/forum>/

<http://www.saskatoonaquarium.com>/
<http://www.reginaaquariumsociety.ca>/

<http://www.geocities.com/mltfishclub/index.html>
<http://www.aquasam.qc.ca>/
<http://www.oricom.ca/pierdes>/

UNITED STATES OF AMERICA

Alaska

Juneau Aquarium Society

Arizona

Dry Wash Aquarium Society

California

Bakersfield Koi & Water garden Society
Desert Fish Club
Sacramento Aquarium Society
San Francisco Aquarium Society
Silicon Valley Aquarium Society
Santa Clara Valley Koi and Water Garden Club
San Diego Tropical Fish Society
Pacific Coast Cichlid Association

<http://www.taursys.com/kasha/JAS>/

<http://www.drywashaquarium.org>/

<http://www.bakersfieldkoiclub.com>/
<http://www.desertfishclub.com>/
<http://www.sacramentoaquariumsociety.org>/
<http://www.sfaquarium.org>/
<http://www.tactics.com/d/svas>/
<http://www.sckoi.com>/
<http://www.geocities.com/sandiegofishfan>/
<http://www.cichlidworld.com>/

Colorado

Southern Colorado Aquarium Society
Colorado Aquarium Society
Rocky Mountain Cichlid Association

<http://www.southerncoloradoaquariumsociety.com>/
<http://www.coloradoaquarium.org>
<http://www.liss.olm.net/rmca>/

Connecticut

Aqua-Land Aquatic Society
Exotic Fish Society of Hartford Inc.
Norwalk Aquarium Society

<http://pages.cthome.net/vito>/
<http://users.rcn.com/wmercer>/
<http://www.castaways56.supanet.com>/

Florida

Gold Coast Aquarium Society South Florida
Tampa Bay Aquarium Society

<http://www.gcassf.org/Home.htm>
<http://www.tbas1.com>/

Georgia

Atlanta Area Aquarium Society

<http://atlantaaquarium.com>/

Hawaii

Honolulu Aquarium Society

<http://www.geocities.com/Heartland/Meadows/2948/HASF.html>

Pennsylvania

Bucks County Aquarium Society

Pennsylvania (cont)

Delaware County Aquarium Society

International Betta Congress

Aquarium Club of Lancaster County

Northeast Philadelphia Aquarium Society

Greater Pittsburgh Aquarium Society, Inc.

Pittsburgh Marine Aquarium Society

Erie Aquarium Society

Rhode Island

Tropical Fish Society of Rhode Island

South Carolina

Myrtle Beach Aquarium Club

Tennessee

Putnam County Aquaiurm Society

West Tennessee Marine & Reef Aquarium Club

Texas

Federation of Texas Aquarium Societies

Capital Aquarium Society of Texas

Dallas/Ft. Worth Aquatic Plant Club

North Texas Water Garden Society

Utah

Great Salt Lake Aquarium Society

Wasatch Marine Aquarium Society

Vermont

Black River Aquarium Society

Virginia

Potamac Valley Aquarium Society

Washington

Bellingham Aquarium Society

Greater Seattle Aquarium Society

Kitsap Aquarium Society

Washington Koi and Water Garden Society

Wisconsin

Milwaukee Aquarium Society

Green Bay Aquarium Society

Central Wisconsin Aquarium Society

<http://www.bcasonline.com/>

<http://www.dcas.us>

<http://lcbettas.com/>

<http://www.adlc.us/>

<http://www.phillyfishclub.com/>

<http://www.gpasi.org>

<http://www.pmasi.org/frm/>

<http://groups.yahoo.com/group/ErieAquariumSociety/>

<http://www.tfsri.org/>

<http://www.facebook.com/pages/Myrtle-Beach-Aquarium-Club/402263799688>

<http://www.pcaquarium.org>

<http://www.wtmrac.com/>

<http://www.fotaswebsite.org/>

<http://www.petsforum.com/cas/>

<http://www.aquatic-plants.org/>

<http://www.ntwgs.org/>

<http://fancyguppy.50megs.com/custom2.html>

<http://www.utahreefs.com/>

<http://www.angelfire.com/vt/brasvt/>

<http://www.pvas.com/pvasindex.htm>

<http://www.facebook.com/pages/Bellingham-Aquarium-Society/112557868810416>

<http://www.gsas.org/>

<http://www.geocities.com/Petsburgh/5640/kastoc.htm>

<http://www.washingtonkoi.org/>

<http://fishclubs.com/WI/MAS/>

<http://www.gbasonline.org/gbashome.htm>

<http://www.cwas.org/>

PUERTO RICO

Asoci. de Acuaristas de Aguadilla

Acuarista Metro Este

<http://coqui.metro.inter.edu/acuaristas/aaa.html>

<http://www.amepr.org/>

BERMUDA

Bermuda Fry-Angle Aquarium Society

<http://www.fryangle.com/>

BRAZIL

Aquaflux Aquarismo e Aquapaisagismo

Aqualinea

<http://www.aquaflux.com.br>

<http://aqualinea.com.br/blog/>



Photo by Hobrias Sudoneighm

Be part of our community!

Are we missing your local aquarium, pond club or society?
Email us at enquiries@redfishmagazine.com.au
to get listed here.



THE SUN CORALS TUBASTREA

TAXONOMY

Sun corals are members of the family Dendrophylliidae. Most species lack zooxanthellae. Most trade specimens are likely to be *Tubastrea faulkneri* or *T. coccinea*.

HABITAT

Widespread in tropical and cold oceans. Typically in dark overhangs, cave mouths or in deepwater.

KEEPING

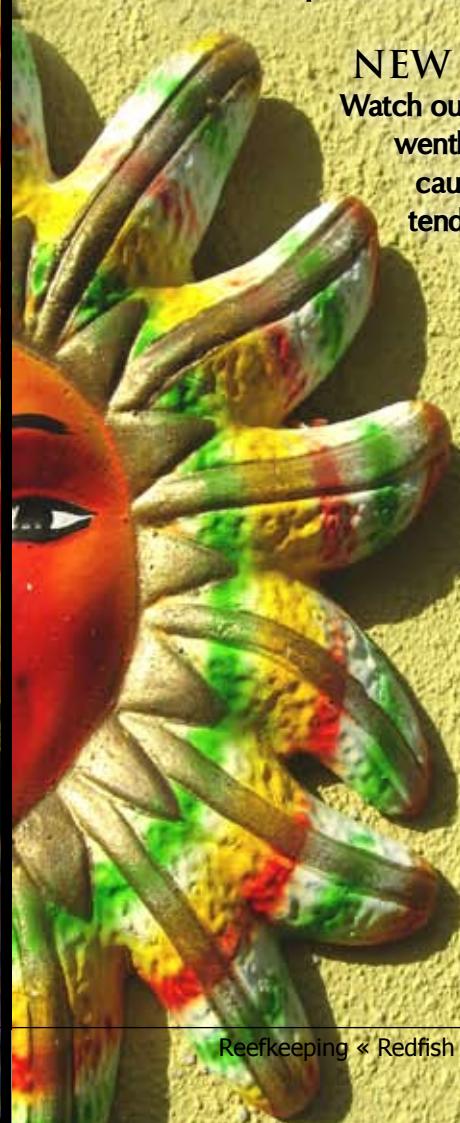
Not for the beginner. Despite their name, polyps open during the night. Lacking zooxanthellae, the polyps MUST be fed on a daily basis. The polyps are separate so they must be fed individually. Failure to undertake this feeding results in decline then death. Provided feeding is undertaken, they can be kept by intermediately experienced reefers. Their stings don't seem to be particularly dangerous to other corals, placement can thus be quite flexible. Ideally, you'll want to choose somewhere ecologically relevant, that's also pragmatic. You're going to be feeding your sun coral all the time - so be sure it's in a position that's easy to access.

NEW SPECIMENS

Watch out for nudibranchs and wentletrap snails on wild-caught specimens. They tend to be common hitchhikers.

On addition to the aquarium many polyps will refuse to open. These should be sprayed with food on a daily basis to entice them to open.

Provided enough food is supplied your sun corals will reward you with a spectacular nightly show! 



PREDATORS

SCORPIONFISH, MORAYS AND TRIGGERS

BY AARON SEWELL



Broadbarred firefish (*Pterois antennata*).

Photo by Christian Mehlführer.

While there are few groups of fish that are completely unsuitable for coral reef aquariums, there are several that are generally considered more ideal for fish only aquariums. This article will cover some of the most common piscivorous fish kept in marine aquariums, moray eels (family Muraenidae) and scorpionfishes (family Scorpaenidae) as well as the triggerfishes (family Balistidae) which are far more varied in their diet but are well known for their aggression. The term "predator" is often used to describe such fish but, while it is correct, the term technically covers most fish so is not particularly useful in attempting to describe a small subset of marine aquarium fish. Predators are those animals (or fish in this case) that feed on other animals. Therefore, this group includes everything from gobies to sharks and just about everything in between; those fish that feed on zooplankton as well as those that feed on other fish.

These fish generally (and there are a number of exceptions) feed on small fish and crustaceans such as shrimp. This is a factor that often appeals to aquarists that want something different and a little bit more interactive. While it is generally desirable to train piscivores onto frozen foods, many people still like to watch their fish hunt live fish or shrimp. For anyone wanting to feed live fish to their piscivores, it is important that goldfish are avoided. The most common reason given is the high fat content but while this is a concern, the more important reason is that these fish contain Thiaminase. Thiaminase is an enzyme that breaks down Thiamin, more commonly known as vitamin B1, which helps to convert carbohydrates into glucose which is then metabolised to produce energy. Fish that are fed goldfish over long periods tend to become lethargic and lose their appetite.

One of the greatest considerations when choosing to keep these fish is water quality and filtration capacity. Any fish that is fed large amounts of meaty food will produce a higher amount of nitrogenous waste than many other fish. When looking at triggerfish, this is exacerbated by their feeding method which involves tearing chunks of food apart meaning that there is a lot of food waste on top of the waste produced by



Ambon Scorpionfish (*Pteroidichthys amboinensis*). Photo by Steve Childs.



Honeycomb Moray (*Gymnothorax favagineus*). Photo by Dr. Holger Krisp.

the fish. Many aquarists opt for more traditional filtration methods such as bio balls or canister filters due to their ability to rapidly reduce ammonia and nitrite to nitrate. This is fine for aquariums where no corals or anemones are being kept, but the resultant nitrate levels can be problematic for reef aquariums and this should be considered before purchasing any large fish with a diet that could lead to excessive nutrient levels.

MORAY EELS (MURAENIDAE)

There are a few families of marine eels such as the conger and garden eels of the family Congridae as well as the snake eels of the family Ophichthidae, but by far the most familiar to aquarists are the moray eels of the family Muraenidae. Ranging in size from around 40cm (15") to almost 2.5m (8'), there are some species that are ideally suited to home aquaria while there are others that are best observed in public aquaria or even better, in the wild. In general, given sufficient space, moray eels do quite well in captivity. They are generally quite willing to accept prepared foods such as fresh or frozen fish or shrimp/prawn. One notable exception are the ribbon eels (*Rhinomuraena quaesita*), whose diet consists primarily of small fish but they are extremely reluctant to accept non-living alternatives. Whether this is due to captive stress which causes the eels to be unwilling to feed or whether it is a lack of recognition of non-live fish as potential prey items is uncertain, although the former is more likely due to many aquarists having little success with live food alternatives, but the vast majority of ribbon eels that make their way into the aquarium trade fare very poorly in the average home aquarium.

One of the most important considerations for aquariums that are to house a moray eel is ensuring that all possible exits are covered. Moray eels have a tendency to find the smallest of gaps around lids or weirs through which to escape. It is not uncommon for owners of moray eels to find their eel flailing or even worse, dried up, on the floor in the morning after the eel has gone exploring overnight only to find itself outside the aquarium. The other consideration is tankmates; not only are most moray eels opportunistic predators and scavengers, they are also quite aggressive. Not only should all fish and crustaceans (such as ornamental shrimp) that are small enough to fit into the eels' mouth be avoided but also any fish that will



Blue Ribbon Eels, (*Rhinomuraena quaesita*) fare very poorly in the home aquarium and are best kept by advanced aquarists, with a specialty in eel husbandry. Photo by Chika Watanabe.



The Snowflake Moray, (*Echidna nebulosa*) is a hardy moray for the aquarium. Photo by Silke Baron.



The Jeweled Moray, (*Muraena lentiginosa*) is sometimes available in the aquarium trade.

Photo by Laszlo Ilyes.

occupy similar niches within the aquarium that are not sufficiently large to defend themselves. One exception to this is cleaner shrimp of the genus *Lysmata* which are not only tolerated by moray eels but in the wild moray eels will seek out cleaner shrimp to remove ecto-parasites from the eels' skin. Moray eels live generally live in crevices or caves within rockwork and once they have found a place they are happy with, they will rarely leave with the exception of short foraging trips. They will aggressively defend their territory and will not tolerate other fish encroaching on their space.

There are a number of species of moray eels that are quite placid and as long as sufficient filtration is in place to counter the high waste load produced by any piscivore, they can be kept with other commonly kept aquarium fish such as angelfish, clownfish and surgeonfish. Snowflake eels (*Echidna nebulosa*) as well as some of the smaller *Gymnothorax* species are generally quite tolerant of most other tankmates. These smaller eels, if kept well fed, will live happily and peacefully in most home aquariums.

SCORPIONFISHES (SCORPAENIDAE)

By far the most recognisable of the scorpionfishes are the lionfish of the subfamily Pteroinae. These highly recognisable fish are also some of the most caution-worthy fish available to aquarists. Like all scorpionfish, lionfish possess a series of venom glands located beneath the dorsal, anal and pelvic fins. While the venom



Zebra Lionfish (*Dendrochirus zebra*)

Photo by Jens Petersen.

produced is not generally lethal, it does deliver a very painful sting that is enough to deter potential predators not only from the initial attack but also subsequent attempts to consume other lionfish. It is also enough to make aquarists proceed with caution when transporting or introducing these fish to an aquarium, or even when putting a hand into the aquarium for maintenance.

While scorpionfishes are ambush predators and are generally considered to be on the aggressive end of the spectrum with respect to aquarium fish, the truth is scorpionfish are generally very peaceful except when it comes to fish or crustaceans that will fit comfortably (or sometimes not so comfortably) into the scorpionfish's mouth.

Without exception, scorpionfish are safe with sessile invertebrates such as corals and anemones. Motile invertebrates such as crustaceans, however, are far less compatible with scorpionfishes. Even cleaner shrimp, which often avoid the menu of fish that feed on shrimp, are fair game for lionfish and their kin. Like any ambush predator, scorpionfish should not



The Leaf Scorpionfish (*Taenianotus triacanthus*) is a smaller scorpionfish. Photo by Silke Baron.

We match internet prices!

Majestic aquariums

Online store

Shop for ALL your aquarium needs from home!

www.majesticaquariums.com.au

Fish tanks, filter kits, water heaters and coolers, used bargains, gift vouchers, books, DVDs, decorations...You name it, we've got what your aquarium needs! Call 02 9525 3474



Don't forget to check out our youtube channel that includes instructional videos, information you need to know and new product previews!

Our username is: Majesticvideos1



The Fu Manchu Lionfish, (*Dendrochirus biocellatus*) can be harder to train onto frozen foods.

Photo by Jenny Huang.



The Weedy Scorpionfish, (*Rhinopias frondosa*) is sometimes available in the aquarium trade.

Photo by Jenny Huang.



Stonefish (genus *Synanceia*) are rarely encountered in the marine aquarium hobby, though examples do exist. All species are highly venomous.

Photo by walknboston. <http://www.flickr.com/photos/walkn/>

be mixed with any fish that will fit into their mouth. Many scorpionfish can be trained to take prepared foods such as whitebait, prawns or similar meaty offerings, however some species are less willing than others. Some of the smaller lionfish, most notably the Fu Manchu Lionfish (*Dendrochirus biocellatus*) are quite difficult to train onto non-live foods but with some perseverance, even these fish are usually willing to accept frozen foods.

TRIGGERFISHES (BALISTIDAE)

The family Ballistidae contains a number of common aquarium fish ranging from the smaller Rhinecanthus triggers, which include the Picasso and Wedge-tail Triggerfish up to the much larger Clown Triggers (*Balistoides conspicillum*). There are larger triggerfish species, including the Titan Triggerfish (*Balistoides viridescens*) but these fish are not often seen in the aquarium trade. Triggerfish



The Common Lionfish is a truly spectacular animal. Photo by Jens Petersen.



Titan Triggerfish (*Balistoides viridescens*) are too large for the average marine aquarium.
Photo by Leonard Low.

belong to the order Tetraodontiformes, this group also includes the filefish, pufferfish and porcupine fish and their most notable common feature is their jaw structure. All of these fish have very powerful jaws which are used to crush their prey which can range from small fish to crustaceans or molluscs. Most triggerfish are also quite opportunistic and will feed on any meaty foods available, including corals. There are exceptions to the rule but for the most part, adding a triggerfish to a coral tank can be asking for problems.

Ideally, triggerfishes should be kept with tankmates that are of similar or greater size as even the most placid of species may be tempted to feed on smaller tankmates. Some species, such as the aforementioned Clown Triggers and Undulate Triggers (*Balistapus undulates*) are notoriously antisocial and should be kept either on their own or in a large aquarium.

REDFISH CLASSIFIEDS

Looking to advertise to people in your region?

Redfish Magazine Classifieds listings offer several advantages over traditional media. Contact us at enquiries@redfishmagazine.com.au to reserve your place!

Regional issues

With dedicated Australasian, North American and European issues your advertisements reach people in your region, maximising your impact.

Impact from back issues

Unlike traditional print magazines, back issues of Redfish Magazine remain online, free and available for download. This means your advertisements in Issue #3 aren't lost when Issue #4 is released and continue to promote your business to new readers of Redfish Magazine.

Link directly to your website

Our readers can simply touch (on iPads or similar devices) or click your advertisement to visit your company's website.

Affordable

Redfish Magazine Classifieds advertising is specifically designed with small business in mind. Sorted by state or province with 15 classifieds per page, it's an ideal way to promote your business online.





1



2



3



4



5

1. Picasso Triggerfish (*Rhinecanthus aculeatus*). 2. Clown Triggerfish (*Balistoides conspicillum*). 3. Bursa aka Blackbelly Triggerfish (*Rhinecanthus verrucosus*). 4. Sargassum Triggerfish (*Xanthichthys ringens*). Photo by Brian Gratwicke. 5. Arabian Picasso Triggerfish, aka Assasi Triggerfish (*Rhinecanthus assasi*). Photo by Rob @ <http://www.flickr.com/photos/bbmexplorer/>

with suitable tankmates such as large groupers or scorpionfishes, but there is even a risk of incompatibility there. With respect to compatibility with invertebrates, most aquarists will encounter issues when attempting to mix triggerfish with crustaceans such as shrimp and while they can be quite useful at eliminating mantis shrimp, they will also generally consume other, more desirable shrimp. Crustaceans make up a large portion of the diet of most triggerfish and should be avoided at all costs. Corals can be more hit and miss though, with some species of triggerfish being somewhat more compatible with coral tanks. Some species, such as those from the genera *Xanthichthys* and *Melichthys*, are relatively safe when kept with corals and other sessile invertebrates but caution should always be used when mixing triggerfish and corals.

While these fish can make very interesting or unusual additions to an aquarium, they all have attributes that make compatibility considerations both with respect to fish and invertebrates somewhat more critical. For many of these fish, aquarium size is also an important consideration as many of them can reach substantial sizes. Like any fish, the maximum size should be considered when selecting these fish as small juveniles are often made available that are only a fraction of their adult size which they can often reach in just a few years. 



Taenianotus triacanthus individuals are superbly camouflaged.

Photo by Steve Childs.



Aaron Sewell

In 2004 Aaron completed a BSc (Marine Science) at the University of Sydney with majors in marine biology and tropical marine science. Since 2001 he has been involved with the aquarium industry at hobbyist and retail level and now works in aquarium product development. Aaron is a former committee member of the Marine Aquarium Society of Sydney and has collected fish and corals in Fiji for the US and European aquarium industries. Aaron has been writing for several local and international aquarium magazines since 2004.

Your aquariums
made to order



0417 696 739

www.AquariumsToGo.com.au

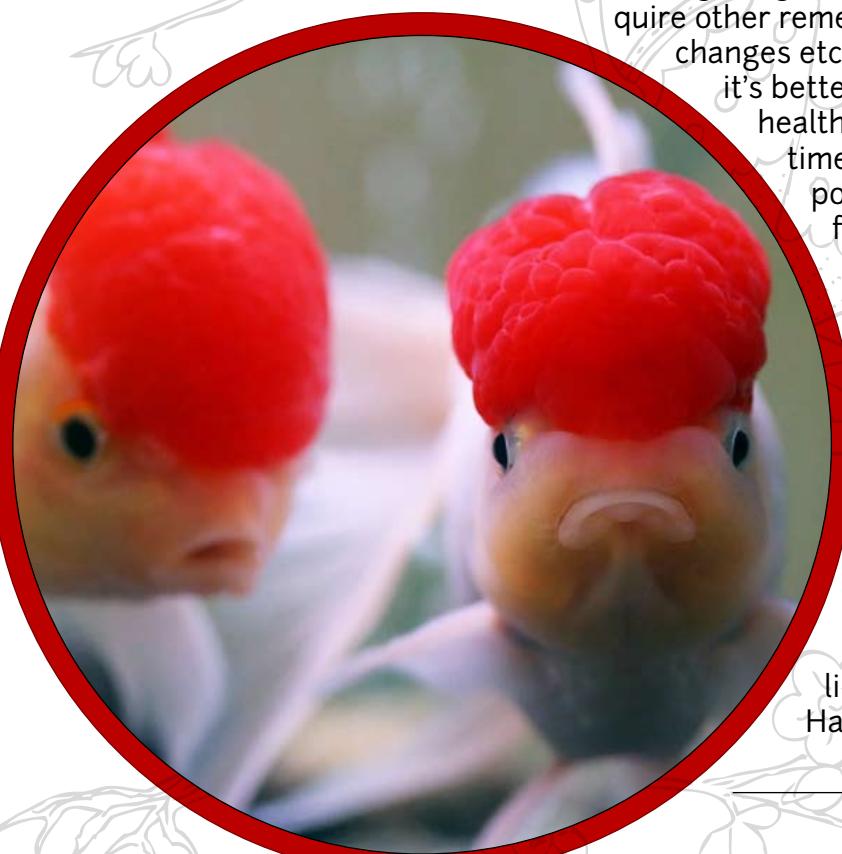
The Red-Cap Oranda is a fancy variety of the Common Goldfish (*Carassius auratus auratus*) that was developed around 1600 AD. It is very popular and widely kept. Like all fancy Goldfish though, they aren't as straightforward as their 'comet cousins'.

Description: Red-Cap Orandas are an ovate bodied variety with a deeply forked, thin-lobed tail. The breed standard requires that they be deep bodied (> 2/3 of their length in depth). All Red-Cap Orandas should be white in basal colour, with red limited to the 'rasberry-textured' wen (Hood or Cap) which should occur on the top of the head (and not all over the head of the fish).

Keeping: Red-Cap Orandas are relatively straightforward to keep. They should be housed in either well-filtered, covered ponds or in aquaria. They aren't as cold tolerant as the Common Goldfish or Comets and should be overwintered indoors in areas where frosts (or snow) occur. The variety swims relatively slowly and should not be housed with fast-swimming varieties where it would compete poorly for food.

It's important to stress that to be successful in the long-term, goldfish require a filter. All-in-one style, modern aquariums, that come with lights and an inbuilt filter are ideal for their care - better still they are easy to setup, maintain and look great! Dechlorinated water should be of neutral to alkaline pH. Placing a few sea shells into the aquarium (or the aquarium filter, if you don't like how they look in the tank!) with the goldfish can assist in maintenance of this pH.

In terms of stocking, as for all goldfish: a 60 x 30 cm tank (24" x 12") can house "30 cm (12 inches) of goldfish length" that is: 3x 10cm (4") fish or 2x 15 cm (6") fishes. Experts should feel free to break this rule, though beginners should be wary of doing so, as it will require other remedial action (improved filtration, more water changes etc). All goldfish tend to be messy feeders and it's better to stock more sparsely as this yields better health outcomes in your fishes. Goldfish live a long time, if yours don't - or they haven't in the past: poor water quality, due to overstocking, overfeeding, or underfiltering are the likely cause.



Feeding is straightforward, as all Goldfish, Red-Cap's included, readily consume high-quality flake and frozen foods. A good tip is, unless you have many aquariums, to buy your food in relatively small volumes. It's fresher, and this ensures your fish get the vitamins they need.

The Red-Cap is a beautiful goldfish variety and ideal for the novice who has a little experience under their belt. Follow the guidelines here and you should have success. Happy fishkeeping! 

Red-Cap Oranda

Aquarium Basics

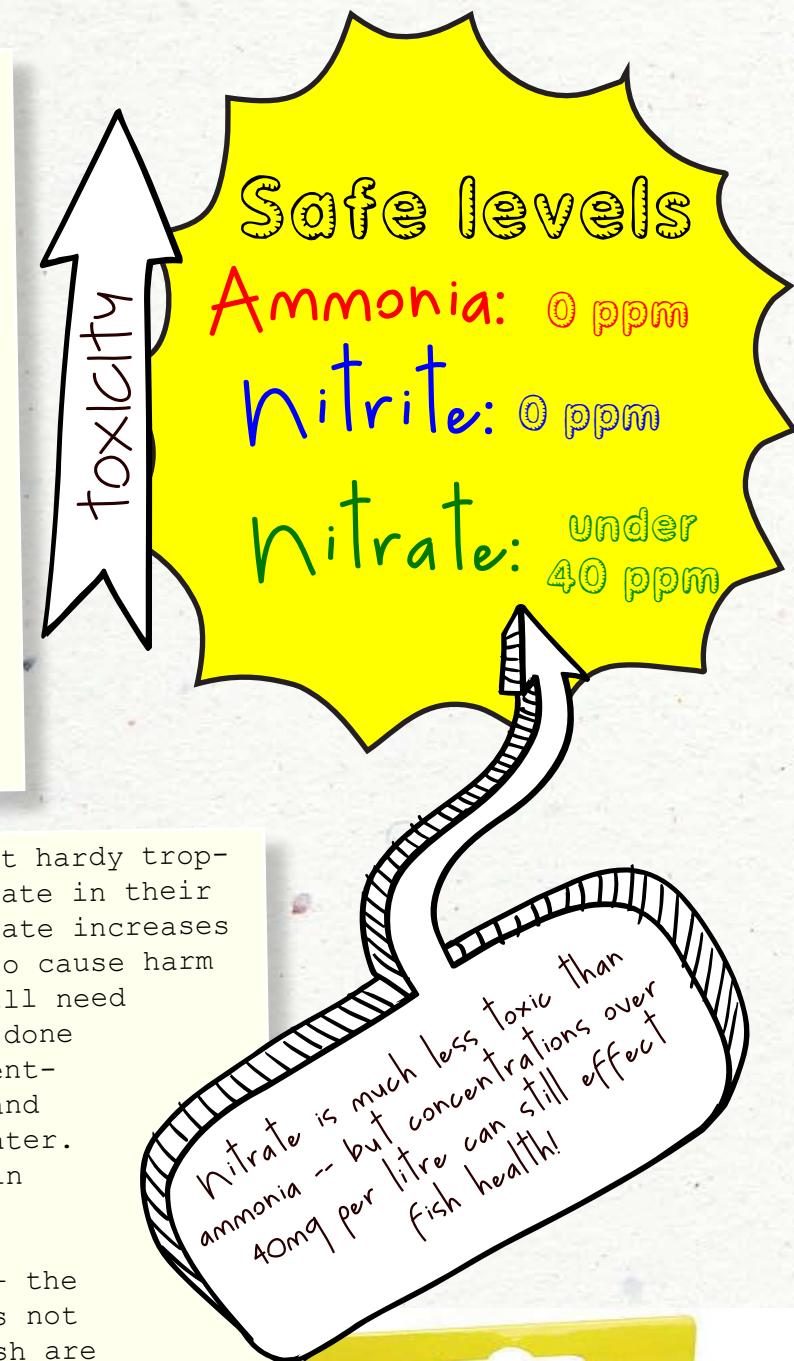
Part 3: Maintenance

Now that we've set our aquarium up and the fish are happy we need to make sure they stay that way, so of course there's going to be maintenance to do. This doesn't have to be onerous - a basic set-up such as the one we've put together over the last two issues should really be quite a low-maintenance system.

Waste from the fish is quickly broken down by the filter into ammonia, then nitrite and finally into the much less toxic nitrate. This nitrate will slowly but surely build up in the water as there really isn't anything in the tank which will remove it from the water (it is possible to have a system where nitrate gets removed - but this is quite complex and beyond

the scope of the average aquarium). Most hardy tropical fish will tolerate having some nitrate in their water, but as the concentration of nitrate increases so does the potential for it to start to cause harm to the fish, so at some point nitrate will need to be removed from the system. This is done through partial water changes - a percentage of water is removed from the tank and is replaced with fresh, nitrate-free water. This dilutes the nitrate that remains in the tank.

Water changes can be stressful on fish - the "new" water going in to the aquarium is not the same as the "old" water that the fish are used to. To avoid causing a great deal of stress to the fish only a small amount of the old water is removed and replaced - usually in the range of 10-30% of the volume of the tank and usually with a frequency of about once a week or fortnight. Of course, the new water going in needs to have been treated with an appropriate water ager to remove chlorine and/or chloramine which are present in most tap water supplies and which are toxic to fish. If everything has been going well in the tank and the fish are eating well and behaving normally, then there's really no need to regularly test for ammonia and nitrite - our filter is well cycled by now and we would not expect there to be any ammonia or nitrite



present if the filter is working normally. It can be worthwhile testing for nitrate though, to make sure that our maintenance schedule is keeping things at an acceptable level. The nitrate level will never be zero, since we'll never remove and replace 100% of the water at any one time. In a well maintained, basic set-up such as this one, having nitrate at around the level of < 40ppm is fine and won't harm hardy fish species.

It's important to check the pH of the water in the tank regularly. In most cases it will stay the same for long periods of time and from results like this it's easy to become complacent and assume that the pH will never change. However, even in very stable systems pH can slide one way or another and it's much better to catch it and correct it when it hasn't changed too much than to try and fix it when you notice that the fish are unwell. Most good pH test kits will come with buffers which can be used to correct the pH up or down, depending on the problem. For most fish it's safest to aim for a neutral pH (7), but of course there are exceptions to this - there are groups of fish which prefer their water to be more alkaline or acidic, so it pays to make sure you get good advice when purchasing fish for the aquarium to make sure that they'll be happy in the conditions that you have for them.

The filter itself will need a bit of TLC from time to time as well. For the most part it's best not to meddle too much with it - it's a living colony of beneficial bacteria that are doing the real filtration work and once they're set up and happy the less they're disturbed the better. Still, over time the mechanical filtration part of the filter will accumulate gunk which can clog up the filter and reduce the water flow through it, which in turn reduces the amount of oxygen flowing through the bacterial colony, making the colony unable to exist at their full capacity. So it's a good idea to regularly check that the filter is not getting clogged in any areas such as the intake, outflow areas or mechanical filtration areas. With the particular set up we've used the filter doesn't necessarily need to be switched off to access these parts for cleaning. If your filter does need to be switched off remember that when it is off there is no water flowing through it and no oxygen getting to the bacterial colony. Try to do any filter maintenance quickly - the lack of oxygen will soon cause the bacteria to start dying and if the filter is left off for too long you'll be back to square one with an uncycled filter, which is very bad news for the fish! As a guide it's usually not too detrimental if the filter is left off for 10 to 15 minutes, but best if it's not left off for longer. If any parts of the filter need washing it's a good idea to use some tank water to do this - all parts of the filter will have some of the helpful bacteria living there and rinsing in tap water will kill these bacteria, where rinsing in tank water will not.

Over time it's quite likely that algae will start to build up on most surfaces of the tank, especially the glass walls, which will obscure our view of the fish. The most basic way to remove the algae is by using a scrubber and old-fashioned elbow grease. If you're going to do it this way, note that some common kitchen scrubbers may contain chemicals which are toxic to fish, and some may scratch the aquarium glass. An easier way to clean the glass is to use a magnetic glass cleaner. They're designed for aquarium use, so no nasty chemicals are present and they should not scratch the glass. Best of all, you don't have to get wet when using them! Just be careful when scrubbing down close to the gravel - if you accidentally trap some gravel between the cleaner and the glass you can scratch the glass quite badly.

To make algae cleaning even easier, why not get a little helper to do it for you? There are a few hardy and commonly available fish species you can add to

your tank which like to eat algae and will do quite a good job of keeping it down. Bristlenose catfish, sucking loaches, Otocinclus catfish and Siamese algae eaters are some of the more useful species and are all interesting fish to have about as well. They'll help to keep algae off all surfaces in the tank, including the leaves of plants. You'll still need to do a little cleaning here and there, but overall the job will be reduced.

One of the best things you can do to keep the maintenance jobs to a minimum is to be sensible when feeding the fish. Just about every fishkeeper actually overfeeds their fish - they need less than you think. It's difficult to say exactly how much food to give, since this will depend on how many and what type of fish are in an individual set-up. However there are some guidelines which can help you work out how much to feed. Firstly, there should never be any uneaten food in the tank - if there is then you are feeding far, far too much! Most people have a general rule to feed only as

much as the fish can consume in about 30 seconds. Healthy adult fish should only need to be fed once a day, and giving them a "break" where one day a week they get no food at all is actually good for most fish. By not overfeeding there will be less waste in the water which will lead to a slower build-up of nitrate. This is in turn will result in a more stable pH (large amounts of nitrate can cause the pH to become acidic), less algae (nitrate is essentially fertiliser for algal growth) and reduces the frequency with which you need to do water changes (as there's less nitrate to remove).

Cleaning and maintenance aren't the most exciting things to do for an aquarium but they're essential jobs which are needed to keep everything healthy and running smoothly. A few quick checks and some regular but relatively quick cleaning activities mean that you can enjoy a great looking aquarium without having to do too much hard work!

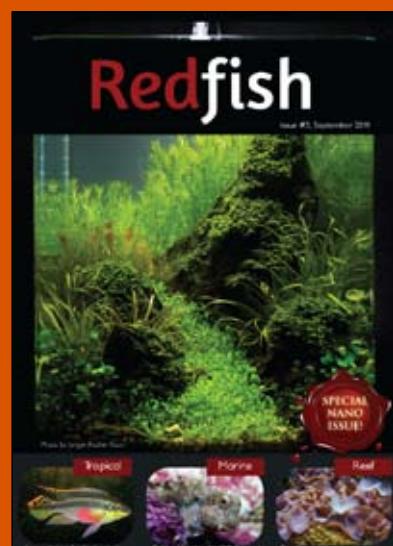
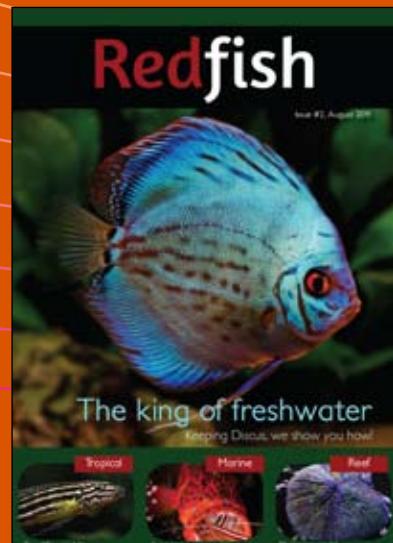
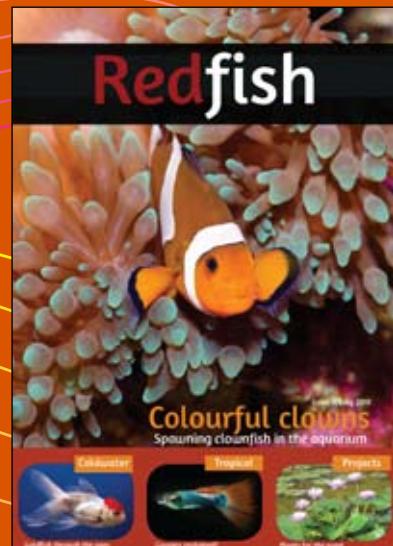
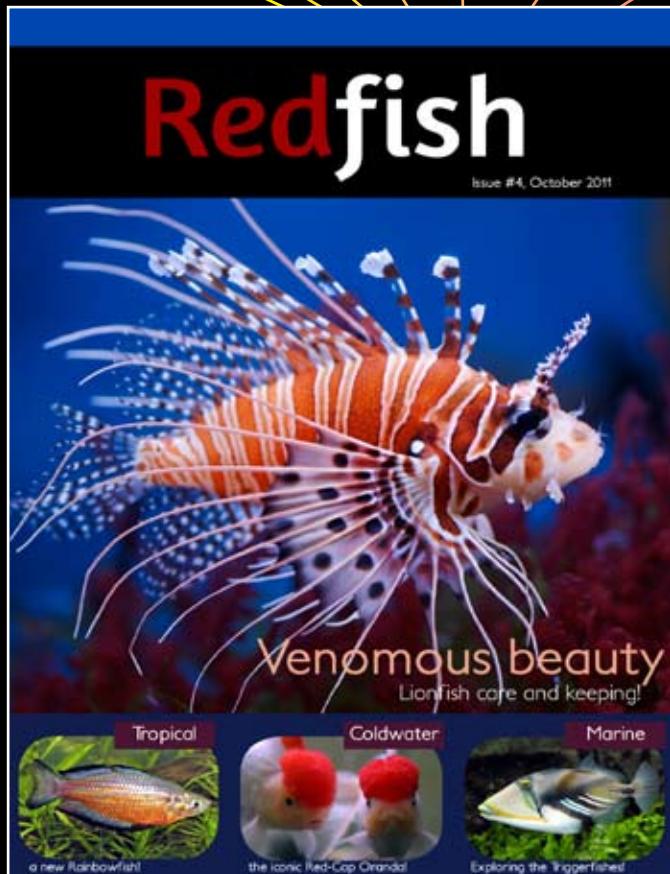
Algae Cleanup Crew!



TOP: BRISTLENOSE CATFISH
The bristlenose is an excellent choice for algae control and doesn't damage most plants.

MIDDLE: SUCKLING LOACH / CHINESE ALGAE EATER
The Chinese algae eater is a good choice while small. Larger specimens eat less algae and can be territorial.

BOTTOM: SIAMESE ALGAE EATER
The only fish known to eat "beard algae" this is a must have for the aquarist with plants in the aquarium. It's peaceful too, and rather attractive in its own right.



We hope you enjoyed this issue.
Please, tell a friend about **Redfish**.

www.redfishmagazine.com.au



CONTACT DETAILS
email: enquiries@redfishmagazine.com.au
web: www.redfishmagazine.com.au
fb: www.facebook.com/redfishmagazine
twitter: [@redfishmagazine](https://twitter.com/redfishmagazine)

Redfish Publishing Pty Ltd.
PO Box 109, Berowra Heights,
NSW, Australia. 2082.
ABN: 151 463 759