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# MALAWI BLUE DOLPHIN

## Common names

Malawi Blue Dolphin; Dolphin Cichlid

## Scientific name

*Cyrtocara moorii*

## Trade names

Malawi Humphead ; *Haplochromis moorii*

Ever since its introduction to the aquarium hobby some 25 years ago, this beautiful, bright blue cichlid has been a popular aquarium fish. It comes from Lake Malawi, and Lake Malombe, in Africa where it will be found living over sandy substrates.

One of its most remarkable characteristics is its distinctive nuchal hump which is present in both sexes. Wild specimens grow up to about 20 cm in the lake but captive raised fish tend to reach a larger size of up to 23cm. Despite its size this is a relatively peaceful species which does well in a community aquarium. This should not house mbuna type cichlids for they are far too territorial and aggressive to make good companions for this species. Other more peaceful cichlids would be a better choice. *Aulonocara* or *Lethrinops* species would be ideal.

This large fish needs a minimum tank length of 120 cm, in fact, the bigger the better! The aquarium should contain a few scattered rocks on an open, sandy substrate. A planted area is optional but would be appreciated by the fish. Large areas of *Vallisneria* occur in its native habitat so this would be the plant of choice for home aquarium use.

Water Conditions in the wild are not constant, although the pH remains close to 8.3 year round. The temperature fluctuates from 20°C in the dry season up to 30°C in sheltered, sandy bays during the rainy season. Such wide

temperature variations are not a good thing in captivity, so it is best to aim for a stable temperature of approximately 25°C throughout the year. The water needs to be moderately hard (7-10 dH) and alkaline (pH 7.3 - 8.0), although they will live and breed in softer or harder water as long as the pH is right. Water quality should be excellent with high oxygen levels maintained at all times.

Breeding is relatively simple, however, it is complicated by the sexes being almost identical but males will usually be larger than females of the same age. The male's hump is bigger and he is generally brighter coloured. This is not going to help you when buying fish from different sources, however, as you really need a group from which to choose. The best solution is to buy a group of youngsters and allow them to grow up together and sex out.

Dolphin Cichlids are maternal mouthbrooders who do not set up any territories in the wild. When a ripe female meets a male in breeding condition they will spawn directly on to the sand substrate. Once the male has fertilised the eggs they are taken into her mouth for incubation. This lasts from 18 to 25 days, with the brood size generally 30-80, with an average of 40-50 young being produced in captivity. The young are easy to rear on small live foods and flake or granular growth foods.

In the wild this species feeds on invertebrates and organic debris stirred up by large sand-sifting cichlids such as *Fossorochromis rostratus* & *Taeniolethrinops praeorbitalis*.

This method of feeding is impossible in captivity but they seem happy enough making do with foods such as *Daphnia* and mosquito larvae, whiteworm (*Enchytraeus*), *Artemia*, chopped earthworms, and chopped shrimp/prawn. Other live or frozen foods can be used as well as good quality flake and pellet foods.



Photograph: MP & C. Pledoir

# A WORD FROM THE EDITOR

Derek Lambert

The new front cover (created by Richard Tijou-Smith) has certainly provoked a great deal of comment with e-mails, letters and phone calls arriving from all parts of the country. Happily almost everyone has been very positive about our dramatic new image and seem to be looking forward to seeing what this month's cover will be.

Cover apart we have another magazine bursting at its seams with fishy information. Sonia recalls her first Malawi set-up and John Rundle is here with a fascinating article on keeping and breeding Pencilfish. Marine lovers have Wrasse and tasty Molluscs to get their teeth into, whilst we have a blast from the past with Arthur Bearder's piece on Goldfish. The Aqua Gardner (Stephen Hook) is back with another feature on aquarium plants and for those of you interested in pond plants make sure you check out the back page for our spotlight on Purple Loosestrife.

Watching Channel 4's coverage of the Chelsea Flower Show I was really pleased to see the way many gardens used ponds and water features to add life to their displays. Sadly fish were not in

evidence, despite several of the gardens having ponds large enough to house them, and looking round BBC Gardener's World show the same seemed to be true. Talking to some of the visitors at this show it was clear fish keeping has grown along with water gardening and we can look forward to many of these new aquarists starting with tropicals in the years to come.

Finally this month I have a new photograph of me again. Despite my spending many hours looking for a suitable photograph to go along with my editorial A&P's publisher was not satisfied with it (probably something to do with 2 people in it). So, out came my photo library and after another exhaustive search I managed to find this real gem. Here I am examining the catch at my local club pond hunt. My fish collecting days actually began as a youngster in Kingston & District Aquarist Society. Every year we would head on down to a local river and have a competition to see who could catch the best fish. Only hand nets were used and at the end all the fish were returned to their home but it was a great way to learn about our native fish.



## INTERNATIONAL KOI SHOW (UK)

**DATE: SATURDAY 5TH AUGUST & SUNDAY 6TH AUGUST 2000**  
**OPEN BOTH DAYS FROM 9.30am till 5.00pm**

VENUE: BILLING AQUADROME, CROW LANE, NORTHAMPTON.  
 ADMITTANCE: £3.00 PER PERSON CHILDREN FREE IF ACCOMPANIED BY AN ADULT.  
 (PLEASE NOTE BILLING AQUADROME MAKE A SMALL CHARGE PER CAR)

- On stage No.1. B.J. the Clown and his face painter.
- On stage No.2. The Tropical Islanders Steel Band.
- Dog obedience training demonstrates in main arena.
- Horse riding demonstrates in the main arena.
- Japanese Martial Arts demonstrates in main arena.
- Adults and childrens Bouncy Castles.
- For children: Quad Bikes, Skate Boards, and Toboggan rides.
- Animal man with Birds and Snakes.

As last years show was such a success we have booked a varied selection of attractions to make it a family weekend as well as for the serious koi keeper.  
 Participating Dealers: Cascade Water Gardens, Japanese Koi Co., Koi South West, Northern Koi & Aquatics, Crown Park Koi, Lincolnshire Koi, Ace of Koi, Q.S.S.C.D. Aquatics, Waterhouse Nishikoi, Walcot Koi, All Clear Purifiers, Selective Koi Sales, Kirei Koi, Kusuri Products, Purity On Tap, Classic Koi, plus many many more.

**There will also be a craft marquee where you will be able to buy that special gift.**

SHOW ARENA: For the hobbyist, please call us to book your exclusive vat.

It could be you who wins this years Supreme Grand Champion Award!

**PACKAGE WEEKEND** includes hotel accommodation (hotel on site which is brand new) a two day pass into the show, Dine/Dance Saturday evening.  
**All this for just £55.00 per person (sharing a twin/double room)**

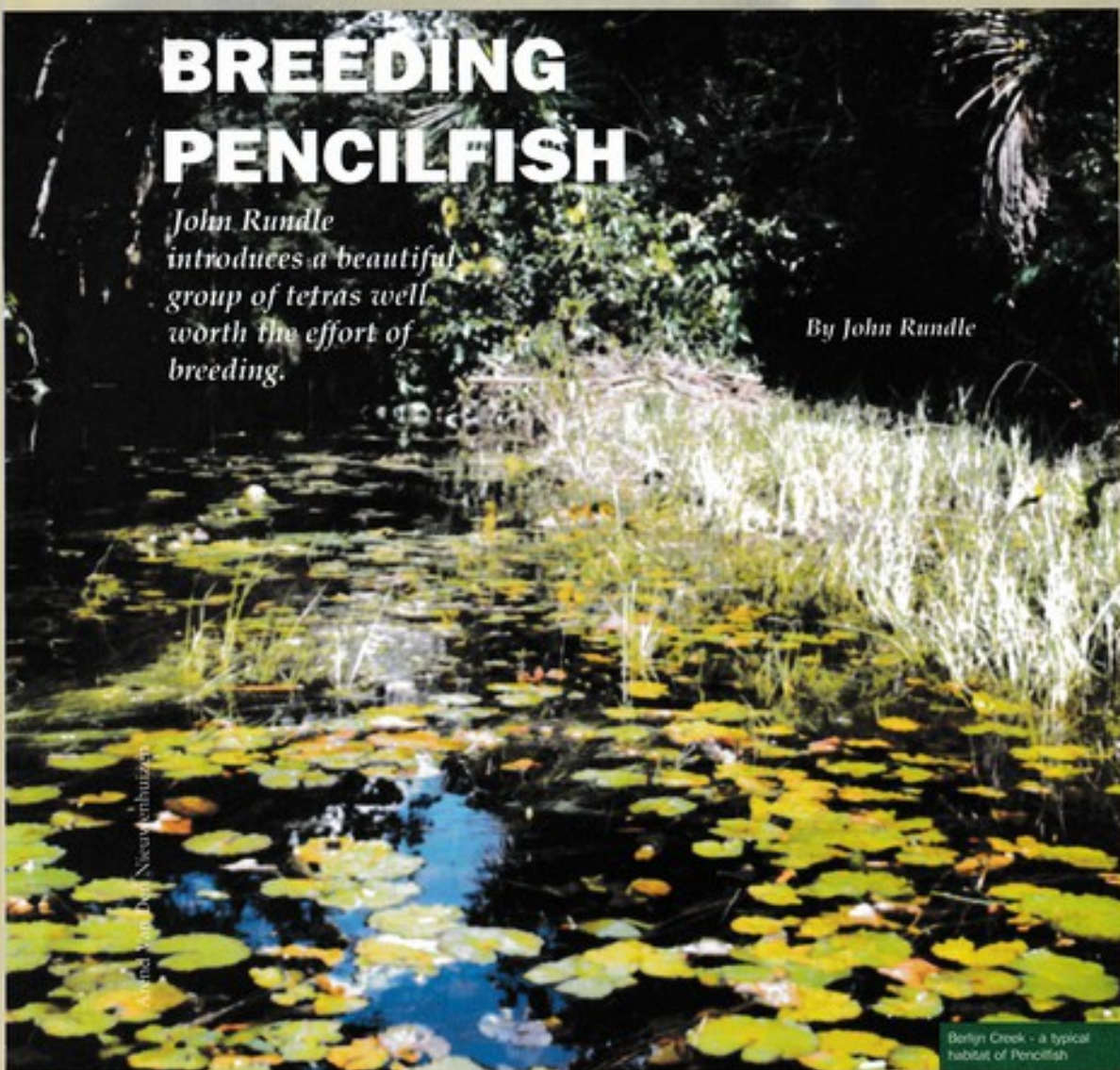
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 Northampton NN3 9DA

# BREEDING PENCILFISH

*John Rundle introduces a beautiful group of tetras well worth the effort of breeding.*

*By John Rundle*



Berlin Creek - a typical habitat of Pencilfish

I have always had a soft spot for the small group of popular tetras with the common name of Pencilfish, a name that describes it so well, for the entire group have body shapes that are slender and pencil like. They are attractively coloured, relatively small, and peaceful. These traits make them ideal for the community tank with fish of their own size and temperament. Another point in their favour is that most of the species can be bred without too many problems. Though having said this, if ever a fish tested my patience as a fish breeder then it would have to be the Pencilfish. I have seen books and magazines, which will tell you that they are no different to breed than for example, the Glowlight Tetra. All I can say is that this is definitely not the case.

This article covers the four species of Pencilfish that I have bred, these are - *Nannostomus beckfordi*, *N. eques*, *N. marginatus*, and *N. trifasciatus*.

## MAINTAINING THE BREEDING STOCK

When I first started keeping and breeding fish it was the norm to keep the sexes of intended breeding stock of the egg-scattering fish such as barbs, danios and tetras apart in separate tanks. For many years I have forgone this method for most of these fish and now keep them together, often in mixed species tanks. This would be the case with Pencilfish. In fact they have been kept in a community tank set up until required for breeding. They are, by nature, fish that shoal and should be kept in groups to see them at their best.

I have kept groups of Pencilfish in bare tanks in a fish house and also held them in planted tanks, and I have to say that the colours on the fish in the planted tanks are far superior to those in the bare tanks. So an ideal tank would be one that is densely planted and not brightly lit. I use

floating plant such as Amazon Frogbit (*Limnobium laevigatum*) to subdue the lighting.

It is obvious that in the wild they feed in the upper and mid water areas on small live food. In captivity, however, feeding is not a problem and they can be brought into breeding condition by using dry and live foods. A typical conditioning diet would be, good quality flake food, frozen Bloodworm, live Grindal worm and live white worm.

### WATER CONDITIONS

It is fair to say that Pencilfish live in biotopes where the water is considered soft and on the acidic side, and are seen at their best in these conditions in captivity. However, just like many tetras, they can be acclimatised to live in water that is moderately hard and has a neutral pH. In my experience when breeding species of these beautiful little fish I found that they would spawn in a neutral pH 7 or just below and a hardness of 0 to 8dH. A temperature range of 23°C to 28°C (73°F to 82°F) is ideal to keep pencilfish.

### SEXING

In mature fish there should be no problem when it comes to finding a pair for breeding. There are three main factors that can be used for this purpose. 1. Shape: The females are fuller in the abdomen than the males and the males are pencil slim (excuse the pun). 2. Colour: Males tend to have brighter colours when in breeding condition. 3. Fins: The anal fin of the males are rounded at the front end; the female's anal fin is pointed and straight-edged at the front.

### BREEDING

I have bred four species of Pencilfish using similar set-ups and methods. However there are differences between the species in their actual breeding strategies and these will be pointed out in their own CV's. First, however, we look at the points that are the same for all species.

#### Tank Size:

There is no need to use large tanks to breed Pencilfish. The obvious reasons are, because of their size and they only cover a small area when spawning. I use 40cm x 20cm x 30cm (16" x 8" x 12") tanks with the water depth at 15cm (6"). This will give a capacity of 18 litres (4 gallons).

#### Tank Set-up:

Of course Pencilfish, like many other tetras, when the conditions are correct will spawn in your community tank but the chances of raising any young fish from these natural type spawnings are very small. So fish breeders take some form of control by using the bare breeding tank method. When breeding Pencilfish, I believe that cleanliness is a must at all times. This starts when preparing the breeding tank; it must be well cleaned prior to filling with water. I use sea salt or cooking salt in a small amount of warm water to pre-clean the bare breeding tank. The salt not only acts as a steriliser but also as a mild abrasive until it dissolves.



Golden Pencilfish (*Nannostomus beckfordi*) - spawning. The male and female will both be in open water, usually under, or close to a plant leaf. In my case the Java Fern leaves, both will come close together, quiver and then release a few tiny clear eggs.

Arend Van Den Nieuwenhuizen

Pencilfish will, if allowed, eat their own eggs and they also can be somewhat fickle on deciding when to spawn and when to stop. To compensate for these facts I use tight fitting plastic net grids. These grids have a mesh of about 3 to 4 mm and are fitted so that there is about 12mm space between the grid and the base of the tank. On top of the grid a few very small pieces of Java Moss (*Vesiculana dubyana*) and a couple of large leaves of Java Fern (*Microsorium pteropus*) are placed. Make sure that the plants are very clean.

The water in my area is very soft so it comes straight from the tap when spawning these fish. This may not be the case in other areas, but if you keep to the parameters already mentioned you should not have a problem in obtaining success. The freshly filled tank is left for 24 hours with an open-ended airline producing bubbles that will help disperse any chlorine. The temperature is set to 26°C (78°F). You will find warmer temperatures quoted for breeding these fish but I have always found that this temperature and the fresh new water is enough to trigger spawning. No filtration is fitted at this stage; just keep the airline in the tank producing a slow flow of bubbles.

#### Spawning:

The important factor now is to choose a female that is showing signs of carrying eggs by having a fat belly region, then pick out the best male from your stock. I have tried using more than one pair in the same breeding tank, but found that as one pair decided to spawn the other pair had a free meal of eggs.

I usually introduce the pair of fish to the breeding tank in the evening, something I tend to do with most tetras. If the fish are in condition then the male will begin to chase the female in the morning, this can give the impression that they will breed the same day. This is not necessarily the case, they may dance and chase for as long as three days before deciding to spawn. On the other hand I have known them to

## TROPICAL

spawn twice over a period of four days. This can cause problems as the eggs hatch within 24 hours and the parents will eat any larvae fish. I have used a two-tank method, by removing the parents after one spawning and placing them in another tank where they spawned again.

When they do decide to spawn, the male and female will both be in open water, usually under, or close to a plant leaf. In my case the Java Fern leaves, both will come close together, quiver and then release a few tiny clear eggs. Then they will break off and chase some more. These acrobatics can last from one hour up to three hours. The eggs are transparent and are about 1.60 mm in cross section, and vary according to the species in adhesiveness. Numbers of eggs from one spawning can vary again according to the species; a good average is about 100.

### EGG CARE:

As soon as the parents have finished spawning they must be removed and the tank covered completely to protect the light sensitive eggs. In fact I have even spawned Pencilfish with the tank covered. I must point out that I have found that eggs are also sensitive to any build up of infusoria in the tank, so do not feed the parents in the breeding tank during the spawning period.

### FRY CARE:

At the recommended temperatures the eggs should hatch within 24/28 hours and can be seen as very tiny splinters of glass. Now fit a small sponge type filter, but do not feed the larvae at this stage. They will be sustained by their yolk sacs for about five days. By this time they should be free swimming and ready for their first food. Up to this stage I still keep the tank covered.

### FEEDING THE FRY:

This is a very critical time and the key word here is patience. Pencilfish fry are very tiny, so will require a minute source of food. I feed the fry my own cultured infusoria, which is of a dust like quality. I have even used cultured green water as a first food to feed one of the smaller species.

Not only must the food be small, but also it must be in a large enough quantity to prevent the fry having to hunt for it. A 200ml jar of my infusorians will last a brood of about 100/200 pencils until they take the next size of food.

This next stage of feeding can begin within 7/10 days from free swimming. It is wise to change around 25% of the tank water prior to feeding the second stage foods. The fry should now be large enough to take brine shrimp nauplii and micro worm. I tend to drop a very small amount of these live foods into the tank and watch to see whether the fry will take it. If so, I add amounts of food to suit the number of fry in the tank. Any uneaten food that could pollute the water should be removed as soon as possible.

### GROWTH RATE AND BROOD SIZE:

Pencilfish are not known for their speed of growth. They seem to grow well in their early stages, but then slow down and it could be with certain species that young fish will be only 25mm long at 15 weeks old. Of the species that I have bred the size of the broods raised varied from 50 to 200.

### CONCLUSION:

It is fair to say that I would not recommend Pencilfish as a first time breeding project for any one wishing to breed tetras. With a little experience, however, these beautiful little tetras can be a very rewarding fish to breed.

In the CV's opposite I cover any peculiar breeding traits of the species I have bred.



Photograph: M.P. & C. Pichot

Hockey Stick Pencilfish (*Nannostomus eques*) pair. There are three main factors that can be used for sexing Pencilfish:- Shape, the females are fuller in the abdomen than males. Colour, males tend to have brighter colours when in breeding condition and finnage, the anal fin of the males are rounded at the front end; the females anal fin is pointed and straight-edged at the front.

**Nannostomus Beckfordi**

Golden Pencilfish (*Nannostomus beckfordi*) are a good first time Pencilfish to breed. They spawn in the lower areas of the tank and may produce as many as 200 youngsters in a brood.

Arend Van Den Nieuwenhuizen

**FAMILY:** Lebiasinidae

**COMMON NAMES:** Golden Pencilfish or Beckford's Pencilfish

**ORIGINS:** Guyana; lower Rio Negro; central to lower Amazon.

**AQUARIUM TYPE:** Small species tank or Community tank with fish of its own size and nature.

**FEEDING POSITION:** Surface or midwater.

**SIZE:** 6.5 cm

**TEMPERATURE:** 23°C-28°C.

**DIET:** Flake, frozen foods and small live foods.

**SPECIAL TRAITS:** A good first time Pencilfish to breed. Will spawn in the lower areas of the tank. I have raised a brood of 200 fish from this one.

**Nannostomus Marginatus**

The Dwarf Pencilfish (*Nannostomus marginatus*) is a very attractive small Pencilfish. It is a very prolific spawner and the eggs were not so adhesive as the other species that I spawned.

Arend Van Den Nieuwenhuizen

**FAMILY:** Lebiasinidae

**COMMON NAMES:** Dwarf Pencilfish

**ORIGINS:** Guyana to Colombia and the lower Amazon.

**AQUARIUM TYPES:** Small species tank or community tank with fish of its own size or nature.

**FEEDING POSITION:** Surface or mid water.

**SIZE:** 3.5 cm

**TEMPERATURE:** 23°C -28°C

**DIET:** Flake, frozen foods and small live foods.

**SPECIAL TRAITS:** I found this very attractive small Pencilfish a very prolific spawner and the eggs not so adhesive as the other species that I spawned.

**Nannostomus Eques**

Hockey Stick Pencilfish (*Nannostomus eques*) can usually be found motionless, just beneath the surface of shallow waters in its characteristic position slanted upward at an angle of between 45 and 60 degrees from the horizontal. Even as small fry when just free-swimming (like this baby) they can be seen in their characteristic slant mode.



Arend Van Den Nieuwenhuizen

**FAMILY:** Lebiasinidae

**COMMON NAMES:** Hockey Stick Pencilfish, or Brown-tailed Pencilfish.

**ORIGINS:** Rio Negro, Brazil; Colombia; Guyana.

**AQUARIUM TYPE:** Small species tank or community tank with fish of its own size and nature.

**FEEDING POSITION:** Surface and mid water.

**SIZE:** 5cm.

**TEMPERATURE:** 23°C-28°C.

**DIET:** Flake, frozen foods and small live foods.

**SPECIAL TRAITS:** In the wild they can be found motionless, just beneath the surface of shallow waters in its characteristic position slanted upward at an angle of between 45 and 60 degrees from the horizontal. When breeding they attempt to lay their eggs on the undersides of the Java Fern leaves. While some eggs will stick, most will fall to the bottom. When the fry are free-swimming they can be seen in their characteristic slant mode. They are sexually mature at about 8 months old.

**Nannostomus Trifasciatus**

Three-Lined Pencilfish (*Nannostomus trifasciatus*) is one of the most attractive Pencilfish. It uses plant leaves to spawn under similar to *N. eques*.

Photographie: MIP & C Piednoir

**FAMILY:** Lebiasinidae

**COMMON NAMES:** Three-Lined Pencilfish.

**ORIGIN:** Brazil; Rio Tocantins; southern Amazon

**AQUARIUM TYPE:** Small species tank or community tank with fish of its own size and nature.

**FEEDING POSITION:** Surface and mid water.

**TEMPERATURE:** 23°C-28°C

**DIET:** Flake, frozen foods and small live foods.

**SPECIAL TRAITS:** This is one of the most attractive Pencilfish. It will use plant leaves to spawn under similar to *N. eques*.



# CLOWN LOACHES FROM INDONESIA

by Iggy Tavares PhD

Photographer: Iggy Tavares



Young clown loaches are social creatures which love to play together. A group like this make fascinating additions to a large community aquarium.

In February 2000, I had occasion to visit Jakarta, capital of Indonesia, as an invited speaker at a medical conference. The half-hour drive from the airport to the hotel ran through green belt areas with many ponds, where people fish at week-ends. The fast growing sky scraper section of Jakarta followed the green belt making for a stark contrast. My stay in Jakarta was unfortunately too short to see even the highlights of the city such as the old harbour of Sunda Kelapa or the Dutch colonial quarter still known as Batavia. Other places to visit are the National



Clown Loaches lying on top of each other or on their sides - 15000 in this concrete tank.

Museum, the modern Istiqlal Mosque and Taman Mini Indonesia Indah.

Fortunately, I had made arrangements from London to visit Jimmy Herlambang, 'King of Clown Loach' in Jakarta. Jimmy kindly picked me up from the hotel on the afternoon of my arrival and drove me in his jeep to his farm/holding station. Jimmy, an amiable man who speaks fluent English, gave me a lot of information about the fish world in Jakarta. There are many fish shops in Jakarta, some of them concentrated in certain streets, but we did not have time to visit them. There are many fish breeders in and around Jakarta, who supply larger wholesalers and exporters. Jimmy Herlambang falls into the category of wholesaler/exporter since he buys quality fish from other breeders. These include *Pseudotropheus lombardoi*, Black phantom and Red phantom tetras and Bumblebees to mention a few. Jimmy's business does, however, centre around the Clown loaches, which are wild caught and quarantined and grown on at Jimmy's farm.

#### CLOWN LOACHES FROM INDONESIA

Clown loaches are caught in the rivers of Borneo and Sumatra. The catching season extends from December through February each year, at which time the new season's young clown loaches in the rivers are over an inch long. Jimmy has visited the clown loach habitat and tells me that they are fairly big rivers in the forests. The young clown loaches though are only caught near the banks of these rivers. The fishermen have a unique method for catching young clown loaches and do not use nets. Rather, they set traps using the clown loaches' natural instincts to hide in holes during the day. The traps consist of seven or eight bamboo pieces about a metre in length tied together in a bundle. As you know, bamboo consists of hollow sections. One inch holes are cut into each section of the bamboo and the whole contraption is then filled with water and submerged in the river near the banks. Traps laid overnight are picked up the next day and are carefully decanted. They usually contain a good number of clown loach and just a few other small catfish. This method of catching young clown loaches is environmentally friendly as it does not destroy habitat or indiscriminately remove other fish species from the river. Moreover the limited catching season allows a sufficient number of clown loach to survive each year in the river. In any case, as the clown loaches grow larger they move away from the river banks making them more difficult to catch. Once caught the clown loaches are soon transported to fish farms to grow on.

#### CLOWN LOACH FARM

Jimmy Herlambang's farm consists of one large outhouse



Jimmy in his specially devised packing area.

containing a separate packing and holding area for outgoing fish. Jimmy has devised a special packaging system where oxygenated water is flowing through small containers holding the clown loaches waiting to be bagged up. His system ensures maximum packing efficiency and ultra clean oxygenated water in the bags.

The farm proper is occupied by 50 large concrete floor-standing tanks, although there are three banks holding around 500 small aquariums. Each concrete tank is 2 x 3 metres but was only filled to some 15 to 20 cm with water, yet each contained thousands of young clown loaches. Seeing so many clown loaches in each tank was an amazing sight. In spite of the numbers all the clown loaches looked very healthy. Jimmy is able to maintain so many clown loaches per tank because the water in the tanks is pristine. Each tank has its own pump, which continually circulates the water past a large UV

Jimmy Herlambang falls into the category of wholesaler/exporter since he buys quality fish from other breeders. These include *Pseudotropheus lombardoi*, Black phantom, Red phantom tetras (like this fish) and Bumblebees to mention a few.



Photograph: M.P. & C. Pridmore

sterilising lamp and into a large sponge filtration system. Water for the whole unit is in a large underground reservoir tank and consists of well water mixed with tap water. The clown loaches are fed three times a day primarily with clean live Tubifex worm and grow fast.

You can contact Jimmy Herlambang by e-mail on [naber@uminet.net.id](mailto:naber@uminet.net.id) or Fax 00 62 21 5800818 to get more information or arrange a visit.

### CLOWN LOACH IN THE AQUARIUM

The clown loach is probably one of the most recognisable fish because of its striking coloration of red and black. The orangey red body is transversed by three broad vertical black bands, which are more intense in younger fish. In older fish the black coloration may tend to fade a little. The pectoral, pelvic and caudal fins are all red, while the dorsal and anal fins carry black colour, which extends from the black bands. The clown loach's thickset body shape is designed for swimming and feeding on the bottom and therefore has a flat belly and a downward pointing mouth with fleshy lips and four pairs of barbels is set in a large head. The clown loach is smooth-skinned and does not have any scales. For protection the clown loach does have a switchblade, like erectile spine on each cheek which can cause painful injury to the hobbyist who does not handle the fish with care. These spines can get caught in the net while handling and have to be freed carefully. The clown loach, which can live up to 20 years, is a slow grower but can grow to 12 inches. Recently, I have occasionally seen beautiful 8-

inch specimens for sale although it is more usual to find 1-inch youngsters that cost around £5.00 each here in London.

The clown loach, *Botia macracantha*, belongs to the Cobitidae family and the suborder cypriniformes. It is found in shoals in the fast flowing, clear soft water streams in Borneo, Sumatra and Malay Peninsula where it is considered a food fish.

### AQUARIUM SET-UP

As clown loaches are social animals, a group of 4 to 6 could be part of a community tank set-up in an aquarium that is four feet long. The clown loach is not aggressive to other species and is sometimes even included in an aquarium containing discus. Preferred water conditions range from soft to neutral water, but not hard, maintained at a temperature of 25°C to 28°C. Clown loaches are intolerant of poor water conditions, which can lead to white spot caused by stress. The clown loach can also come down with Oodinium (Velvet) which can be treated with quinine sulphate. Water quality in a large tank is best maintained by outside canister filtration or even by an efficient under gravel filter powered by one or two powerheads that also provide a current in the tank.

Clown loaches are nocturnal by nature but in the aquarium they do spend a lot of time out and about during the day. They do, however, like to have a tank that offers lots of cover. This can be achieved by using plenty of bogwood in the aquarium. In the wild clown loach are shoaling fish and gather in groups ranging from 10 to as many as 1000. In aquaria, each clown

loach generally has a particular rock or bogwood that it likes to sit on and it will return here time and again. With a group a pecking order will quickly be established and although they show some territorial inclinations they are social creatures. With just two clown loaches in a tank there could be trouble as the dominant fish may bully the other fish. Generally though, a group of young fish are gregarious and playful. They sometimes lie on their side and play dead or lie on top of each other or playfully chase each other round. This behaviour should continue into adulthood with fish raised together.

In the wild clown loaches feed on worms, crustaceans, insects and snails. In the aquarium clown loaches will eat almost all foods that are offered. Because they are usually bottom feeders, suitable food is of the tablet type as well as any granular sinking foods. Clown loaches love eating earthworms and are also said to eat snails. When feeding they might produce a warning clicking noise to keep competitors away.

### BREEDING

In the wild, clown loaches spawn in the rainy season in groups in the vegetation along the banks. There are not many reports of clown loaches breeding in the aquarium. One of the main reasons for this is that most aquarists usually keep them singly, treating them as

just another catfish to clear up the uneaten food that other fish leave behind. To stand any chance of breeding the clown loach, one has to take the cues from nature. This would involve a group of mature specimens (at least 8 inches TL.), a large tank and plenty of live food for at least a month. Obviously the group should include both male and female fish, but they are difficult to tell apart, although males reportedly have concave tails while females retain V shaped tails. As the fish come into condition with the females filling out with eggs, the temperature should be raised into the middle 80s and frequent water changes performed. Should the fish spawn the parental group must be removed. Once the eggs have hatched and the fry are free swimming they can be fed with newly hatched brine shrimp and a powder fry food. The one report I heard regarding breeding involved the above conditions.

### CONCLUSIONS

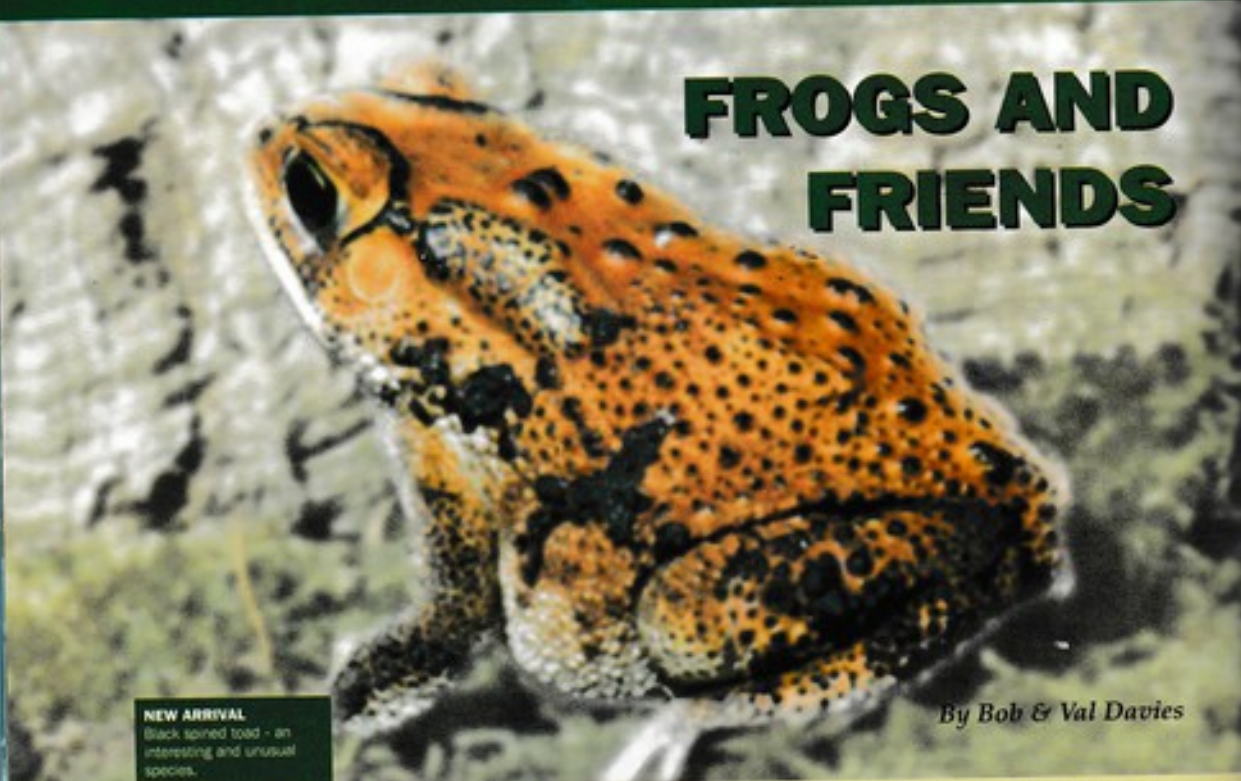
Clown loaches should not be treated as just colourful animals to clear up after your other fish have eaten. Like Corydoras, clown loaches prefer to live in a group, provided the aquarium is large enough. Starting with a young group, you will enjoy all the amusing antics of these animals as they live up to their name. The clown loach is expensive but is well worth the money as you obtain a long-lived, colourful and entertaining fish.



Photograph: M.P. & C. Pedinzer

The clown loach's thickest body shape is designed for swimming and feeding on the bottom and therefore has a fat belly and a downward pointing mouth with fleshy lips and four pairs of barbels set in a large head.

# FROGS AND FRIENDS



**NEW ARRIVAL**  
Black-spined toad - an interesting and unusual species.

By Bob & Val Davies

## LIFE IN THE DESERT - SAND SWIMMING

The title might sound like a new activity to amuse the children on holiday but it is a way of life for certain reptiles in the extensive areas of loose sand in North Africa and the Middle East. In spite of the hostile nature of such regions surprising numbers of reptiles (and some amphibians) have adapted to living in them. The salient features are high daytime temperatures (often with a dramatic drop at night), sparse vegetation which might increase for a short time after occasional rainfall and lack of water. Although some areas may receive precipitation in the form of mist or dew, rainfall may be seasonal or only occasional. Standing water is relatively rare and may soon disappear - it quickly percolates into the sand or evaporates. The highest dunes lack vegetation which is the basis of any food chain so life in such areas tends to occur at lower levels.

Controlling the body temperature at a suitable activity level and avoiding lethal maximum and minimum temperatures is vital. Some reptiles are heliotherms; they absorb radiant heat from the sun, others are thigmotherms; absorbing heat by conduction from their surroundings. Some heliotherms also partly use the latter method. Various methods are employed in heat absorption; certain species can flatten the body to provide a greater surface; tilting the back towards the sun. Others possess the ability to lighten and darken their coloration to absorb or reflect heat. Consequently, they tend to move about to maintain optimum conditions. Many geckos are thigmotherms and on cool nights will regularly return to warm areas (rocks) to 'top up' their body temperature.

In actual fact a desert can contain many microclimates - dark sand can retain heat better than light sand, rocks can provide coolness both underneath and on the shaded side; the base of bushes can provide cooler conditions and since

the air temperature rises after the ground heats up some relief can be found by climbing into bushes. Raising the body and alternately the feet is also practised by some lizards. As a last resort cooling can be induced by increasing the respiratory rate or panting (lizards) but this causes moisture loss and this can be fatal in a desert. An important microclimate is below the surface of the sand. Here can be found cooler, moister conditions in the day and warmth at night, as well as protection from predators and concealment from potential prey. Consequently a number of reptiles take advantage of this to cool down and reduce moisture loss.

Desert sand consists of more than 90% grains between 0.125 and 0.5mm. Fine particles, less than 0.063mm, constitute only one or two per cent. This particulate composition allows rapid percolation of any moisture to lower levels; free movement (not without friction) and most important; it holds air between the particles - vital for respiration when buried. Some desert reptiles will use burrows excavated by other mammals or may dig their own. Others bury themselves either by entering the sand head first or by using a sideways shuffling movement. The former is seen in the Awl-headed snake (*Lytrochynchus diadema*) the latter *Avicenna's viper* (*Cerastes vipera*).

The sand dweller par excellence, however, is the sandfish (*Scincus scincus*). As the name implies, it moves rapidly through loose sand as if swimming, although it is not the only lizard that possesses this ability. A number of physical adaptations equip this skink for such a lifestyle. Although it spends time on the surface - its toes have enlarged scales along the sides to assist movement on loose sand - it can disappear in a flash by diving into the sand when threatened or in order to thermoregulate. During swimming the limbs are held against the body - undulating movements of the body provide the locomotive power. The upper jaw overlaps



Sandfish about to nose-dive

the lower one to prevent the mouth being forced open by forward movement. The snout is cuneiform (wedge shaped) to aid penetration. The lower eyelids are translucent permitting the detection of light and dark when just below the sand surface. The nostrils can be closed by a 'valve' and the ear openings are protected by a row of fringed scales. Loose, dry sand behaves like a semi-liquid as animals burrow. It presses in around the animal but not from below. The scales of the sandfish have a layer of osteoderms (bony plates) to further strengthen the body. Extension of the thorax during respiration is facilitated by ventrolateral ridges which assist in forming a space under the thorax keeping the sand from pressing in too tightly.

Another noticeable feature, typical of certain reptiles that burrow or sand dive is the relatively short tail which reduces drag and is quickly drawn into cover when escaping. Like some other species from arid regions sandfish seldom drink. Some desert species do not drink at all, relying on the moisture content of their food. In fact too much humidity in a vivarium can cause respiratory infection and skin problems. If a water dish is supplied, it should be small and supported underneath on a stone which rests on the vivarium base to prevent burrowing creatures from overturning it thus causing wet conditions.

Since sandfish and other burrowers are occasionally on sale the above has implications for the keeper. Fine sand will soon clog their nose, ears and eyes. A fairly coarse, washed river sand or non-dusty bird sand should be used. It is worth noting that many skinks burrow in leaf litter or soft soil. Ideally the natural habitat should be ascertained before setting up the vivarium.

### NEW ARRIVALS - BLACK-SPINED TOADS

At a recent show we noticed some rather unusual toads; labelled 'yellow toads' they were actually black-spined toads (*Bufo melanostictus*). Having purchased a potential true pair we set about trying to find some information on them, particularly captive breeding. So far information seems scarce. Those on sale varied in colour from yellowish, dull orange, reddish brown to light brown. They are covered with scattered black tubercles; one reference says these are tipped with small spines but in our specimens they tend to be rather blunt. The lighter the background colour the more noticeable these are. Like other bufonids they possess a raised parotoid gland behind each eye. Parotoid glands are well endowed with pores from which a toxic substance oozes when toads are attacked (there is no assessment of the toxin's strength in *B. melanostictus* - it varies in other species).

One reference source gives their distribution as 'widespread in Southern Asia and Sunda Islands; up to 3000m in the Himalayas'. These particular specimens had come in from Indonesia. *B. melanostictus* is also referred to in a field guide to Borneo as 'Common Sunda toad' and 'Black-spotted

toad'. They are thought to have been introduced to Borneo and are the only Bornean species that does not live in forests but is found in areas disturbed by man: around villages and towns; often seen under street lamps catching insects attracted by the light. Temporary or permanent pools, cisterns and drainage ditches are used for breeding.

The pair have been installed in a 90 x 30 x 30cm (36 x 12 x 12in) aquarium with a substrate of soil-based potting compost, moss and dead leaves (oak and beech). Three cork bark caves provide hiding places in the damp area. A plastic tray of water is supplied should they require it. Occasional spraying to maintain a damp area is necessary. Crickets dusted with multivitamin supplement are readily taken.

So far no breeding activity has occurred although at least one of the two is a male. His call is a low rattling trill. There is little difference between males and females - the latter (up to 85mm) are a few millimetres longer but as the non-calling specimen has a plumper outline it could be a female. A paper published in the 1960s suggests that the lunar cycle affects breeding activity. The study, done in Java, where *B. melanostictus* breeds all year, found that more ovulating (egg-forming) females were evident at full moon than during the darker phases.

### CAUTION - ALWAYS READ THE LABEL!

Reading instructions is a good idea whether one is assembling a flatpack kitchen unit or taking tablets, although in some cases it must be said, they can be absolute 'gobbledygook'. Looking at instructions for a digital camera made in Taiwan the same procedure was given for two different (and opposite) functions. A recent occurrence brought home the consequences of ignoring instructions. An acquaintance showed us his royal python which had suffered severe burns to its body by lying too long on a heater mat. The snake was housed in a large plastic box, with the mat underneath. During a cold spell the ambient temperature in the box was insufficient, the snake had remained huddled over the mat trying to maintain an adequate body temperature. The mat was not controlled by a thermostat so the snake's body absorbed more and more heat although its exposed body surfaces were still too cold. As a result the unfortunate creature suffered horrendous burns along its belly (from which it is thankfully now recovering).

The mat was of relatively low wattage, placed under part of the box - a method used by many snake keepers. If uncontrolled the mat acts like a hotplate on a cooker - damage to the mat and the vivarium can occur particularly if a deep substrate is used as the substrate material acts as an insulator, producing a build-up of heat. An animal's body can also work in the same way. Manufacturers' instructions warn against the use of deep substrates and uncontrolled heating sources. Thermostats tend to be expensive but are worth every penny.



The results of an uncontrolled heater in a cold room

# A-Z OF REPTILES AND AMPHIBIANS

## KINOSTERNONIDAE

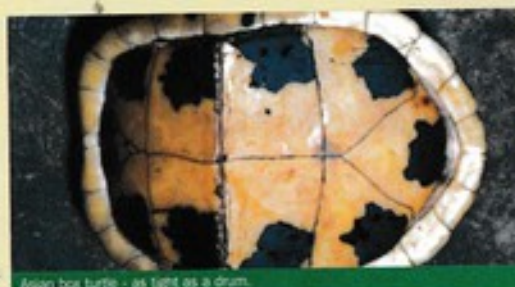
A family of freshwater turtles consisting of two genera; *Sternotherus* - the musk turtles and *Kinosternon* - the mud turtles. Both types are often referred to as 'stinkpots' or 'stinking jims' due to their habit of releasing a strong-smelling secretion from glands located either side of the body where the skin meets the carapace. In a stricter sense one particular species, *Sternotherus odoratus* is the 'true' stinkpot. The four species of musk turtles are found from Southern Ontario down as far as the Gulf states, mainly in the eastern half of the U.S.A. The mud turtles range from New England down to Argentina in South America. The genus contains around fifteen species, four in the U.S.A. Some may be subspecies and intergrades are known to occur. Distribution of mud turtles in the USA is again mainly in the eastern half although two species, the yellow mud (*K. flavescens*) and the Sonoran mud (*K. sonoriense*) occur farther west.

All species are relatively small, the largest being the scorpion mud turtle (*K. scorpioides*) at just over 20cm (8in). A wide variety of habitats are used; ponds, lakes wet meadows, ditches and slow-moving streams. The Eastern mud turtle (*K. subrubrum*) is tolerant of brackish water often being found near tidal marshes and on offshore islands. Temporary pools may be utilised until they dry up the turtles then move off overland to find new pools. Under water, both types tend to walk along the bottom as they forage.

Coloration above varies through brown, black, olive - some species possess reddish, yellow or white markings. The plastron is yellow, black or reddish brown. Colours tend to fade with age, younger specimens being brighter and more clearly marked than adults. Due to their habit of basking in shallow water with only the carapace exposed most specimens tend to develop a coat of algal growth which further enhances their camouflage. Possibly the most attractive is *K. cruentatum* from South America which has a bright red head. Both groups share certain characteristics: small fleshy barbels on the chin and neck, twenty two marginal scutes on the plastron; most other turtles have twenty five and a short tail which is longer in males with a hardened, clawlike tip. Males of most species have two patches of rough scales on each hind leg. According to species the carapace may be smooth or keeled. Young of some species are born with three keels which may disappear with age. The razor-backed musk turtle has a distinct central ridge with the plastron sloping sharply downwards - its keel is retained throughout life.

The main distinguishing feature is the plastron (undershell). *Sternotherus* have a relatively small plastron that offers little or no protection for the legs. The anterior part of the shell is hinged, although the hinge is not actually visible - gentle pressure on the anterior lobe will show its presence. The two pectoral scutes are squarish in shape. Pectoral scutes are the two shields or 'plates' anterior to the central pair of scutes. *Kinosternon* has a much larger plastron with two visible hinges providing much better protection. Hinges are not developed in the young of either genus. The pectoral scutes of *Kinosternon* are triangular.

Not being the most colourful turtles neither



Asian box turtle - as tight as a drum.

genus have achieved the popularity of species such as red-ears. Relatively few are seen in the trade, the most common are the stinkpot, the Eastern mud turtle (*K. cruentatum*) and the striped mud turtle (*K. baurii*). South American species are seldom if ever imported. The stinkpot, having the most northerly range, is a hardy species suitable for outdoor (escape-proof) enclosures. Its small size and omnivorous habits make it easy to care for. If kept in an aquarium it needs clean water and a land area. Captive breeding to several generations has been recorded. The mud turtles, owing to their more southerly range, are not quite as hardy and might not tolerate British winters outside. They can be long-lived in captivity - over fifty years has been noted. Both genera have sharp, strong jaws - even baby specimens can give a sharp nip. It is worth mentioning that a group of turtles known as Mexican musk turtles belong to a different family; the *Stawrotypididae* which has three species in two genera.

## KINESIS

Hinged or kinetic shells as mentioned in the mud and musk turtles occur in various other chelonian species. The hinge-backed tortoises (*Kinixys*) are unique in having the posterior part of the carapace hinged, in other species hinges occur in the plastron. In 'hinged' species the hinges are not apparent in young specimens; they develop as the animal grows. Several species of *Testudo*, particularly adult females, have limited kinesis of the posterior lobe of the plastron possibly to facilitate egg-laying. The hinge mechanism differs in various species although the hinge may be in the same position the nature of the bridge (connection between plastron and carapace) can differ thus enabling closure of both halves of the plastron in some species but only the posterior half in others. An example of this is found when comparing the Asian Box turtle (*Cuora* spp.) which can close both halves and the spiny turtle (*Heosemys*). The bridge in *Heosemys* is partly ossified whereas that in *Cuora* is more fibrous giving greater flexibility.

A kinetic anterior only plastral lobe (as in *Sternotherus*) would seem to have more to do with permitting threat behaviour with open jaws when the head is partially withdrawn than with protection, although in the African hinged terrapins (*Peliasios*) the anterior hinged lobe closes to protect the head and neck. This genus is side-necked: the head is not withdrawn but 'folded' sideways under the shell. Other sidenecks do not have a hinged plastron.

Generalised kinesis occurs in the pancake tortoise (*Malacochersus tornieri*), the complete shell is relatively thin and soft allowing distension of the body so that the animal can wedge itself in crevices. No hinge is involved. Complete protection is seen in *Cuora* and the American box turtles (*Terrapene*) - the two lobes of the plastron close making it practically impossible to open them.



Stinkpot turtle - a good pet in spite of its name.

# YOUR ESSENTIAL GUIDE TO BEGINNING WITH FISH

## ESSENTIAL QUESTIONS :-

*What is the correct temperature for my fish?*

Freshwater tropicals	70 - 80°F
Coldwater	55 - 70°F
Marines	75 - 79°F

Again some delicate species have very specific requirements, so read up on them before you purchase.

*How many fish can I keep?*

### Freshwater

For freshwater aquaria it is safest to work on surface area rather than volume. We recommend 12 sq. inches of surface area per 1" of adult fish. This means you must take into account how big your fish will grow to, not just how big they are when you buy them.

### Marines

Marines require a different method of working out the number of fish you can house in an aquarium. You need to work on volume here and 1 inch of fish to every 6 gallons of water is a safe stocking level for a reef style aquarium. Fish only tanks can house more fish, but the exact level will depend on how good your filtration system is. Again you need to find out how big your fish grow to rather than just measure how big they are now.

### Ponds

Ponds are usually calculated on volume and for a filtered pond you can house an absolute maximum of 100 inches of fish per 1000 gallons. It is vital to remember this only works when you calculate it on the final size of your fish - not the current size. A 6" Koi will grow to 24" long and increase its weight 50 - fold! This can happen very quickly and often leads to ponds becoming over stocked with fatal results.

*How should I light my aquarium?*

Correct lighting is vital for plants, corals and other invertebrates. All too often beginners buy set-ups which are not designed to do what they want to. Make sure you have lighting designed for plant growing and ask your local aquarium shop for advice on marines.

*Why can't I add fish directly to a new aquarium?*

When a new aquarium or pond is set up you should test for Ammonia and Nitrite every day. Initially you will see ammonia levels rise and then start to fall. Then nitrite levels will rise and fall. After this you can be sure your biological filters have developed a healthy colony of bacteria which will break down fish wastes.

During this initial period the aquarium or pond should not house any fish. Once these two poisons have peaked and dropped back to safe levels again you can start putting a few fish into your aquarium or pond. No more than 4 to start with followed by a slow build up in numbers over a period of months. This way you will avoid sudden spikes in ammonia or nitrite levels which will harm your fish.

Once your aquarium has become established it is still important to check for ammonia and nitrite every 2 weeks or whenever the fish look ill. Most health problems can be traced back to poor water quality so it makes sense to look at this first.

Nitrates will build up over a period of time and will also need

monitoring. In some areas of the U.K. aquarists have been reporting high nitrate levels in their tapwater. If this is the case in your area you will need to find a way of reducing these before you use tapwater for topping up. A vegetable filter works very well given enough time, alternatively you can buy a water purifier specifically designed to remove nitrates.

*Are live plants essential in a freshwater aquarium?*

The simple answer is no but they are beneficial and we strongly recommend you grow some in all but exceptional circumstances. The reason for this is that they remove nitrate from the water. This pollutant is the end product of normal aerobic filtration and whilst at low levels it is unlikely to kill your fish, it will still stress them, which can lead to health problems.

Two other important aspects to consider are :-

1. That they provide cover for your fish and create a more natural environment.
2. Reduce the likelihood of algae becoming a problem.

*Water changes - how much & how often?*

### Freshwater

In freshwater aquaria you should change 10 to 20% of the water weekly. If you live in a water area where chloramine is added to your tap water it is essential to add a water conditioner to the fresh water before use.

### Marines

The ideal here is 20% every two weeks. This will reduce nitrates to a safe level and replenish the vital minerals and trace elements. Never change larger volumes of water than this, however, as large water changes in a marine aquarium may cause osmotic shock or other problems which will harm fish or invertebrates.



Photograph: Keith Lambert

### Ponds

Pond fish also benefit from regular water changes but here it is rarely practical to change large volumes on a regular basis. Even so regular water changes should be carried out and ammonia, nitrite and nitrate levels monitored regularly or whenever the fish look in distress. With enough growing plants in the pond nitrate should be reduced naturally and providing your pond is not overstocked or over fed, ammonia and nitrite should always read zero in a mature setup.

*What is the correct pH range for my fish?*

Freshwater	pH 6.5 - pH 8
Marine	pH 8.2 - pH 8.4

However, certain delicate fish and invertebrates have specific requirements, so check before you buy any animal.



# ASK **AP**

quarist pondkeeper

Your queries solved here.... with the featured problem winning a prize from **ALGARDE**

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Send your queries to: Ask A+P Inverte Magazines Limited, Suite 4, Invecla Business Centre, Orbital Park, Ashford Kent, TN24 0HD or E-mail them to [askpeditors@btinternet.com](mailto:askpeditors@btinternet.com). All letters accompanied by SAE will receive a personal reply regardless of whether they appear in the magazine.

## STAR LETTER - TROPICAL

### BREEDING ANGELFISH

**Q** For the last 6 months I have been trying to breed my Angel fish. I started with what I thought was a compatible pair, but their eggs never hatched or were eaten. About 11/2 months ago I changed the pair and now I have been partially successful. They still seem to eat the clutch when disturbed in any way, even for feeding or lighting, yet if I take the eggs out and place them in a container in the tank in the same water that is aerated, the eggs hatch but the fry only last a few days before dying, even though I am feeding them on liquid fry food at the right dose. I have been to all the aquariums in my local area and got all the books on angel fish that I can get, but nothing seems to tell me how to stop this from happening. Can you please help me out because I am now stuck.

*P.M.Cook via Internet.*

**A** Angel fish can be real problems when it comes to breeding. Your problem with the original pair is fairly common and giving young fish time to mature might have solved it. On the other hand you may have been sold two females as a pair or just been unlucky and bought a pair which will not look after their eggs or young.

The second pair you have are obviously fertile and providing you get the young feeding correctly should give you good results in the future. The adults may well look after their young if you leave them

well alone. Egg eating after the lights have been turned on is a problem my own fish have exhibited from time to time. A simple solution is to leave the lights on all the time whilst they are caring for eggs and young. It does not harm the fish and prevents the adults from "forgetting" about their offspring.

If you do have a pair which continue to eat eggs and fry, then you will have to remove the fry to a separate aquarium for rearing. I try to wait until they have hatched out and then move them over to the rearing tank. This aquarium should be about 18l long and need not contain any filtration - just very gentle aeration.

Once the fry are free swimming you can start feeding them a liquid fry food or infusoria. With either of these foods it is very easy to pollute the water by adding too much, or starve the fry by not adding enough. Nobody (including any instructions on the pack) can tell you exactly how much to put in. You need enough to just cloud the water and then wait until the cloudiness has faded. Two to three feeds a day should be about right. Angel fish fry will often be large enough to handle newly hatched brine shrimp or Microworms as soon as they are free swimming. So I also give them a little of these foods right from the start as well. Feed them very sparingly until you are sure the youngsters can handle these larger foods and then stop feeding the liquid fry food.

This initial period is by far and away the most difficult part of rearing Angel fish, so once you have overcome it you should be able to rear batch after batch of them without any problem.

## HEALTH

**Q** Over the last couple of weeks I have been keeping a close eye on one of my angel fish. For some reason the fish does not seem to be eating, yet all my other angel fish are doing fine. Could you enlighten me on any reason for this and more importantly is there a cure because I don't want to lose the fish?

*P.M.Cook via Internet.*

**A** This is a very difficult question to answer because so many different things can cause a fish to go off its food. Without more information and looking at the fish I don't think I can come up with any sensible answer except to suggest keeping an eye out for bullying and make sure your water quality is OK. It is so easy for the water quality to slip without your realising it and it will be the weakest fish in an aquarium which shows the symptoms first. If everything checks out OK then watch for a bully. They can chivvy a fish to the point where it no longer feeds and eventually dies.



**ALGARDE**

These pages are generously supported by Algarde who are offering a Midi Therm Electronic Thermostat suitable for aquarium or vivarium use as a prize for the featured problem. The unit, with a 300 watt handling capacity, has two heater connections and a fully waterproof probe which senses water (or air) temperature and easy-to-follow instructions.

## NEW AQUARIUM

**Q** I have just set up my aquarium and I am wondering when I should do my first water change. Should I do one weekly or should I wait a month or so for the filter to mature? I have a fluval 204 external filter and with my tank having a lot of plants in it what sort of filtration should I be using? At the moment I am using foam, carbon, bio-max ceramic and JBL symec synthetic filter floss, is this OK or should I use something else? Also should I use the spray bar or the funnel?

*Terry Hull.*

**A** You should start your water changes the first week after setting up an aquarium and nitrates which are bound to build up during the first few weeks that an aquarium filter system is up and running. Initially change 20% (1/5th) of your water twice a week. Add a de-chlorinator to the fresh water before you top your

aquarium up with it. Once the filter has matured this can be dropped down to weekly water changes.

The filter media you mention are fine for your filter. Remember to change the floss and carbon regularly and only wash the other media out in old aquarium water - never tapwater as this will kill the filter bacteria.

Personally I would use the spray bar rather than funnel as this creates less water movement in your aquarium and increases gaseous exchange at the surface.

There are not very many plant books on the market and fewer which concentrate on Dutch style aquaria. I will have to check up on what is available but I do know TFH do several worthwhile ones. The Japanese are also into aquatic gardening and have written a couple of interesting looking books as well.

## COLDWATER

**Q** The water lilies in my pond have covered the surface and I cannot see my fish. Is there anything I can do about it?

*J. Dodge, Wolverhampton.*

**A** You have probably made the same mistake that many of us have made when we first started a pond. We all have visions of a pond with flourishing water plants and flowering lilies and just cannot wait long enough for this to happen naturally. We therefore put into the pond too many or too large growing types of plants, and in no time the pond is in such a state of over-growth that the fishes cannot be seen. It is a better plan to try to visualise your pond three or four years ahead, and plant accordingly. If the pond is a small one only the smaller growing types of water lilies should be used.

You can cut away some of the older leaves of the lily so that some of the water surface is clear, and then in the spring either remove the lily (if it is of the very large type replace it with a smaller kind) or you can cut the old one up so that there is not too much left to spread all over the pond.

**Q** I have a fairly large pond and find it very difficult to catch my fish on occasions; is there an easy way of doing so?

*P. Capri, London.*

**A** I am afraid there is no easy way. I wish there was one, since I have had the same trouble when catching fish for a show. You might try to feed the fishes always at the same spot and at the same times each day. Once you can get the fishes used to congregating at the same place it is simple to lower a good wide net in the water before feeding. Then when the fishes are over the net a careful lift will catch several. Do not try to repeat the catch until an interval has elapsed so that the fishes which were not caught have a chance to settle down. Any net for catching fish in the pond should have as large a mesh as possible. A fine meshed one is too slow to drag after swift moving fish. You will find that the larger the fish then the larger the mesh of the net should be.

When trying to catch a particular fish in a pond never make a hurried dart at it, but try a quiet approach at first. Once you have missed the fish and startled it you will find that it will become artful and remain hidden for a long time. I find that most fishes are most tractable at night time, and if you use a torch to locate your fish it will be easier.

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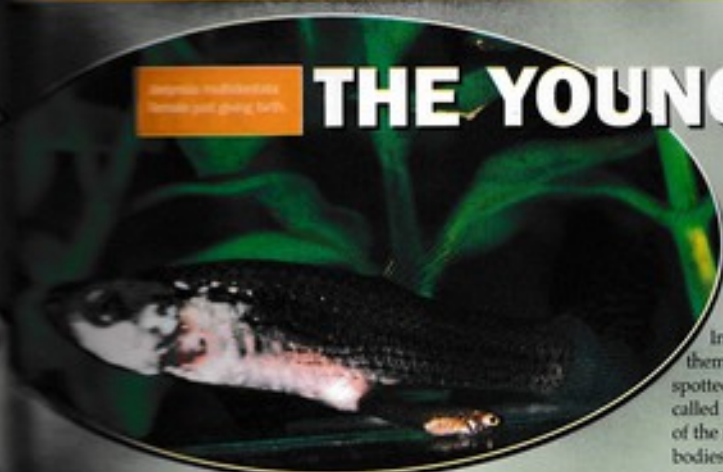
**Q** I have a Bristol shubunkin which I think is good enough to show. How should I go about this?  
*J. Barnes, Nottingham*

**A** If you have never exhibited a fish before you should join an aquarist club first if possible. There is one in your area and there would be many members of the club who would be only too pleased to advise you as to the value of your fish as a show specimen. Most clubs hold table shows and by putting your fish against others you would soon see its true worth. There is nothing better than seeing your fish in a show tank alongside another to assess its real value. You could also visit public shows to see how your fish compares with those exhibited, but unless the finer points of judging are pointed out it may not be of much benefit to you. It is possible to buy a book of Goldfish Standards which will help you a good deal. Really to assess the true value of a fish it is essential that you exhibit, so that you may obtain an outside opinion of it.

*Parachanna mlaboulana female just giving birth*

# THE YOUNG AQUARIST

*From our earliest fishkeeping days we have been very interested in breeding fish and nowadays fish breeding is the main focus of my interest. This month I want to talk to you about the prelude to breeding tropical fish.*



In order to breed your fish you need to be able to sex them. In the commonly kept livebearers the male is easily spotted as his anal fin is elongated into a rod like structure called a gonopodium. Egglayers are more difficult but in many of the species the males are more highly coloured with slimmer bodies than the females. Often the finnage is slightly different as well. Many of the barbs are like this but the sexing of many species can be difficult for the beginner.

Common species of livebearers such as Guppies, Platies, Mollies and Swordtails, (these are the livebearing species I shall be dealing with) breed easily in a community tank, but it is uncontrolled breeding and in the aquarium this is the worst kind of breeding if you wish to produce good stock. (This was covered in last month's column). Although these livebearers breed very easily you will have a problem with the quality of the young. Ideally you need to select the parents and this is another problem, for female livebearers can store sperm from one mating and go on to produce several broods at monthly intervals from that one mating. This means that when you buy your fish they are already fertilised, so you have no control over the pairing of your fish either. When people tell you that livebearers are easy to breed they only tell you half of the story don't they?

If you have chosen your community fish with care (and you should always buy the best) your breeders should come from there. Remember that the rules for choosing fish are lively and active species swimming in a manner appropriate to their kind. They should not be thin or weedy but have a robust body structure.

Compared to many of the egglayers who lay vast numbers of eggs livebearers produce small broods, but the fry are easy to find as they are quite large when newly born. Many of the egglayers are so small at birth that feeding them can cause major problems. Gouramis and some Rainbowfish have tiny fry which need specialised feeding. If you wish to breed egglayers it is much better to start with some of the easier ones. (See the list of easy breeders).

Your fish will only breed easily and willingly when they are in top condition. This means they should be given special treatment before attempts are made to spawn them. Live foods are an important part of the special treatment.

Livebearers and many of the egglayers will spawn in your community tank if they are in good condition and the tank is well maintained, but your chances of saving any of the spawning are very slim with all those other fish waiting for a tasty morsel of eggs or baby livebearer fry.

So you will need to set up an 18x10x10 breeding tank for your breeders. There are books on the market which will help you with the lay-out for breeding the species you are interested in. I'm sure you will find breeding fish a very worthwhile experience.

Until next month - Pat

## BREEDING METHODS USED BY FISH

- Egg scatterers who just scatter their eggs into plants or gravel.
- Bubble-nesters who build a nest of bubbles at the surface in which they place their eggs which are guarded by the male until they are old enough to leave the nest.
- Mouth-brooders who hold their young in their mouths until they are old enough to look after themselves.
- Livebearers who keep their young inside their body until they are fully formed and emerge as tiny replicas of their parents.
- Other methods are used but they are unusual. The above four are the commonest.

## EASILY BRED FISHES

Livebearers like Guppies, Platies, Mollies, and Swordtails.  
Egglayers - Kribensis and many other cichlids.  
Most Killifish, if you can provide plenty of live food and have suitable water. Panchax are good Killifish to start with.  
Barbs, Danios and Minnows. Good species to start with are - Whitecloud mountain minnows, Zebra danios, Rosy barbs but there are many others.  
Catfish like Ancistrus and most Corydoras species.

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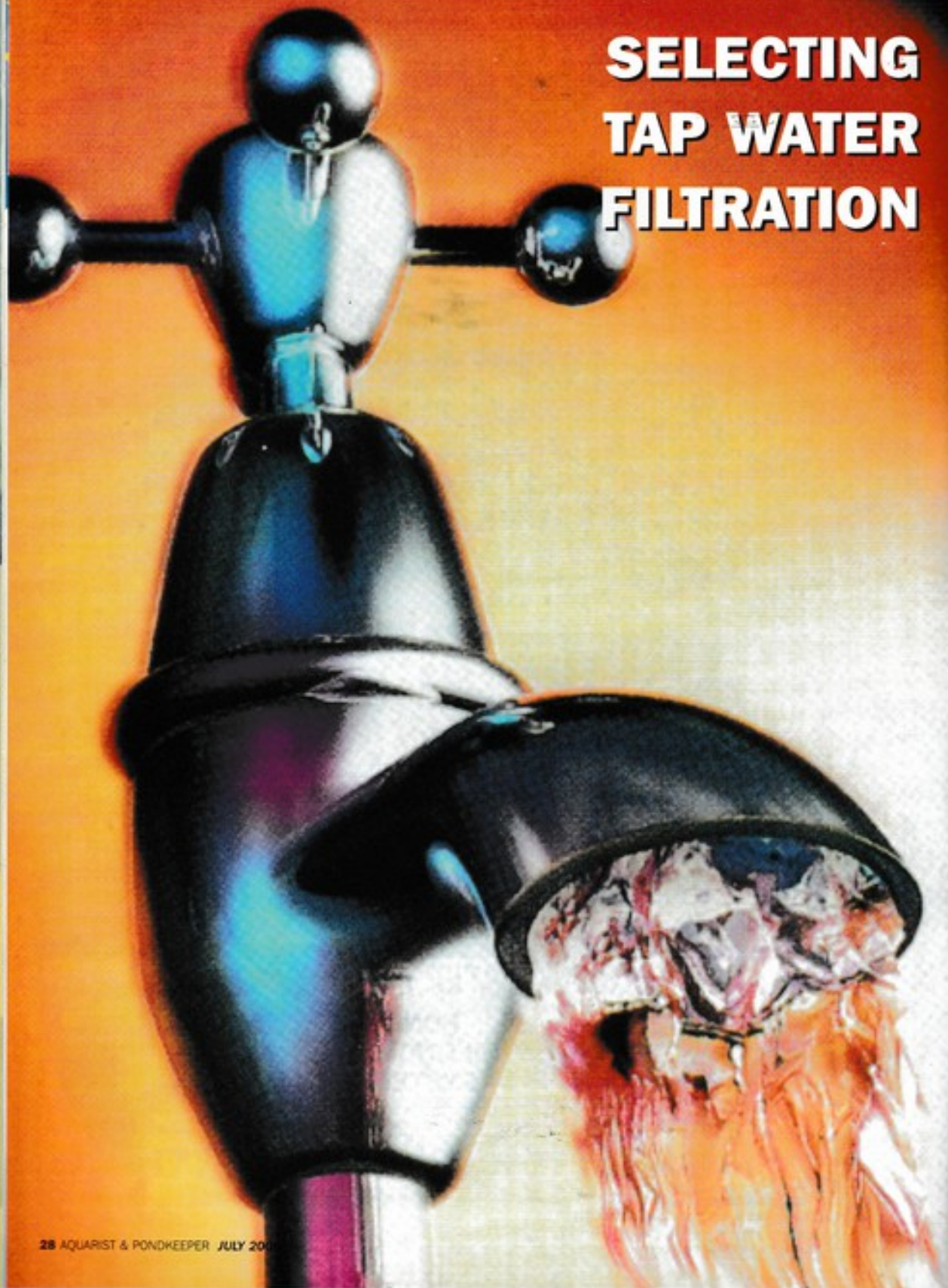
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**USEFUL ADVICE**

# **SELECTING TAP WATER FILTRATION**



The water in our taps may be filled with all sorts of toxic materials. Among these can be lead, mercury, arsenic, chromium, pesticides, herbicides, industrial pollutants (carbon tetrachloride, vinyl chloride, benzene etc.), gasoline, and trihalomethanes (from reactions between organic matter and chlorine), chlorine, radium, and radon gas to name just a few.

These substances are toxic to humans and to aquarium fish. Some fish, such as discus, are also sensitive to hardness (i.e. sodium and calcium compounds). Phosphates and silicates cause rapid growth of undesirable algae in both fresh and salt water aquariums. This is particularly true in "reef" type aquariums.

To remove these pollutants there are two ways to go, Deionization or R.O. (Reverse Osmosis) or a combination of both. No single answer exists for every water system, however, since everybody's water is different. Some municipal water systems contain high levels of chemicals which can cause problems with any filtration system - see the paragraph on potential problems below. Just remember, you must purchase a system which will meet the needs of your situation, so educate yourself as much as possible prior to purchase.

The Kent Marine DEION unit is a cation and anion exchange resin filter, with a carbon pre-filter, which will remove dissolved solids similar to an R.O. unit. It wastes no water, is designed for connection directly to your household piping system, and has replaceable or regenerable cartridges (regeneration requires use of dangerous chemicals and must be done by qualified persons). The DEION will produce anywhere from 50 gallons to 500 gallons of water between regenerations. This is entirely dependent on what is in your water. If your water is very hard, it will produce less, if it is very soft, the DEION will produce more water between regeneration's. DEION units typically will produce better quality water than RO units, but for a much shorter time, and with more maintenance.

For most people, the R.O. unit is the better choice, because it is less expensive to operate, and requires less frequent maintenance. The R.O. unit utilizes a membrane, under pressure, to force water to leave its pollutants on one side of the membrane and produce water free of dissolved solids on the other. The units "waste water," is a drawback, however, Kent Marine R/O's waste only 4 gallons of water for every 1 gallon of product water (The 50 gpd TFC unit wastes only 2.5 gallons to 1). Some manufacturer's units waste up to 10 gallons. For most areas of the country, R/O is probably the only reasonable alternative. They will produce water very cheaply and the membranes will last for 5,000 to 10,000 gallons of product water if properly cared for!

RO daily water production ratings are nominal. A 10 gallon per day unit will produce about 10 gallons of filtered water per day when supplied with a pressure of 65 PSI, and water containing an average TDS (total dissolved solids). If your

TDS is high (i.e. you have very hard water) or your pressure is low, your RO unit will produce less water per day. This is a fact of life. So - if you need exactly 24 gallons of water every day, and you know you have hard water or low pressure, DON'T buy a 24 gpd unit. Go to the next larger size.

There are three types of membranes, CTA or Cellulose Triacetate, TFC or Thin Film Composite and Hi-S high silica removal. Which do you need?

The CTA membrane is less expensive. It will remove above 90% of most pollutants, and together with an activated carbon post filter, will provide all the filtration required by people and most aquariums. Water must be chlorinated to use the CTA membrane.

The TFC membrane is more expensive. It must have carbon filtration ahead of the membrane to remove the chlorine, because this chemical will ruin the membrane. This requires

all water, both product and waste to flow through the carbon filter, exhausting it much quicker and requiring frequent changes (5 times as often). Forgetting to change the carbon filter will cause the membrane to destruct. The TFC membrane removes a little higher percentage of most pollutants.

The main difference between CTA, TFC, and the Hi-S membranes for aquarists is that nitrate removal for the CTA is 50 - 70%, TFC is 95%, and the Hi-S is 96%, so the question is do you have high nitrates in your tap water, and do they cause problems in your tank? If the answer is yes, then purchase the TFC or Hi-S membrane. If the answer is no, then purchase the CTA membrane.

#### POTENTIAL PROBLEMS

High levels of iron, manganese, phosphates, chlorine, hydrogen sulphide, or chloramine etc. can cause problems for your water treatment system. You may need to contact your supplier for help when these problems occur. In some cases special pre-filtration may be required ahead of the RO or DI unit.

If you live in an area with exceptionally high phosphates, say over 1 ppm, you should consider an RO unit followed by a DEION to get the phosphates low enough for a reef tank. The Maxima combines the best attributes of IVO and Deionisation all in one system.

The Hi-S system, a Kent exclusive, has the highest removal ratings, on average, of any membrane type. This membrane is slightly more expensive than the TFC, but the benefits outweigh the cost difference. These membranes are able to remove 99 - 99.5% of the silicate from the tap water. The CTA only removes 80-90, and the TFC removes 92 - 95%. If brown diatom algae is a problem in your aquarium, the Hi-S system might help. If the chlorine or chloramine in your area is over 1 ppm, you should contact your supplier for help in designing your water system.



## YORKSHIRE FESTIVAL UP AND RUNNING.

The organisers of Yorkshire Aquarist Festival are well in hand with plans for this year's Festival and it looks like the change of date from spring to high summer may well be paying off. Club displays are being prepared and show fish pampered well ahead of time, all in the hopes of making this a really successful festival with lots for everybody to see.

If show fish are not your thing, then there will be pond displays and furnished aquaria to look at as well. Aquarist and Pondkeeper will be there as usual and apart from magazines there will be furnished aquaria to see and experienced aquarists on the stand to answer your fishkeeping questions. Our Editor, Derek Lambert, will also be giving a lecture during the weekend (time and day to be

announced in next month's magazine). You will easily recognise him at the show, however, since his picture is in every issue of A&P!

Apart from A&P there will be plenty of other trade stands at the show including some with lots of interesting fish to buy. No doubt there will be lots of bargains to be had and many of the major manufacturers there with stands to show off their latest products. All in all a Festival well worth making the journey to Doncaster Exhibition Centre.

### THE GARDENERS MEET THE AQUARISTS BY DR DAVID FORD OF AQUARIAN

It was at New Horizons South Downs Holiday Village, Bracklesham Bay, Sussex, over the four days of May 5th to 8th that a special Gardeners Weekend was organised. Professional Gardeners such as John Negus, Sue Phillips and Geoff Hawkins gave lectures on everything from water gardens to lawn care whilst guests were wine and dined.

A few weeks earlier, FBAS Chairman Joe Nethersell was at the Holiday Centre negotiating affairs for the Supreme Festival of Fishkeeping next October (20th to 22nd, 2000) when the organisers of the Gardening Weekend revealed that 40 places were still available. "We'll fill them" said Joe and invited all his aquarist friends to join him at the Centre.

There were aquarists from Hounslow, Riverside, Strood, Ilford, Mid Sussex, Isle of Wight, Plymouth and Corby aquarium clubs, Mr & Mrs Arnold Chadwick of BAF and the FNAS, plus all the FBAS committee. The weekend coincided with the trade exhibition AquaZoo in Germany, so most of the trade were away, but AQUARIAN was able to send Dr & Mrs David Ford, representing the manufacturers.

FBAS built a water garden feature during the weekend, which will be retained for the Supreme Festival of Fishkeeping in October. The gardeners and their specialists were so interested in the group of aquarists, especially their knowledge of water gardening, that it was decided to invite them all to the Fishkeeping Weekend too.

Photograph 1: FBAS Chairman Joe Nethersell tells Vice Chairman Peter Furze how to build the watergarden feature at the New Horizons Holiday Village

### NEW WAY OF SELLING FISH

If you have access to the Internet, or you know someone with access, then a brand new website that was launched in January may be of interest to you. It is [WWW.HOMEBREDFISH.COM](http://WWW.HOMEBREDFISH.COM) and has been created to help aquarists with a surplus of fish from breeding to be able to offer them to other aquarists directly.

The main fish database is divided into 3 sections, Coldwater, Marine and Tropical and can be further subdivided into specialist groups such as Cichlids, Killifish and Koi. Each entry in the database include the fish owners postcode, which means that it is easy to search for all local breeders in your area and buy from them direct. If you require specialist fish, just search on a fish name and you will be presented with a UK wide list of home breeders if you do not mind travelling a bit further.

For the price of a single fish, you can advertise all fish of the type and age/size. There is a minimum cost of 50p per database entry and a minimum transaction cost of £2. This means that for £2, you could advertise 4 different types of fish. They will remain on the database for 1 month. Discounts are available for advertisers.

### FBAS & FNAS SORT OUT FESTIVAL DATES

Moving on to the other two main fixtures in the aquatic calendar. The FBAS and FNAS had a real problem to resolve this year because due to availability of the venue the FBAS ended up having to move the Supreme Festival of Fishkeeping to the weekend of October 20/22nd. This clashed with the British Aquarist Festival and created a situation neither organisation wanted. As a result the FNAS has now managed to move their date to a week later 28/29th October. Hopefully this means members of both organisations will now support each others festivals and make both of them successful.

A&P will be doing its best to support both events and will be attending both. We are also sponsoring the Champion of Champions and any exhibitors who wish to enter this competition should contact Army Chadwick on 0161 652 6207 for more details. Since clubs need a form filled in at the time of their show to allow the Best in Show access to this competition it is important to make sure they contact Army before the show to have one sent through. Any club working to any show rules is eligible to take part.

# THE AQUA GARDENER

Although there are over 30 varieties of Sagittaria, there are only a few which are used to any extent in tanks, the most common being *S. subulata gracillima* which is often incorrectly called *S. natans* or *S. subulata f. natans*.

Plant expert Stephen Hook takes a look at some more common aquarium and pond plants.

**S**agittaria species are members of the Alismaceae or water plantain family, and although the plants are so well known and so commonly used by British tropical and coldwater aquarists, they originate mostly from the United States. The only member we have in the British Isles is the common Arrowhead, *S. sagittifolia*. The family derives its name from the Latin word sagitta meaning an arrow and also from the mythological archer Sagittarius from the signs of the zodiac. It is quite a common sight during the summer months to see the arrowshaped leaves emerging above the water in ponds and ditches, while a number of aquarists plant the arrowhead in their garden ponds.

## Arrowheads

The arrowhead is found in various parts of the country, and makes a good show with its leaves and whorls of white or flesh coloured flowers, both of which rise six to eight inches out of the water. The formation of almost each part of the plant appears to revolve round the figure 3, even the leaf-stalk being triangular. The sagittate leaves have the two "barbs" almost as long as the end lobe, which has three main parallel nerves. The stamens and carpels are in separate flowers although on the same plant. They are arranged in whorls of three, the three sepals are ovate and have a reddish tint. The white petals are showy and very akin to those of the water crowfoot, and there is a red nectar guide at the base of each.

In the male flowers there are many stamens whose sagittate anthers split lengthways, and are a dark brown. A few carpels are present but they are abortive. The male flowers are larger than the female flowers, and usually placed higher on the stem. The female flowers have many one seeded achenes, which are free from each other, normally opening before the staminate flowers. The seeds are arranged on a fleshy axis, and when the flower stalks are cut an acid white juice exudes, but diminishes as the plant dries.

Members of this genus are perennials, and this species has creeping stems ending in edible tubers, thus its American name of duck potato. The classification is based on the flowers and fruits, as the leaves are too variable; the mature fruits are usually necessary for the determination.

## Arrowheads in the aquarium

Although there are over 30 varieties of Sagittaria, there are only a few which are used to any extent in tanks, the most common being *S. subulata gracillima* which is often incorrectly called *S. natans* or *S. subulata f. natans*.

This plant is very like Vallisneria, and it is sometimes known as ribbon arrowhead. Many years ago it was one

## ALLCLEAR WATER PURIFIERS

### Flicking & Flashing?

When new water is added to the pond do your fish flick & flash? Are they off their food? Are you experiencing koi health problems?

### What's wrong?

It could be because you do not use a water purifier.

If you are using a purifier perhaps the purification media is exhausted & needs changing.

It could even be that the purification media you're using is wrong for 'your' water. For example, did you know that activated carbons do not reduce dissolved metals?

Are you inadvertently adding zinc & copper to the pond to kill blanketweed?

Once their water's right, when your fish attract your attention it'll probably be to tell you they're hungry!

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of the few good plants available and was very popular for fancy goldfish tanks. As time went on, it lost its popularity, but with the advent of tropical fish it reappeared once more. Many aquarists today prefer it to Vallisneria owing to the fact that as well as being a good oxygenator, it lives longer. The leaves are strong and grow from six to twelve inches, and do not easily tangle. When grown outside during the summer, little else will be seen except the arrow-shaped floating leaf, but towards autumn the lancelet leaves make their appearance from the runners and corms among the roots. At this stage it is particularly like Vallisneria, but it gradually darkens, and the runners become longer.

When grown in a tank few arrowheads appear, although the tiny white flowers will emerge from the water. The leaves tend to curl, and the plant will thrive in a well-lit tank. If, however, there is little overhead light the leaves become short and broad.

#### Indian Fern & its close relatives.

Indian fern (*Ceratopteris thalictroides*) is also known by two other names, Sumatra fern and water sprite. It is a close relation of the floating water sprite (*C. pteridoides*), but grows in sand at the bottom of the tank. It is truly tropical and although its oxygenating qualities are doubtful, it is an asset to an aquarium from a decorative aspect.



Indian fern (*Ceratopteris thalictroides*) is a close relation of the floating water sprite (*C. pteridoides*), but grows in sand at the bottom of the tank. It is truly tropical and although its oxygenating qualities are doubtful, it is an asset to an aquarium from a decorative aspect.

This plant belongs to the family Parkeriaceae and can be found throughout the tropics including America, Africa, Asia and even parts of Australia. It is more consistent in its form than its other close relative *C. cornet* which can have broad coarse fronds or relatively fine ones. *C. cornet* is also far happier growing as a floating plant where it will receive the maximum light available.

The method of reproduction for all these species is unusual for aquatic plants.

While the parent plant is still in good condition, the young plants appear on the leaves, and send out thread-like roots. They eventually break away from the parent, and float to the surface. The roots of Indian ferns will gradually elongate, and finally reach the soil in the bottom of the tank, where they embed themselves.

Given the right conditions the new Indian fern plant will grow to a height of fourteen inches and ten inches across, but if allowed to emerge the leaves become darker, tougher and narrow.

All these species will tolerate a wide range of conditions being happy in pH 6.5 to 7.5 and moderately soft to moderately hard water. Whilst the Indian fern is a truly tropical species, the other two will be happy in temperatures as low as 64° so make good additions to indoor coldwater aquaria.

## FACT FILE

### NOT EVERYTHING IN THE AQUA-GARDEN SHOULD BE THERE!

It is a sad fact that a number of house plants are offered for sale in aquatic outlets. This is not always the shopkeepers fault as they often arrive with the rest of their order from reputable dealers. To help raise awareness of this problem, A&P will be showing a few of the commoner ones to avoid over the coming months.

#### OPHIPOGON

This terrestrial plant is correctly called Lily turf or Mondo Grass and lasts a fairly long time under water but will slowly rot and fall to pieces in the end. You may find it offered for sale under a number of trade names and in several different varieties, so it is best to take a good long look at the photograph so you can identify it for yourselves in future and steer well clear when buying plants for your aquarium.

It actually belongs to the Lily family and Lily Turf is a particularly good name for it because its grass like leaves will quickly spread to fill its container. It produces small flowers (white or purple depending upon species and variety) during the summer months and makes a good undemanding house plant. Keep out of direct sun and make sure the compost is moist at all times. If it is in a dry environment the leaves should be misted with water every day.

The species pictured is *Ophiopogon japonicum* which is one of the smallest within the group and only grows to a height of 8". If the leaf tips start to go brown it is usually because it is too warm during the winter (keep in a cool but frost free room during the winter months) or has been allowed to dry out during the summer.





### FACT FILE

Photograph: Arend Van Der Neerweenhouten



**Common Name:** Angelic Pimelodus

**Scientific Name:** Pimelodus pictus STENDACHNER, 1876

**Family:** Pimelodidae

**Origins:** Found in the region of Mito, Columbia. Live specimens for the aquarium hobby were first collected by Dr Axelrod & Bill Reese in the mid-1960s.

**Size:** 11cms

**Diet:** All commercial foods, but particularly fond of tablets and sinking pellets. This species will take flake food right at the surface once settled in its aquarium but small live foods of all kinds should also be fed.

**Temperature:** 70 - 80oF

**Aquarium Type:** Likes a roomy aquarium with some caves and other places to hide away in during daylight. Whilst it is found in soft acidic water in the wild it will adapt to a wide range of conditions in the aquarium. Good filtration is important as are regular partial water changes. Once settled it will be seen out and about even during daylight hours. Despite information given in literature to the contrary, this is a predatory catfish which will take small fish at night. Small Neon Tetras are particularly likely to fall victim, otherwise it makes an excellent addition to a community tank.

**Reproduction:** No information is available on breeding this fish - unless you know different!

### MAJOR DATES IN 2000

19th - 20th August Yorkshire Aquarist Festival (YAAS), Doncaster Exhibition Centre.

20th - 22nd October Supreme Festival of Fishkeeping, (FBAS) New Horizons, South Downs Holiday Village, Bracklesham Bay, Near the Witteringis & Chichester.

28th & 29th October British Aquarist Festival. (FNAS) George Carnall Leisure Centre, Kingway Park, Urmston, Manchester.

### FEDERATION CONTACTS

AofA Ian & Rhona Walker, 01252 668747

FBAS Paul Corbett, 01983 721246

FNAS Army Chadwick, 0161 652 6207

FSAS

USA

YAAS

James Sheekey, 01475-704219

John Reid, 01738 634689

Terry Nelson, 01724 289736

# JULY MONTH PLANNER

## IMPORTANT DATES

Sat	1st	
Sun	2nd	
Mon	3rd	
Tues	4th	Hampton Court Flower Show Contact 020 8570 0934 Southend & Leigh Club meeting. Contact 01702 305740 Gloucester F.C. Club meeting. Contact 01453 824810
Wed	5th	Hampton Court Flower Show Contact 020 8570 0934 Corby & DAS. Club meeting. Contact 01536 761736 Hounslow Club meeting. Contact 01784 259230
Thurs	6th	Hampton Court Flower Show Contact 020 8570 0934 Telford & DAS meeting. Contact 01902 372945
Fri	7th	Hampton Court Flower Show Contact 020 8570 0934
Sat	8th	Hampton Court Flower Show Contact 020 8570 0934 Port Talbot A.S. Open Show (FBAS) Contact 01639 779728
Sun	9th	Hampton Court Flower Show Contact 020 8570 0934 Washington A.S. & P. Auction. Contact 0191 4167292
Mon	10th	Ilford & D A&P Society. Contact 0181 550 7329
Tues	11th	
Wed	12th	
Thurs	13th	
Fri	14th	
Sat	15th	
Sun	16th	North East Goldfish Society (held in Sunderland) Open Show (IGS) Contact 0191 4170768
Mon	17th	Thorpe & D.A.S. Club meeting. Contact 01953 605394
Tues	18th	Southend & Leigh Club meeting. Contact 01702 305740
Wed	19th	Hounslow Club meeting. Speaker Malcom Goss on plants. Contact 01784 259230 Corby & D.A.S. Club meeting. Contact 01536 761736
Thurs	20th	
Fri	21st	
Sat	22nd	
Sun	23rd	Merseyside A.S. Open Show (FNAS) & Auction. Contact 0151 5218584
Mon	24th	
Tues	25th	Lincoln D.A.S. Club Meeting Contact 01522 703620
Wed	26th	
Thurs	27th	
Fri	28th	
Sat	29th	
Sun	30th	
Mon	31st	

Website Review

The Internet is rapidly becoming a major source of information for aquarists and pondkeepers the world over. There are now literally thousands of web sites up and running on virtually all aspects of fish keeping. Some of these are not so good, whilst others are excellent and well worth checking out. One of the really good web sites which has recently been revamped is Hagen's ([www.hagen.com](http://www.hagen.com)). This is simple and easy to navigate and has some really good basic advice for any fish or pond keeper.

The frequently asked questions section on ponds was particularly good and could easily have come from the pages of Ask A&P. Here are just a couple:

How deep should my pond be?

The minimum recommended pond depth for fish is 18", although 2.5' is considered ideal. Keep in mind that your fish require cool water in the summertime and need to be able to live under the ice in the wintertime. In extremely hot or cold climates, a few extra inches in the depth of your pool may have considerable impact on the health of your fish.

Why is oxygen so important in my pond?

Fish, plants and other pond inhabitants require large quantities of oxygen in order to survive. In an isolated pond, dirt, leaves, algae and other contaminants can quickly accumulate, depleting a pond's vital oxygen supply. Laguna fountains and waterfalls help to aerate oxygen deficient ponds and help keep pond inhabitants healthy.

Some of the information available on the site will help you understand the adverts the companies put out. This article from Hagen's newsletter section does just that -

Laguna Pumps cost less to operate!

Author: Steve Pond Source: The Hagen Insider Vol: II No. 1 Date: 1998

A pond pump operates continuously over the season, 24 hours a day, 7 days a week. If the unit is not energy efficient, the cost of operation can very quickly exceed the initial cost of the pump.

Just as important as the original purchase price is the cost of operation. Laguna is proud to state the power consumption of each unit on the box. Most competitive pumps are reluctant to do the same. Let's take a good look at why.

In Canada, the pond season usually starts in May. Pumps will operate continuously until late September or October. Assuming the average operating period to be from May 1 to September 30, that's a total of 153 days. Laguna 7000, our largest model, uses only 100 watts per hour, as much as a standard household light bulb.

The 7000 pumps over 8316 litres per hour. Another pump range, with outputs ranging from 1984 to 4536 litres, use between 200 to 380 watts per hour, a noticeable increase in electrical consumption every hour. The closest model to Laguna pumps 756 litres more an hour, but the price for this flow is a huge 588 watts per hour.

Simple math (W/h x 24 x days)/1000 shows that Laguna 7000 will use 367.2 kilowatts during that period. The smaller alternative models will consume 1395.36 Kilowatts and the closest capacity unit will cost the homeowner 2159.136 Kilowatts of power.

The pump's actual operating cost depends on local power costs. In the higher levels of power cost, the cost of operation far outweighs any minimal price difference at the outset. Couple that with all the other features of our line, and the Laguna clearly becomes the logical choice for pond pumps. The full Laguna range will be on view at Hampton Court Flower Show on the FBAS stand or you should be able to see it at most good aquarium, pet and garden centres.

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# LIFE IN THE OCEANS

*The Molluscs:  
Shellfish, Octopuses,  
Squid & Cuttlefish.  
Part 1.*

Photograph: M. Payne / Aqua Press

*Chromodoris quadricolor* belongs to the Nudibranchs (Sea Slugs). These are shell-less gastropods and are probably the most beautiful marine animals, their vivid coloration and cerata (tentacle like appendages over the upper surface of the animal), making them a wonder to find. Their very restricted diet, however, prevents them being kept in aquaria.

*Andrew Caine BSc, of Aqua-World, continues his look at invertebrate life in the oceans.*

These are the shellfish which we all know and love, not only as animals but also as consumables, with some species being very desirable indeed. Sea slugs, octopuses, squids and cuttlefish also belong to this group. There are over 50,000 species with a fossil record going back over 500 million years. The groupings that we shall look at include the gastropods (limpets, whelks and winkles), bi-valves (mussels, clams and cockles), cephalopods (octopus, squid and cuttlefish) and the nudibranchs (sea slugs).

**The Gastropods:** These are characterized by basically consisting of one shell placed on top of an animal. We have three sub groupings here, namely the Archeogastropods (limpets), Mesogastropods (winkles) and the Neogastropods (whelks) However, with the differences that exist between the groups, there are evident adaptations on a common theme.

**Locomotion:** The gastropods have one basic problem here, resulting from the environment in which they exist. This is that there is always a force (current) acting on the animal and, if dislodged, they would be swept off the substrate. When that occurs there is always a waiting predator who would relish a snack. So how do these beasts not only hold on to the surface but actually move when they possess only one foot? The answer lies in a special mucus that is produced and secreted over the base of the highly muscular foot. We have all seen snail trails on land, it is a similar tale in the sea. The mucus is composed of 96% water and 4% protein, the secret is in the molecular make up of the protein and the bonds in the molecule which hold the protein together. These bonds are broken when stress is applied and the mucus then acts as a lubricant allowing sliding movement. When the stress is released the molecular bonds reform and the mucus acts as a glue holding the foot to the substrate. So we have a highly muscular foot covered in a sticky mucus. A small muscular wave appears at one end of the foot and

Photographer: M.D. &amp; C. P. Fisher

Murex pecten belong to the Neogastropods (Whelks and Cone Shells). These are the predators of the group, with whelks taking a fancy to bivalves and barnacles and the cone shells eating more mobile prey such as worms and fish.

progresses down the length applying a stress to the molecules as it does so. This allows the mucus to behave in a lubricant manner along the wave and as a glue when the wave passes. With many waves occurring at any one time some parts of the foot are moving whilst others are holding on. Thus; locomotion and stability are achieved at the same time. So there we have it, an animal which is able to hold on to a surface and move along it with only one foot, truly an amazing biological fact!

**Feeding:** Every method of feeding is displayed by these animals, from active predation (some catch and eat fish) to deposit feeding and scavenging. However there is one common characteristic in the gastropods. All food is obtained via a specialized structure known as the radula. The basic radula is like a long strip of sandpaper which is placed on the surface. Food is rasped off and passed to the mouth. The number of teeth present on the working part range from one to 750 and, like shark teeth, they are replaced when worn.

**The Mesogastropods:** the Winkles and Topshells:- These are mainly herbivorous and exist on a world wide scale, often in very high densities, on the intertidal zone and below. They utilize both macro and micro algae depending on species. Individual species often eat a specific food so that many species are able to co-exist without competing. Macro algae (the large seaweeds) often have grooves cut out of them where grazing has occurred and the radular teeth have gouged out a slice. Over rocks in the intertidal zone is a microscopic algal film, invisible to the human eye. This is actively grazed.

**Archeogastropods:** the Limpets:- These are the oldest members of the shellfish family alive to date, with one species, dating back 260 million years, found on hydrothermal vents. There are two forms, the homing and non-homing species. However, all intertidal species feed nocturnally at low tide. This behaviour avoids predators from both land and sea. The non-homing species graze over the rock surface and settle down anywhere in daylight or when covered by the tide. The homing limpets have a home scar, that is a depression in the rock surface which fits the shell outline perfectly, and increases with

growth. The beasts have a territory around the home scar, the size depending on the species, but ranging from 10 centimetres to 50 centimetres. Some species have been shown actively to fight for the right of a feeding territory, with the loser being pushed off the rock, and making a snack for a passing crab. These home scars can be seen by placing a blunt strong knife under the shell and removing the limpet, but always replace the animal when it has revealed its secret to you.

**Neogastropods:** the Whelks and Cone Shells:- These are the predators of the group, with whelks taking a fancy to bivalves and barnacles and the cone shells eating more mobile prey such as worms and fish. The radulae have become specialized and are contained in a moveable siphon. Turning one over, we find that the circular opening of the shell has a siphonic canal which is a characteristic of these carnivorous shellfish. Whelks have a boring radula and a sulphuric acid secreting gland which work together to penetrate the shell of an unfortunate victim. The drilling is achieved by secreting acid for around thirty minutes. This softens the shell. The radula then drills for a few seconds to remove the weakened part. The process is then repeated. It can take up to eight hours for a two millimetre shell to be penetrated, so these animals work for their food. The siphon is then pushed into the shell and the soft flesh is ripped apart and ingested. The shape of the hole is always bevelled so you can easily see where these have been feeding on the shore.

The cone shells, which are mainly sub tropical to tropical in distribution, take a more mobile prey. How, then, does a slow snail catch a prey which is always faster and often bigger than itself? This is achieved, either by ambush or by deceit, an example being a fish eating species which lies buried until it senses a fish. It then exposes its highly coloured siphon and waves it about. The fish thinks it has found a meal, but it is in for one hell of a shock! The radula here has one hollow loose tooth, spares being kept in an internal sac. A tooth is passed to the end of the siphon and, when a fish comes to nibble it is harpooned, often in the mouth. A very potent toxin is forced through the hollow tooth which acts as a hypodermic needle and the fish is dead within seconds. Human fatalities have occurred when handling cone shells and death is certain within four hours if not treated.

Photographer: M. Dune / Aqua Press



The Common ormer (*Haliotis tuberculata f. lamellosa*) belongs to the Archeogastropods (Limpets). They are nocturnal feeders which will take green algae, lettuce, spinach and some commercial tablet foods. This is a very popular shellfish with humans which has to be protected in some parts of Europe to prevent harvesting.

**Reproduction:** Archeogastropods show that they are the oldest members here as they are broadcast spawners, releasing their eggs and sperm into the water, with fertilization in the water column and planktonic development. However, as we move up the evolutionary tree, internal fertilisation is the rule. Mesogastropods lay bundles of eggs which hatch out into either feeding or non feeding planktonic larval stages. The non feeders remain in the plankton for only a few hours but the feeders may remain for up to a couple of months. Here, the shell is modified and acts as a sail, helping with buoyancy and dispersal of the species. Neogastropods are the most advanced, having dispensed with all larval stages. The advantages include less mortality, less energy spent on producing eggs and when the young hatch they are already in the adult habitat, where plenty of food is available. Eggs are laid in cases with ten to eighty cases being laid in one season, with four to ten eggs per case. On hatching, a fully formed baby beast emerges. The cases are often yellow in colour and can be seen under rocks or rocky overhangs in the intertidal zone.

#### The Nudibranchs:

**The Sea Slugs-** These are shell-less gastropods and are probably the most beautiful marine animals, their vivid coloration and cerata (tentacle like appendages over the upper surface of the animal), making them a wonder to find. The cerata can be blue, red, green, yellow or virtually any colour imaginable, and the shape varies from thick and stout to long and feathery, all of which combine to produce a visual wonder of the oceans. This 'wonder' is not restricted to the visual aspect, as bizarre things happen when the animal is feeding. The vivid coloration acts a warning to others not to eat them. They are slow moving and have no shell for protection. Their protection comes in the form of glands running along the body secreting sulphuric acid and other nasty substances. They also can contain nematocysts to sting any beast taking a nip.

**Feeding:** Sea slugs are mainly active carnivores which eat sessile prey such as hydroids, corals' jellyfish polyps and sponges. Some are herbivorous and these are normally the colour of the plant they eat. The nudibranchs, though gastropods, are equipped with a set of jaws to nibble away at their food source which is always species specific (one



Flamboyant cuttlefish (Cyphoma gibbosum) belong to the Mesogastropods (Winkles and Topshells) and are unusual in the group because they eat only *Gorgonia flabellum* and *Gorgonia verticillata* whilst most other species are mainly herbivorous. Here we can see a pair laying eggs.



Spanish Dancers (*Hexabranchius sanguineus*) are so unique that not only are they probably the only species in the genus but the family only contains one genus (*Hexabranchius*). Here we can see one laying eggs in a typical pink frill which is anchored to the substrate along one edge.

species of nudibranch only eats one species of prey). Here we come to the 'wonder' that was mentioned above, and may be the beginning of a new symbiotic relationship. This will be confirmed, or otherwise, in a few million years.

When a slug eats a polyp containing stinging cells, for some reason these are not discharged or digested when in the gut. Considering that these cells

are normally discharged on touch this is unbelievable, yet it happens. When in the gut they are not excreted but retained and passed through the body up into the cerata where they provide a defence for the animal. Even immature cells are translocated and they then mature into a fully formed stinging cells. We have not yet finished. The herbivores also display unique behaviour. In a cell there are many small parts which act together to make the cell function like organs in our body. The chloroplast is the part of the plant cell which traps sunlight and releases energy. When the alga is ingested, instead of digesting the chloroplast, this becomes incorporated into the gut lining and functions normally for a few weeks' supplying the animal with energy. After a few weeks the chloroplast starts to break down and is then digested and replaced. How the nematocysts and chloroplast are translocated and allowed to function remains a mystery.

# COLOURING OF YOUNG GOLDFISHES

Arthur Boarder tackles the problem of late colouring goldfish and has a few pointers to looking after this season's fry

Now that the breeding season is well advanced it is possible that you have young fishes at various ages from fry to three or four months old youngsters. The early hatched ones should now be of a fair size and it is possible that some of them may soon start to change colour.

Most kinds of fancy goldfishes are bronze when very young and only change to gold or silver when they are about two inches long (over all), unless they are of the invisible-scaled types, which change colour much earlier than the scaled ones. You will find that all the calico or shubunkin types change colour when they are very young and any that do not do so are not worth keeping. The comets are as a rule rather slow to colour and may take as long as three years to change completely. Many breeders have difficulty in getting their common goldfishes to change colour and I have often had people tell me that their fishes have not changed colour at three years of age.

I consider that this is the result of haphazard breeding at some time or other. It may not be the fault of the present owner but may be an inheritance from bad selection by a previous breeder. I am quite sure that if any strain were consistently worked on the time of changing colour could be considerably lessened. If goldfishes are bred in a pond and left to themselves it is almost certain that many fishes will breed which have not changed colour at a year or two. The resultant young will be more likely to fail to change colour early and so if the same strain is bred over several years it is probable that very few young will change colour at all.

## Early Change Breeders

It is, in my opinion, absolutely necessary to empty a pond completely each year to see that there are no youngsters which have not changed colour left in the pond at the commencement of the spawning period. In my own case I should not think of breeding from any fish which had not completely changed colour by the time that it was one year old. My strain is the scaled type and I have found that by careful selection over a long period I can get most of my fry to change colour from three months old. They will all tend to revert back to the original colour unless you are careful to choose your breeders for their capacity to change colour early, as well as seeing that they have the necessary show points that you require in them.

Even though you have a good strain which generally changes colour early it is also necessary to provide the best of growing conditions to encourage this change. There is no doubt that the amounts of sun and warmth do have a great deal to do with the time taken to change. If you keep your youngsters in a cold place away from all sunshine then I am sure that you will never get them to turn colour for at least a year. Even the best strain for colouring early will not do so without special treatment with regard to feeding, space and warmth. I consider that if it is possible to keep the fry in a fairly sunny place so that the temperature of the water is at about 70°F. for most of the time, then you have a very good chance of getting the fry to change colour in a few months.

Photograph: G.L. Wiggin

You will find that all the calico (like this fantail) or shubunkin types change colour when they are very young, whilst comets are, as a rule, rather slow to colour and may take as long as three years to change completely.



With regard to space requirements, each breeding season brings home to me afresh the fact that it is practically impossible to grow on young goldfishes without plenty of room. Although I do not suggest that it is size alone which regulates the time taken to change colour, it is a fact that a well developed fish is more likely to change early than a backward one. If, then, you want your common goldfishes, comets, fantails and other scaled fishes to change colour early you must see that the fishes are kept in as light a position as possible. See they are not kept too cold, feed well and often and give them plenty of room. Cull out all those which do not change colour early and on no account breed from them another year.

## Inducing Colour Change

I have heard of experiments to assist in this early change of colour such as placing the fishes in different coloured receptacles, but I still think that as long as you see that the strain is right, then it is possible for you to get the young ones to colour by the time that they are a year old. My earliest time for colouring scaled fantails has been three months and I have always found that it is the fishes which have grown on well all the time which change first.

If you find that some of the fry are making up into very good specimens you should place them in a tank where they have plenty of room in which to develop, as you really only need about a dozen good ones to carry on for the following year. It is not necessary to have a large stock of breeding fish to be successful. It is quite possible that from one female and one or two males you can breed all the fishes that you can find space for. The one pair of fishes can give you at least a thousand fry in one season, so do not be greedy and try to run too many spawners. Look after the good ones and scrap the rubbish. They will not only eat good food but will take up precious space.

If the fry are crowded then I am afraid that you will soon be in trouble. It appears that the fry can be so crowded when they are up to two weeks old, which enables you to keep five hundred in a six-gallon tank, but after that age it is quite impossible to keep this number healthy in such small quarters. Once they are over a fortnight in age it is imperative that you spread the fry out so that each fish has

at least twenty-four square inches of surface space. You may try to rear the fry in overcrowded conditions but very soon you will notice that things are going wrong. The first sign that all is not well is when the fry appear to float near the surface of the water most of the time; healthy fishes will be lower down, feeding. If you watch the overcrowded tanks you will see that the fry suddenly appear to develop a whitish bloom on them, often starting on the pectoral fins. It may then appear on the tails and after that on the sides of the body. The fry become listless and keep near the surface of the water all the time. Although they seem to be attempting to feed from the surface I do not think that they are able to take in any food at all. Their bellies become hollow and the fins all fold up. The colour of the fry changes from a healthy bronze to a dull or blackish colour and the fry will eventually die.

#### **Treatment for Sick Fry**

Prevention is always better than cure in all fish troubles but it is possible to save these affected fishes if they are not in an advanced stage of ill health. The first treatment must be to spread the fry out so that they have much more room. Do not on any account give any dried foods while the fry are not well, try to give live food only. I feel fairly certain that the condition I have described is due to overcrowding and polluted water. As I have stated before it is so easy to give that little bit of dried food extra to the fishes' requirements, but this uneaten food can pollute the water in a very short time. Once that has happened the fry do not feel like eating, so all foods which are added only help to make matters worse. I have known fry which have been affected as above recover completely when placed in another tank which was roomy and in a healthy condition. A sudden chill does sometimes bring on the condition but the general hygiene of the tank has a lot to do with the health of the fry.

I have written in previous articles how seemingly impossible it is to breed a very high percentage of good youngsters from especially good parents, and I should like to relate an experience of mine to help to substantiate my remarks. I took a very good female fantail from the pond and placed her in a tank in my greenhouse with two good males. This female has almost everything which I consider necessary for a show specimen. In addition she has a wonderful carriage of the caudal fin or tail. There is a tendency in many fantails for them to droop their tails, especially as they get older.

This particular female holds the tail up better than any fantail I have seen, and it was with the idea of trying to fix this advantage on the offspring that I tried out this special female. Many eggs were laid and many fish hatched out. It

was not long before I could see the results of my experiment, as the fry always show the fantail quite plainly when at least a week old. I was very surprised, and not a little disappointed, to find that for every fantail there appeared to be ten single tails. Yet the parent males were very good indeed, probably the finest in this country, and the female appeared almost perfect. They were all from my selected strain and yet they threw such a lot of rubbish! I wonder what the scientific aquarists have to say about this? I remember that one night at a aquarist club meeting a lecturer on genetics said that if you paired a fantail to a fantail then the resultant young would all be fantails. If any geneticists still think this I shall be delighted to show them the parents and also the fry which have come from the pairing.

Fancy goldfishes may be very different in their make up from many other animals, but I do know from many years' experience that even the best double tailed fishes can have young which have single tails. Each season convinces me more than ever that fancy goldfishes do not behave according to the way the theorists would have us believe; it is only by practical experiments that we can learn about their breeding habits and their peculiarities with regard to the types of young.

#### **Hardening off youngsters**

When your young fishes are about three months old you must see that they are gradually hardened off. If you have been keeping the water temperature at about 70° then you should gradually reduce it. I know that if the weather is very warm the water will not drop below this temperature, but do not use any form of artificial heating after the young are three months old. If the fry have been kept in a greenhouse or fish-house then you may place them outside as long as they were early hatched fry and are at least two inches long. Do not do this, however, after September. I consider it is safer to keep young fishes inside for the first winter unless they were hatched very early in the year and had made good progress. If they are show specimens then I think that it is just as well if you delay putting them outside until the spring of the following year.

#### **Sexing Difficulties**

Your spawners in the pond will probably spawn again well into the year but I do not think that it is much use spending time and labour on fry which are hatched after July. I know that you may rear a number of healthy fry from late spawnings but it is always more trouble and you will find that the days are getting shorter so quickly later in the year that the fry do not get enough food during the daylight hours. I know that there is little that you can do to prevent the pond fishes from spawning late in the year unless you are able to separate them. This may be possible but it is not always easy.

In my own pond I have spawners which I could not rightly sex. This year some of my fish spawned and the males had shown no white tubercles at all. The four special fish which I had kept from the pond for exhibition, etc., turned out to be just the opposite sexes to those which I had expected them to be. All the short bodied fancy goldfishes are difficult to sex and you can often only be sure which is which when you watch them actually spawning, and even then it is not an easy matter to mark them. Where they are all one colour and much about the same shape the only way that I could recognise one fish from another would be by placing some form of tag on them!



This pearlescent has only just begun to colour despite being a mature fish in many other ways



## KOI CALENDAR - JULY 2000

This years International Koi Show is being staged at Billing Aquadrome, Crow Lane, Northampton on 5th & 6th August. Admittance to the show is £3.00 per person but you will have to pay a small fee in addition to this for entry into the Pleasure Park. If you are planning to show you should contact John & Beverley Woodall at DJ's Koi, Leamore Enterprise Park, Bloxwich, Walsall, West Midlands, WS2 7LZ. Tel 01922-493290 to book your vat and for further information. As usual day visitors will find a shoal of dealers stands and dry goods stalls at this event. Everything you will ever need for your Koi will be on sale, as well as a whole host of related goods.

### USEFUL NUMBERS

#### THE BRITISH KOI-KEEPERS' SOCIETY SECTIONS

Birmingham and West Midlands - Alan Smith - 01214 223669  
 Central - Christine Green - 0121 369 6601  
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 Yorkshire Section - Andrea Thornton - 01924 275749

#### INDEPENDENT KOI CLUBS

Birmingham & West Midlands Koi Club - Alan Smith - 0121 422 3896  
 Black Country Koi Society - Tony Bowcott on 01284 395299  
 Bristol & West Koi Club - Larry Lacey - 01454 896287  
 Cambridgeshire Koi Club - Graham Haggart - 01487 711229  
 Dorset Koi Keepers - Alison Allen - 01202 475417  
 East Coast Koi Club - Alan Wright - 01382 587116  
 East Midlands Koi Club - Richard Jones - 01283 228975  
 Eastbourne & District Pondkeeping Club - Brian Dale - 01323 731349  
 East Yorkshire Koi Society - Steve Mattinson - 01964 527863  
 or Chris Hill - 01482 146777  
 Fylde & District Koi Club - Chris Inglelew - 01772 635591  
 Heart of England Koi Society - Paul Storey - 01281 674821  
 Merseyside - Syl Bennett - 01942 204948  
 Midland Koi Association - Keith Hanson - 01527 545238  
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 North Lines Koi Club - Kim Bush - 01472 883377

North of England ZNA Chapter - Yvonne Mase - 0134 289 1437  
 North Wales Koi Society - Keith Parry (Chairman) - 01482 580803 or Rachel Wilkinson (Secretary) - 01487 741846  
 Northern Koi Club (ZNA Friendship Club) - Glynnis Morgan-Davies - 01796 218243  
 Norwich Koi Club - Jenny Allen - 01603 452912  
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## INTERNATIONAL KOI SHOW (UK)

**DATE: SATURDAY 5TH AUGUST & SUNDAY 6TH AUGUST 2000**

**OPEN BOTH DAYS FROM 9.30am till 5.00pm**

**VENUE: BILLING AQUADROME, CROW LANE, NORTHAMPTON.**

ADMITTANCE: £3.00 PER PERSON CHILDREN FREE IF ACCOMPANIED BY AN ADULT.  
 (PLEASE NOTE BILLING AQUADROME MAKE A SMALL CHARGE PER CAR)

- On stage No.1. B.J. the Clown and his face painter.
- On stage No.2. The Tropical Islanders Steel Band.
- Dog obedience training demonstrates in main arena.
- Horse riding demonstrates in the main arena.
- Japanese Martial Arts demonstrates in main arena.
- Adults and childrens Bouncy Castles.
- For children: Quad Bikes, Skate Boards, and Toboggan rides.
- Animal man with Birds and Snakes.

As last years show was such a success we have booked a varied selection of attractions to make it a family weekend as well as for the serious koi keeper. Participating Dealers: Cascade Water Gardens, Japanese Koi Co., Koi South West, Northern Koi & Aquatics, Crown Park Koi, Lincolnshire Koi, Ace of Koi, Q.S.S.C.D. Aquatics, Waterhouse Nishikoi, Walcot Koi, All Clear Purifiers, Selective Koi Sales, Kirei Koi, Kusuri Products, Purity On Tap, Classic Koi, plus many many more.

**There will also be a craft marquee where you will be able to buy that special gift.**

SHOW ARENA: For the hobbyist, please call us to book your exclusive vat.

It could be you who wins this years Supreme Grand Champion Award!

PACKAGE WEEKEND: Includes hotel accommodation (hotel on site which is brand new) a two day pass into the show, Dinner/Dance Saturday evening.

**All this for just £55.00 per person (sharing a twin/double room)**

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 O's Koi  
 Registered Office: Fryers Road, Leamore Industrial Estate, Bloxwich  
 Walsall, West Midlands WS2 7LZ  
 Tel: 01922: 493290 Fax: 01922: 710191

Venue:  
 Billing Aquadrome  
 Crow Lane, Great Billing  
 Northampton NN3 9QA

Copy for Koi Calendar should be sent to *Aquarist's Pondkeeper*, Inline Magazines Ltd, Suite 4, Inverclyde Business Centre, Orbital Park, Ashford, Kent, TN24 0PB. Telephone: 01673 885352 or fax 01233 500021. Copy deadline 4 weeks before publication date.

## SHOW CALENDAR July

### JULY

- 8/9 BKKS East Pennine Section Open Show, The Heritage Centre, Elzeat, nr Barnsley, Yorkshire. Contact Betty Koomer 0114 2341151
- 15/16 South West Koi Club at the Bath and West Showground. Contact Colin Baker on 01934 822620, John Spouting on 01934 822620 or Dennis Hunt on 01884 256710
- 15/16 BKKS Lea Valley & Harlow Closed Show, Harlow Gardens, Harlow. Contact M. Nunn 0208 524 3660
- 16 BKKS South Wales Section Closed Show at Maidenhead Aquatics, Crowtham.
- 23 BKKS Essex Section Open Show at Arley Sports Ground, Arley Essex. Contact Ian Prior (Show Chairman) on 0181 392 3268, Esther Bell (Show Liaison [Dealer Bookings]) on 0181 395 6327, Margaret Spurr (Vol Bookings) on 01702 292766
- 30 Yorkshire Koi Society (celebrating its Silver Jubilee) at York Racecourse. Contact Jeff Glasspool (show Manager) on 01903 526264.

### AUGUST

- 5/6 International Koi Show organised by O.L.s Koi at Billing Aquadrome, Northampton. Contact 01922 493290.
- 12/13 BKKS Mid Staffs section show at Hollybush Garden Centre, Nr Wolverhampton. Contact Val Stokes 01943 278709

### SEPTEMBER

- 2/3 BKKS Isle of Wight Section Show. Contact M. Giddens 01993 527520
- 3 BKKS Leicestershire Section Open Show at Farn World, Gattow Road, Chaddly, Leicestershire. Contact Nigel & Pip Dabell on 0116 220 1522

Hand feeding Koi can be a real pleasure but young children must always be supervised around a pond.

## KOI SOCIETY MEETINGS/EVENTS

There are numerous koi clubs/societies throughout the U.K. and we will publish details of their meetings each month as and when we receive details, however, don't forget to include a contact name and number.

Photographer: Dave Bevan

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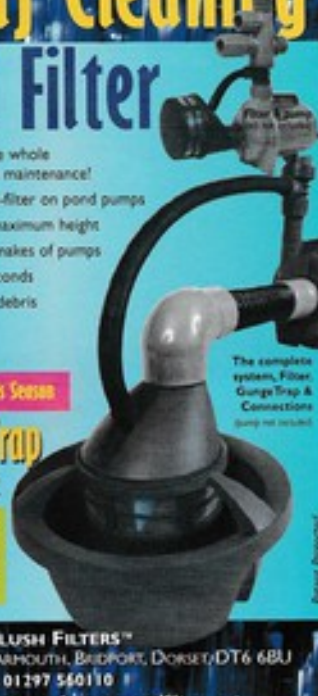


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## INSPIRATIONS - PLANTS

**D**utch furnished aquaria are famous the world over for their outstanding beauty, yet aquarists outside of Holland are perfectly capable of producing such wonderful underwater gardens themselves, all they need is a little inspiration and the right equipment. Lighting is the key to it all and, with the modern full spectrum fluorescent bulbs available, a beautiful furnished aquaria like this one can readily be created.

Unlike biotope aquaria where the substrate, plants and fish are all in keeping with a particular natural habitat,

furnished aquaria like these are created using any combination of plants and fish which the aquarist finds attractive. Since these tanks are very personal creations it is impossible to say, "Use this plant or that fish to create a particular effect". It is entirely up to you, all we can do at A&P is try to give you a little inspiration.

This aquarium uses pieces of bogwood to create a tiered effect and give it structure and form. The plants have been selected according to height, colour and leaf shape and have been generally planted in drifts, as they would



Photographer: Arno van Dieën / www.vandieben.nl

grow in the wild. A few specimen plants have been spot planted and this is very effective. If you think about it, this is exactly the sort of planting scheme you use for a mixed border in your garden.

In this set-up the Red Tiger Lotus creates a lovely focal point just off centre whilst in the centre foreground *Cryptocoryne willisii* has been used extensively. This *Cryptocoryne* is a particularly hardy plant which does well in most aquaria but needs good lighting. Reaching only a couple of inches in height when full grown, this *Cryptocoryne* makes an excellent foreground plant. A good alternative would be Pygmy chain swords - *Echinodorus tenellus*. A row of Scarlet Lobelia (*Lobelia cardinalis*) has been planted behind the Red Tiger Lotus

and a piece of bogwood. Here we see the true *Lobelia cardinalis* rather than *L. fulgens* "Queen Victoria" (a plant frequently sold in garden centres as *L. cardinalis*). *Lobelia cardinalis* is a tough plant but it does require bright lighting to do well.

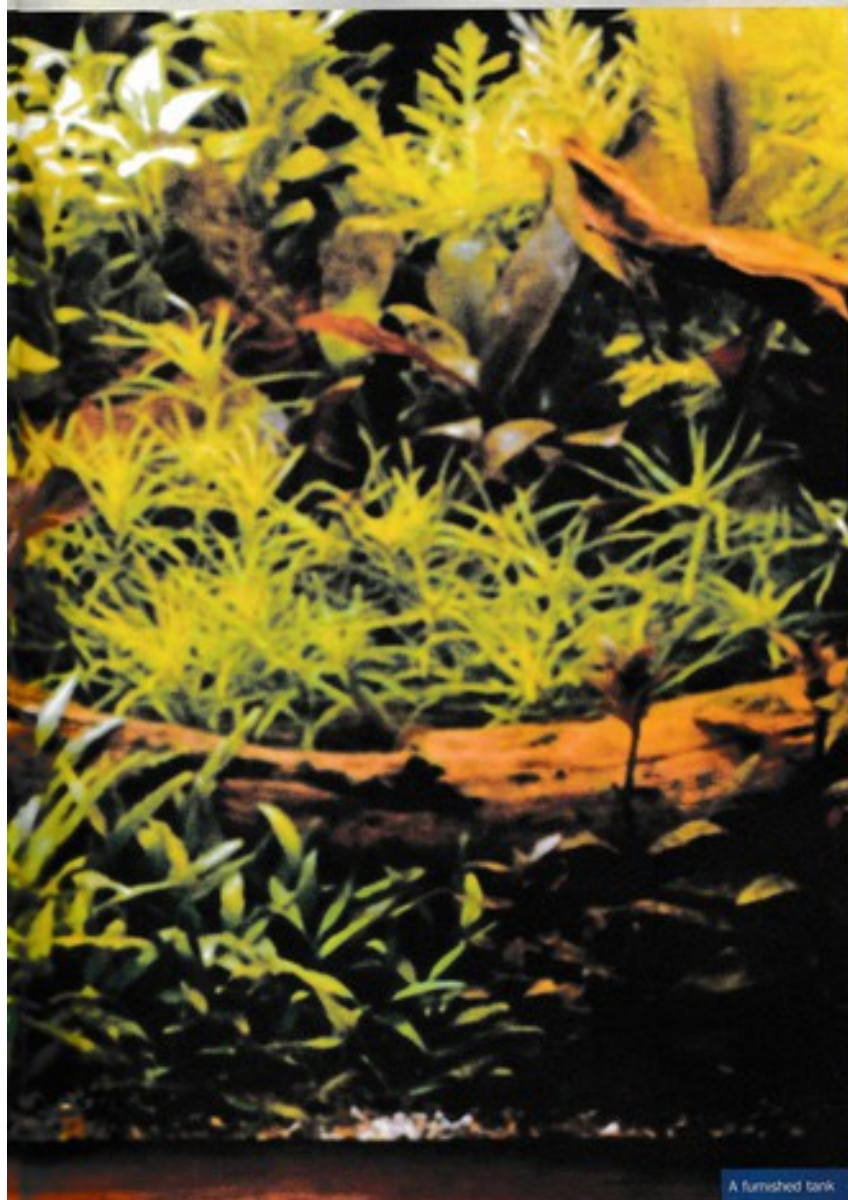
In front and to the right of this is a group of Stargrass - *Heteranthera zosterifolia*. This is another easy plant to grow, but only regular pruning will keep it down to this height. Untended it will soon grow tall enough to cover up the *Cryptocoryne siamensis* just behind. This would be a real pity as the red leaves make a lovely contrast with the light green foliage in front.

When initially setting up an aquarium like this, many Dutch aquarists pot up some of the taller background plants. These are then stood on another pot to raise the foliage above the foreground plants or bogwood etc. As the plant grows the pot is lowered until it is standing upon the substrate. Finally it is taken out of the pot and planted directly in the substrate. This system is particularly useful with large tall plants where mature specimens are unavailable or cost far too much money.

Whilst the emphasis of these Dutch furnished aquaria is very much on the plants, all the tanks I have seen contain some fish. These are always chosen with the plants in mind, so plant eaters are excluded from the set-up. The most popular species tend to be midwater shoaling fish. Tetras, Danios, and Barbs predominate, although many others are used. Surface dwellers are popular in the more heavily planted set-ups. Catfish tend to disappear in this kind of tank, although *Corydoras* may be seen out and about. Cichlids prone to digging in the gravel are definite no-nos.

What you often see in many Dutch aquarists tanks is the survival of homebred youngsters. The plants tend to form such a thick carpet of vegetation that a few eggs and fry will survive. I even had Honey Gouramis breed and rear fry in a Dutch style aquarium, despite many other fish being present.

Why not try your hand at creating an indoor aquatic garden. In the coming months other Dutch aquaria will be featured. As you will see, each one is unique and individual.



A furnished tank

*Peter Skinner of Black Knight continues his series on pond construction with a look at concrete pond construction.*

## CONCRETE POND CONSTRUCTION

Perhaps the simplest and most convenient method of building a pond is to use concrete for the base of the pond and to use concrete blocks for the walls. Not only is this very simple but it does not require specialist equipment and the process is broken up into natural stages.



It is usually wise for those new to Koi keeping to opt for using a liner to construct their first pond, partly because if design or construction mistakes are made, or if it is later decided that a larger pond is required, then not too much money will have been put into the first effort. Also the demolition of a liner pond is very simple, whereas a well built concrete pond can be very difficult to alter or demolish.

For the experienced Koi keeper the advantages of concrete pond construction are such that the majority of dedicated Koi keepers choose this method for their final pond. The strength, resistance to damage and quality of finish will be far superior to that of any liner pond, but is far less forgiving to poor workmanship and those seeking to take short-cuts.

The cost of building a concrete pond will be much higher than using a liner so it is vital that a fully detailed costing is done beforehand and then a contingency margin should be added right at the beginning of the planning stage. Ignore this at your peril, otherwise you are bound to get a few shocks along the way.

### CONCRETE-THE MATERIAL

Concrete is a very versatile construction material which can offer great strength and durability for pond construction but there are several basic principles which must be followed in order to get the best results.

If concrete is to be used to create a pond, the strength of the structure must be such that it is easily capable of withstanding the stresses that will be exerted on it. Of course the amateur pond builder is unlikely to want to be concerned with complicated stress calculations which would determine the most delicate structure that is adequate. For this reason it will be necessary to build in an extra safety margin to compensate.

When calculating the total cost of constructing a concrete pond the actual concrete does not make up a large proportion of the total cost. For this reason, if you are in any doubt about whether the structure will be strong enough, it is safer to increase the thickness of the concrete a little rather than taking a gamble. In this situation peace of mind comes at little expense!

### REINFORCEMENT

There are advantages in using steel reinforcement in some

concrete structures but the benefit will be almost totally lost if the reinforcement is not carefully placed and is of the wrong type. Concrete has excellent compressive strength but not high tensile strength and so the purpose of steel reinforcement is to compensate for this lack of tensile strength. This will be successful only if one can identify where the strains will act upon a structure so that the steel is properly located.

If steel reinforcing is very badly placed it can, in fact, weaken rather than strengthen the concrete. If steelwork is used in concrete of inadequate thickness or if it is placed too close to the surface then it cannot function because it may not have sufficient purchase on the parent material to work in harmony with it. Therefore, it will be displacing valuable concrete volume at critical points which is likely to lead to crack propagation and failure.

Steel reinforcement in concrete must always be covered by at least 2" (50mm) of concrete. This is essential to prevent rusting which not only diminishes the strength of the steel but will cause the steel to expand consequently cracking the surrounding concrete. For this reason it is essential that steel is never allowed to protrude from concrete in an earthwork situation.

A situation where steel reinforcement is very useful is when a structure is to be built in several stages and abutting concrete is to be poured on different days. These joints will normally be a weak point but if steel is left protruding from one pour so that it corresponds and will be encased by the next, then the potential for failure is reduced or removed.

In conclusion it is better to avoid the use of steel reinforcement unless you know what you are doing. It is far simpler to increase the thickness of the concrete if extra strength is required.

The use of fibres for reinforcing concrete is a well established practice but it has not really caught on amongst pond constructors. In situations where extremely high strength is required, or if a part of a structure needs to be made very thin for aesthetic purposes, then this is certainly worth considering.

Fibres are used extensively for rendering ponds and this will be covered later.

### CONCRETE MIXING

If you require only a small amount of concrete, or you need only small amounts at a time, then it will be better to mix it on site. Of course this will require more space for the storage of the materials and is more labour intensive than ordering readymixed concrete. The quality and strength of the concrete will depend upon how well it is mixed and laid. If the materials are not allowed sufficient time in the mixer, or if the proportions of the mix are incorrect, the concrete will be of inconsistent quality and this could lead to structural failure.

### READYMIX

Ready-mixed concrete is much more convenient and will save time if a medium to large quantity is required in one go. Access for the lorry could create a problem because it may not be possible to get the lorry close to the delivery point, the weight of the lorry could do damage to the driveway or the lorry could get stuck if invited on to wet ground. If this is a problem consider the hire of a dumper so that the lorry can remain on the road, delivered into the dumper and taken to the site bit-at-a-time.

When ordering ready-mixed concrete be sure to have extra help and ensure that the site is completely ready for the delivery so that the driver is not kept waiting. It is quite often the case that the level of co-operation given by the driver is in direct relation to the time he thinks he will be kept waiting.

If the weather is very warm and the lorry is coming a long distance, it is vital that the concrete is laid very quickly because it will remain workable for only a short time. Once concrete is mixed, a chemical reaction takes place. With a small amount of concrete one would not notice a temperature change. With a full load of concrete, however, the exothermic reaction can be quite dramatic and this will serve to make the concrete set very quickly.

When laying concrete be sure to tamp or vibrate it well to eliminate air pockets and ensure that the mix has run into position evenly.

### CONCRETE POND CONSTRUCTION

There are many different methods of using concrete for constructing a pond and careful consideration must be given to the advantages and disadvantages of each. The criteria of choice are likely to be cost, complexity, durability and time. If the timescale for completion is very limited, it may be better to use a pond liner instead because you cannot rush a concrete pond otherwise disaster is being courted.

Cost will of course have to be considered but whichever way you use the concrete the final cost will not differ very much from the other concrete techniques.

The complexity of the construction method you choose is very important. Either stick to what you know or take expert advice. When using concrete the stakes are high because you have only one opportunity to get it right.

### BLOCKS

Perhaps the simplest and most convenient method of building a pond is to use concrete for the base of the pond and to use concrete blocks for the walls. Not only is this very simple but it does not require specialist equipment and the process is broken up into natural stages. That is once you have laid the concrete slab the rest can be completed at your own speed. An extra advantage is that the complexity of the pond shape is not limited by this technique.

### SHUTTERING

Another way of constructing the pond walls is to shutter and pour. Shuttering is simply a temporary mould which is commonly made from timber and plywood which is erected in the excavation. This can either form just an inner skin, in which case concrete would be poured into the void left between the shuttering and the excavation, or two skins with the required gap between into which the concrete is poured. As soon as the concrete has set the shuttering can be removed and the structure is complete.

For very large structures it may be necessary to employ a shuttering company because they will have the proper equipment and will do a quality job.

This construction method is completely unforgiving if the shuttering is not equal to the task. If it were to move or rupture when the concrete is being poured the only answer is to move house!

### SHOTCRETE

This involves propelling concrete directly on to the excavation using a high pressure gun. The main advantage is that a very large pond can be concreted in one day although there is a lot of preparation required beforehand. The concrete thickness is built up gradually and both the floor and the walls can be completed simultaneously thus creating a monocoque structure which has obvious strength advantages.

This process can be executed only by specialist contractors due to the amount of equipment involved and it is suitable only in situations where there is good access and a large area to be concreted.

### FIBROMIX

A number of pond builders have been experimenting with fibre reinforced mortars and concretes laid directly into an excavation. Usually a fairly dry concrete mix with added



As the walls are built don't forget to position pipes in the wall for such things as Venturis and wall drains, also any skimmers should be installed at this stage.

fibres would be applied to the excavation to a thickness of about 2" (50mm) and a subsequent coat of fibre reinforced mortar.

On the face of it this method has merit but it is important that ground conditions are taken into consideration in order to determine how strong the application should be. In theory this shell is able to flex slightly in harmony with ground movement without cracking. It can be difficult to apply the concrete to very steep or vertical walls and the finished job will offer little support to the earth if the pond walls are straight.

The use of this method for building ponds is relatively new and everyone seems to have their own variation of it and many ponds have been completed in this way but there have been a few failures for a variety of reasons and therefore it may be safe to class this method as 'experimental'.

#### BUILDING A POND WITH CONCRETE AND BLOCKS

When building a concrete pond the most important thing to remember is to ensure that the footings are of sufficient strength and are on sound soil. A footing is constructed by excavating into the ground to a specific depth below the level at which the bottom of the walls will start. Into this excavation concrete will be poured in one mass so that when it sets there is a very strong collar around the perimeter of the pond which should never sink or crack. The cross-sectional dimensions of the footings will be determined by the loading that will be placed on them. For instance, if the pond contains only 500 gallons then the footings may be only a few inches thick. If the pond contains 10000 gallons then the strength requirement is much greater. The weight of water in this pond will be almost 45 tons, which will be pressing downwards on the ground and outwards on the walls, not to mention the additional weight of the walls pressing down on the footings.

An extra loading that can place an immense force on a structure, but which is often ignored, is that created if the compressive strength of the soil under the footings varies along the length of the structure. If the soil is hard at one point and soft at another then a twisting or bending strain will have to be withstood by the structure.

In cases where the suitability of the soil is in question, the thickness or strength of the concrete will have to be increased. The object of this extra strength is to create a raft. This means that the structure is designed to withstand all the forces likely to be exerted on it whether or not the ground gives even support from underneath or not.

For very small ponds it is usual practice to pour the perimeter footings and build the walls before the base of the pond has been concreted. For larger ponds, particularly those which are being rafted, it is much better to concrete the perimeter footings and the pond base all in one pour. This means that there will be no weak joints and there is an extra benefit in that the earth oversite will be covered, creating a much better surface on which to work whilst building the walls. Do not, however, try to get the base of the pond to the finished contour and very smooth all in one go because you will never do it. It is much better to bring the concrete up to about 1"-2" below finished level to allow for a final sharp sand and cement screed at a later date.

For the larger pond it is also a good idea to leave steel rods protruding from the footings on a line corresponding with the wall location. The reason for this is that the walls will be

built on the footings only after the concrete has gone off and so the bond between the two is a potential weak point in the structure. The steel rods will remove this risk.

Positioning the reinforcing rods in the footings can be difficult because of the accuracy required if they are to correspond with the vertical holes in the concrete blocks. The best way to achieve this is to pour the concrete and wait until it has 'gone off' just enough so that you can walk on it without sinking in. Get one line of blocks and temporarily lay them where the wall is to be built. This will show where the rods need to be and these points can be marked. The blocks can be moved and the steel rods can be pushed into the concrete taking care not to penetrate completely through the footing. Finally the concrete immediately around the rods should be compacted gently. The following day the wall construction can begin.

When the bottom drain is installed it is usual to run the pipe directly horizontally away from the drain. If this is done it is important to consider that the position the pipe occupies may displace some concrete from the oversite covering. If this is the case you have a potential weak point which could lead to structural failure. To prevent this it may be necessary to thicken the concrete below the pipe and/or perhaps use some appropriately positioned steel reinforcing.

Before the base of the pond is concreted it is a good idea to position the bottom drain(s) accurately and put a few shovel fulls of concrete around it(them) so that they are held securely in position. This must be done well otherwise the drain(s) are liable to be dislodged during concreting. Also if the mix were to be quite wet the drain will have a tendency to float; a habit which is not easily overcome once it has occurred.

#### BLOCKS

When the base of the pond has been completed the wall construction can begin. There are several types of blocks available and care should be taken to choose the right type. Soft blocks such as thermalite or durite are best avoided because they will not last in the ground and are not sufficiently strong for pond building purposes.

#### SOLID BLOCKS

Solid concrete blocks are suitable for small to medium sized ponds but it must be remembered that although the blocks themselves are very strong the integrity of the structure is determined by the mortar bond between the blocks. Since



Once the concrete structure has been finished then it must be sealed on the inside so that the chemical constituents of the concrete do not affect the chemistry of the water. If this is not done the consequences will be harmful to the fish since if cement comes into contact with the water it will raise the pH dramatically.

the surfaces of these blocks have no key, frog (indentation) or holes, the mortar relies on the fact that the surfaces of the blocks are rough for adhesion. Although this will give a certain amount of strength it must be remembered that the forces involved in a large pond may just be too much and structural failure could occur. For this reason 9"x9"x18" hollow concrete blocks are best because the hollow flutes of the blocks line up vertically as the blocks are laid. These columns can be filled with concrete which will make the wall very strong indeed.

As the walls are built don't forget to position pipes in the wall for such things as Venturis and wall drains, also any skimmers should be installed at this stage.

Many koi ponds will have curved sides which, although perhaps aesthetically pleasing for the finished pond, may make construction a little more difficult. If the walls are to be built with blocks then there will be a minimum radius that can be achieved before the strength of the wall is compromised since your curve will be stepped rather than constant. This obviously reduces the surface contact area between the blocks, not to mention the extra difficulty of laying blocks this way. If you have any tight curves it is preferable to construct these with ordinary bricks or to erect shuttering and then form the curve with poured concrete.

#### FILLET

In cases where blocks are used to form a curve the inside surface of the blocks will not be smooth enough to accept a render. To rectify this the low points should be filled with mortar the day before the final render is to be applied. Also, any sharp corners, such as where the wall meets the pond base, should be rounded with a fillet. Not only will this make it easier to apply the final coating but it will make the pond look more professional.

#### RENDERING

Once the inside of the pond is fairly smooth it is then ready to accept the render coat. This is simply an application of sand and cement to make the surface of the pond smooth enough to accept the pond paint. If only sand and cement are used then the strongest mix that can be used is about four parts of sand to one of cement. If you exceed this cement content then it is highly likely that the rendering will crack because it will shrink as it dries.

Ideally if you are going to paint the pond then the stronger the mix the better because this will prevent 'dusting' as you paint it. A way of increasing the strength of the mix and also



For larger ponds, particularly those which are being rafted, it is much better to concrete the perimeter footings and the pond base all in one pour. This means that there will be no weak joints and there is an extra benefit in that the earth outside will be covered, creating a much better surface on which to work whilst building the walls. Do not, however, try to get the base of the pond to the finished contour and very smooth all in one go because you will never do it.

the durability of the finished coating is to add special fibres to the mix (Fibromix or Fibrin). With this the mix ratio can be as strong as two parts sand to one of cement. One extra benefit, particularly to the amateur plasterer, is that the use of this material makes it much easier to apply to a vertical wall than a standard mix. As with all renders it is vital that it is not applied in direct hot sun otherwise it will dry out almost as you apply it. This does not allow the proper chemical reaction of the setting cement and so the coating will not be successful. One other tip is to wet a block wall before the render is applied because it will make the render bind to the wall more effectively.

If fibres are used in the rendering then it is important that any surface or protruding fibres are burnt off with a blowtorch before the application of the pond paint. If this is not done the paint will solidify around the fibres and form needle-like protuberances which can cause severe injury to a fish.

#### SEALING

Once the concrete structure has been finished then it must be sealed on the inside so that the chemical constituents of the concrete do not affect the chemistry of the water. If this is not done the consequences will be harmful to the fish since if cement comes into contact with the water it will raise the pH dramatically. In fact only really well built concrete ponds would hold water without being sealed anyway and so it is essential that the coating is applied evenly and without faults, otherwise water will be lost.

#### COATING

The main factors affecting choice of coating will be either cost or simplicity of application. Products such as G4 or Pondseal are very easy to apply and have a good life expectancy. The cost of these products usually works out to be fractionally higher than that of a good quality pond liner. The alternative is G.R.P. The application of G.R.P. is more difficult and messy than the one-part paints. You have to work very carefully and methodically otherwise you will get in a mess and the quality of the coating will be poor. Many people choose to employ contractors to coat the pond with this product. If the job is done well then the pond should be watertight for decades and it is so strong that it is resistant to damage and cracking.

#### FUTURE

It is expected that in the next few years there will be a number of new products suitable for the coating of ponds. At present there are specialised renderings which out perform ordinary sand and cement for strength but can also seal and colour the pond all in one go. At the moment, though, the high cost is limiting their appeal.

It is also expected that there will be new types of plastic coatings which are easy to apply and are durable without being too expensive.

#### SUMMARY

*My advice to anyone considering the construction of a large pond using concrete as the primary material is take your time and do it properly. Cutting corners is false economy because the time and effort employed in trying to repair a cracked pond contributes little to the fun of Koi keeping.*



# DISCUS POOL

## AN ALPHABET OF DISCUS TIPS

By Tony Sault

This month Tony Sault is our guest Discus Pool writer and has a second A - Z of Discus tips for us.

**A**quarium size for Discus should be as large as the available space permits, but a minimum of 36" X 18" X 18" or 40 gallons net volume.

**B**uy young Discus from a reputable dealer, and if home

**D**iscus Diet should be varied and High Protein for example Beef Heart, Prawns, Frozen Blood Worm or any of the proprietary brand foods designed for Cichlids.

**E**gg Protectors can be made from Plastic coated "Chicken wire" in a cylinder shape just large enough to drop over the spawning cone.

**F**iltration can be either internal or external, it is a fallacy that Discus do not like turbulence from internal power filters.

**G**rowing young Discus to a saleable size in the shortest period of time requires the availability of a lot of good quality water and numerous small feeds per day (a minimum of 6)

**H**ole in the Head disease is no longer the scourge it used to be, it can be cured easily by using Octosin or obtaining Metronidazole from your vet, administer at a dosage of one 250 mg tablet per 10 gallons of tank water.

**I**nbred Discus tend to exhibit more defects such as elongation of the body.

**J**elly like white faeces and long stringy white faeces from your Discus usually indicate intestinal parasites, do not use drugs until you can confirm which parasite and which drug it is susceptible to.

**K**illing sick fish has always been a touchy subject and there is no easy way, but one of the kindest ways is to contact your vet who will administer an anaesthetic such as Bensocaine which painlessly puts the fish to sleep.

**L**ighting for Discus breeding tanks should be minimal but can be quite bright for Discus community tanks.

**M**atched pairs of Discus are a guaranteed compatible male and female that have begun spawning. Breeding pairs have reared fry on a number of occasions.

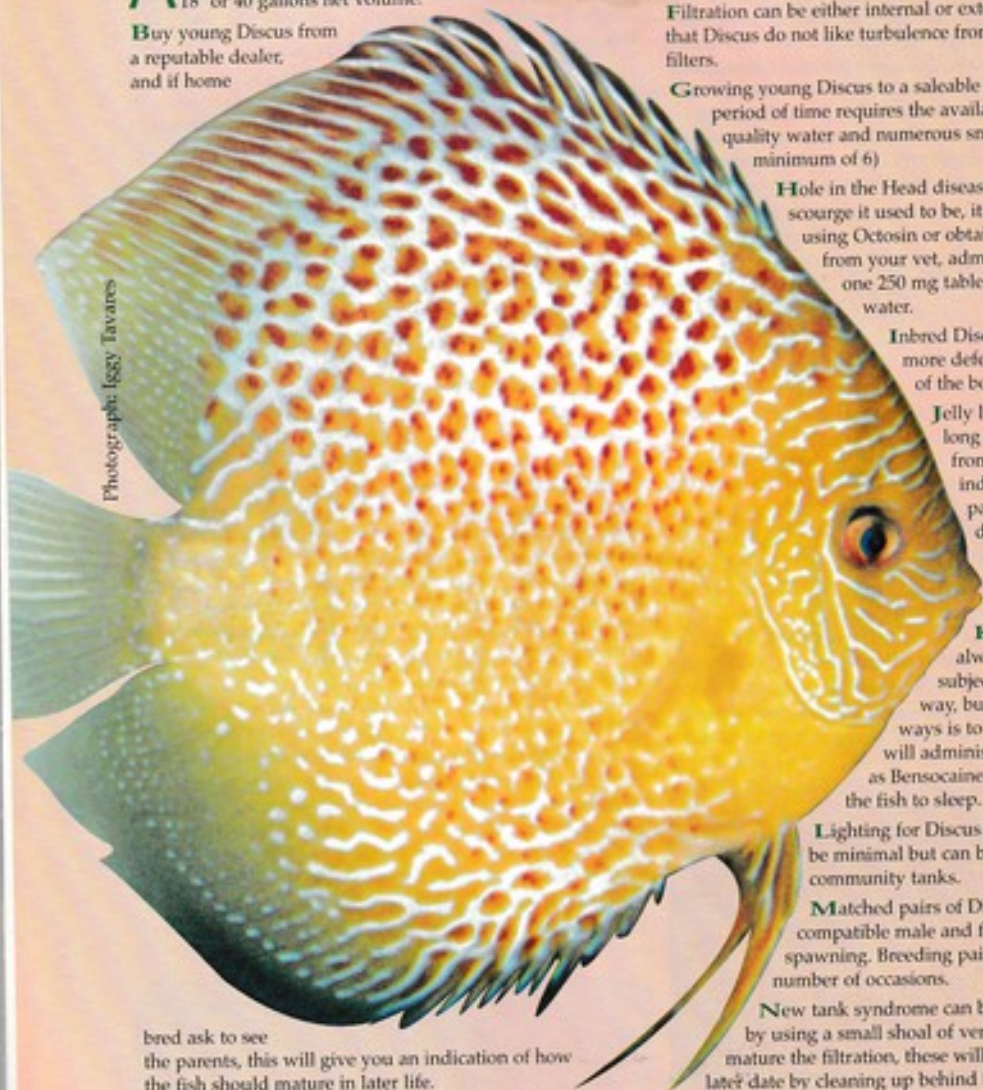
**N**ew tank syndrome can be avoided with Discus by using a small shoal of very hardy Corydoras to mature the filtration, these will earn their keep at a later date by cleaning up behind the Discus.

**O**ptimum temperatures for Discus (community tanks should be 82 degs. F. for Discus species tanks 86 degs F and if your Discus stop feeding turn the temperature up to 90

bred ask to see the parents, this will give you an indication of how the fish should mature in later life.

**C**heck your Tank parameters on a regular basis, the most important factor being the pH this should be 6.0 - 7.0.

Photograph: Iggy Tavares



degs F for a few days, this increases the metabolic rate and makes them require more food.

Patience is the greatest virtue for a would be Discus breeder.

Quarantine all new fish before introducing them into your main aquarium.

Regular partial water changes should be limited to no more than 10% in a well established sensibly stocked aquarium.

Stressed Discus are susceptible to anything, avoid stressing new fish by floating the bags in your aquarium for a minimum of 30 minutes, at ten minute intervals add a tea cup of tank water to equalise the pH.

Tapeworm in Discus can be cured easily by feeding them a prepared food containing a drug called Droncit, obtainable from your Vet and administered in the food at 1 gram per kilo of food, this should be fed to the Discus on days 1-2-3 with no other food being given, on day 4 revert to normal.

Under gravel filtration can be used quite successfully with Discus but as with sponge filters you will only get the biological action so any nasties in the water must be removed before introduction to the main aquarium.

Vigorous and often very boisterous courtship behaviour always precedes spawning, the male and female swimming towards each other with heads held high then bowing as they pass, shaking of the fins and whole bodies and often mouth locking.

Water Quality is the single most important factor in successfully keeping and breeding Discus. A water purifier that removes the chemical and metallic nasties and leaves the natural salts and minerals is ideal but failing this Activated Carbon should be used to remove the chemicals Xtra feeds every day for a week prior to going on holiday and an Xtra water change is preferable to your fish being over fed by a friend who thinks they are not getting enough to eat.

Young adult Discus under 5" body size are virtually impossible to sex with any degree of accuracy, the only 100% method I have found is if you see eggs coming down the tube it's a female and if after two days fry appear you can bet there is a male in the vicinity.

Zero Nitrite and Nitrate readings in a Discus tank are desirable.

## DISCUS DIRECTORY

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# LIGHTING THE WAY



The author working on a large tank set-up, the dichroic spotlights will shine through a glass cover and the tank has only pelmet surrounds

The fluorescents fit - note that they are different colours to maximise spectrum range for the plants and enhance the colours of some fish

*Dr David Ford of the Aquarian Advisory Service sheds some light on lighting your aquarium.*

## FUNDAMENTALS

You, your fish and indeed everything else in the Universe is made up of atoms. However, the latest research by 'atom-smashing' machines has shown that these incredibly tiny atoms are made-up of even tinier particles. So far over 200 different particles have been discovered and indeed that these may consist of even smaller things, called 'strings'. The fundamental particles fall into two groups: solid matter particles called Leptons and Quarks and the force particles (four of them) that control them.

Two of these particles are of interest to the aquarist, the matter particle in the Lepton series called the electron and the force particle called the photon. The electron carries an electric charge and as it flows in the subatomic world the effect we see in our world is called electricity. Hence the electron operates our heaters and thermostats, turns our pumps and powers our lighting.

The photon is a particle (or it can behave as a wave) that carries an electromagnetic force that has an effect on those electrons. Photons stream from things around us into our eyes and affect the electrons in the retina, which creates electricity in a 100 billion nerve cells, that flows to our brain and we see 'light'. That same photon-electron reaction energises chemical reactions (called photosynthesis) in plant cells to give growth of the aquatic plants.

The chemicals that carry out the photosynthesis have Copper as one of the atoms involved and this imparts a green colour to the compounds - hence your aquatic plants are mainly green, just like most land plants.

## RGB COLOURS

The photon/electron reaction operates the other way around too. Streams of electrons can strike chemicals that respond by emitting photons. This is called fluorescence (note spelling - even well-known manufacturers print leaflets with the o before the u in 'fluorescent'). A classic example is your TV set where a stream of electrons, varying according to the signals (i.e. the programme you are watching) strikes the inside of the screen where three chemicals that fluoresce red, green or blue are made to glow. These are called the primary colours because combinations will give you every colour of the rainbow and equal amounts of each gives white.

The ideal colour TV would have all the rainbow colours - red, orange, yellow, green, blue, indigo and violet - as fluorescing



spots in every tiny cell of the screen, but the technicalities and cost make this impractical, so the three primary colour compromise is mass produced.

The same compromise occurs in fluorescent lighting. The ideal would be to flood the aquarium with photons that cover all the rainbow colours, just like the noonday sun that shines over the tropical streams and coral reefs. Cost and complexity means only part of the colour spectrum can be chosen, so manufacturers choose a range suitable for plant growth, or algae growth or inhibition, for colour enhancement of the fishes, or brighter or dim displays, even moonlight colours.

## THE AMAZING PHOTON

The most fantastic property of the photon is that it can behave like a particle (i.e. a discrete lump of matter) or a wave (it radiates in a continuous flow) according to how you observe it. In its wavelike character, the energy the photon possesses is measured by its wavelength and frequency, and it is that energy that determines its colour.

The low energy photons will be red, then, as the energy level increases, i.e. the frequency (or cycles of waves per second) is higher, they are orange, yellow, green to blue. Our sun issues photons in the middle of this range and so is a yellow colour and land plants are 'tuned' to this frequency. When the photons hit water they are slowed down; simply because water is thicker than air. The less energetic photons get absorbed first, so the red ones disappear, then yellow, leaving the blue as the last to go before it gets dark. Hence deep corals live in a blue world and the corals that photosynthesise are tuned to this frequency. Most coral fishes have eyes that see blue, violet, even ultraviolet (which we cannot).

The shallower freshwater plants of jungle streams use the yellow to blue range of light for photosynthesis. In addition, the number, as well as the energy, of the photons, determines how much photosynthesis takes place. This is the amount of light received i.e. the light intensity.

## PHOTOSYNTHESIS

The chemical family that carries out photosynthesis is, of course, chlorophyll, but it comes in two major types called, by botanists, 'a' and 'b'. Chlorophyll-a absorbs photons of wavelength 400 to 450nm (see box for an explanation of nms) which is blue to our eyes. Chlorophyll-b absorbs 500nm which is blue-green to us. Most aquatic plant leaves have both types

of chlorophyll at a ratio of 2 parts 'a' to 1 part 'b' so the plant can use the most effective photons (the blue ones that penetrate the water) but still access the yellow ones (from the yellow sun) that are available at midday when tropical sun is overhead.

Another feature of the chlorophyll-a type is that it can 'switch on' again beyond the green colour into the red range (700nm) so plants can even make use of the setting sun (when it turns red).

Algae photosynthesise but not all use chlorophylls. Many species have a more primitive form of photosynthesizing chemicals called carotenoids. A classic example is Phaeophyta which always forms first in the new aquarium. Without chlorophyll, the alga is not green and aquarists actually call it 'brown algae'.

The green algae have some chlorophyll but also still use carotenoids. The carotenoids absorb photons at 500nm down to 400nm; that is blue to violet, hence blue lights encourage algae whereas 'warm-white' lights encourage plants rather than algae. This is why marinists who keep living rock will fit blue lights for the algae in the coral heads to photosynthesise, but the same lighting is unsuitable for the Amazonian tank, where higher plants need to outgrow the algae. In Dutch style planted aquaria the lighting of choice is dichroic (means cool burning) spot lights, which are as yellow as the sun.

The common fluorescent tube lighting, as used in offices for example, emit photons at the yellow, orange and red end of the spectrum, hence they do allow photosynthesis to occur, but since these photons are the first to be absorbed by the water, the lighting is weaker than it looks in air. This is why special aquatic fluorescent tubes have been developed that emit photons in the bluer end of the spectrum to encourage both chlorophyll-a and chlorophyll-b to work - there are many on the market.

## LIGHT INTENSITY

The energy content of the photons is important to your choice of lighting for your planted aquarium, but equally important is the number of those photons, i.e. the amount of light. This is called the intensity and is measured in various ways. Because of history it was measured in candles, based on the light from one special wax candle. Modern measurements in the SI system (System International) are still called 'candelas' and is now 1/60th of the light intensity of 1 square centimetre of a perfectly black body at the freezing point of Platinum?

This is the number of photons emitted, but we need to know how many are received in a given time, which is a different measurement, called Lumens. Also the distance traveled, hence illumination was in foot-candles (where measured in

## PRACTICAL ADVICE

The subatomic world may be interesting to explain 'why', but the aquarist needs to know 'how' so here is some practical advice on lighting.

- Choose a fluorescent tube that fits easily into the aquarium hood, i.e. 18" for a 2 foot tank, 30" for a 36" tank etc. (or 50cm for a 60cm tank etc.) Think where the starter unit can be hidden away since it will make the hood too heavy.
- Note that starter units use electricity too so if calculating the cost of lighting do not just take the wattage of the tube - add 10 watts (so that a 15 watt tube uses nearly 25 watts and a 40 watt tube is really 50 watts).

- Remember that lighting should emulate natural conditions which means a daily rhythm for the fish and plants - use a timer for 10 to 12 hours on per day starting at the same time every day.
- If pendant lights are used fit them 12" (30cm) above the water surface to reduce heating effects.
- Read the makers data so the correct size bulb is used - for example an 80 watt Metal halide bulb is equal to a 150 watt spotlight bulb and a fluorescent tube is approximately twice as bright as a tungsten bulb of the same wattage.
- If banks of lights are used, switch them on in sequence so the fish do not suffer light shock.

## TABLES

Recommended lighting for the average planted community aquarium

Length of tank	Tungsten bulb	Spotlight	Fluorescent	Mercury
18"/45cm	1 x 40w	-	1 x 8w	-
24"/60cm	2 x 40w	-	1 x 15w (18"/50cm)	-
30"/76cm	2 x 60w	-	1 x 20w (24"/60cm)	-
36"/91cm	3 x 40w	3 x 60w	2 x 25w (30"/75cm)	1 x 80w
48"/122cm	4 x 60w	4 x 60w	2 x 30w (36"/90cm)	1 x 80w
60"/150cm	5 x 60w	4 x 100w	2 x 40w (48"/120cm)	2 x 80w
72"/180cm	6 x 60w	5 x 100w	2 x 50w (60"/150cm)	3 x 80w

The fluorescent lights can be combinations of smaller tubes e.g. a 60"/150cm tank can have 2 x 40w or 4 x 20w etc.

Comparisons of lighting type

Type	Advantages	Disadvantages
Natural daylight	No cost, good for plants and triggers breeding	Cannot be controlled and causes algae to grow
Tungsten bulb	Cheap and good for plants	Gets hot and short lifespan
Spotlights	Good water penetration and long life, dichroics are cool	Bulky, needs open top tank
Fluorescents	Cheap to run and easy to install, spectrum can be chosen for type of aquarium	Expensive to buy and replace Bulky starter and wiring
Mercury	Brilliant light Good for deep tanks, ideal spectrum for Corals	Bulky and hot, needs open top Expensive


## THE NANOMETRE

The nanometre is a measure of the wavelength of the photon and is a billionth of a metre (10<sup>-9</sup>). The smaller the number the shorter the wavelength and the greater the penetrating power of the photon - this is why the 400nm (blue) photon reaches the deep Corals, whereas the 700nm (red) photon only affects surface plants.

Photon colour	Wavelength	Maximum photosynthesis occurs at-
Violet	400-430nm	-
Blue	431-480nm	435nm & 445nm
Blue-green	481-490nm	-
Green-blue	491-510nm	500nm
Green	511-530nm	-
Yellow-green	531-570nm	-
Yellow	571-580nm	-
Orange	581-600nm	-
Orange-red	601-680nm	640nm & 675nm
Red	681-700nm	-

feet). Most manufacturers describe their lamp's output in Lumens e.g. One popular brand is 600 Lumens for the 15 watt, 18" tube and 2000 Lumens for the 40 watt, 48" tube.

The photons that flood from these lights into the tank arrive at the water surface at 300,000 kilometres per second but are then slowed by the water to 225,000 km/s, the shock of which causes the light rays to bend. Glass slows down the photons even more, to 197,000 km/s, so a cover-glass has a dramatic effect too (one reason why Dutch style aquariums are open topped). Then the light spreads out and becomes weaker with tank depth.



Two different fluorescent tubes in a hood - note use of aluminium foil to reflect light (metal reflectors are available from some manufacturers).

### STARTER UNITS

A simple light bulb was the original lighting that aquarists used but they had major problems - they produce a lot of heat and the lifespan was short. On the other hand the yellow spectrum photons were good for plants and some aquarists still insist on adding a bulb (or two) inside the tank top for better plant growth. These filament bulbs have a Tungsten wire that glows hot from the electrons that race back and forth at 50 cycles a second, hence all that is needed is a mains electricity supply.

The Tungsten bulb is incandescent (heat glow) but a Mercury lamp is fluorescent. The mains supply of electrons acts on the Mercury vapour to force the electrons in the atoms of Mercury into a different orbit and when they drop back from this 'excited state' they give out the energy originally gained as photons. These photons are very energetic and so are coloured blue, indeed they pass into the ultraviolet range. By altering the pressure and chemistry of the Mercury within the bulb (i.e. High Pressure Mercury or Mercury halide) the ultraviolet produced includes visible light and special glass is used to screen out the potentially harmful ultraviolet. The blue light is very penetrating and mercury lights are popular with marinists who own living rock and coral reef systems in deep aquaria.

If that Mercury vapour is reduced and added to a long tube rather than a bulb (to maximize the surface area) the gas will still produce ultraviolet rays if bombarded with electrons from filaments sited at each end of the tube. The inside surface of the tube is coated with a Phosphorus chemical (called phosphors) which emit photons when bathed in this ultraviolet radiation. This is fluorescence and hence we have a fluorescent tube with the wavelength of the photons determined by the chemistry of the phosphor coating. Each manufacturer has their own secret recipe for the phosphor and offer a range of lighting effects. There are white, warm white, actinic (a blue photon at 420nm, the wavelength used by many Corals). Another chemical used like Mercury is Sodium with its very yellow photons - they can be seen as the fog-piercing street lights all over the UK.

All these lights rely on an arc being struck between electrodes that cause a stream of electrons to pour out. In Mercury bulbs

the arc can be seen but in fluorescent tubes they are hidden by the coating. To start the process going the electrodes sited at each end of the tube have to be warmed-up, then a stream of electrons triggers the gas to emit ultraviolet that excites the phosphors into fluorescing. This chain of events begins with the 'starter', the little white plug that slots into the 'starter unit'.

It contains a switch (suppressed to prevent interference with radio or TV) and when the mains electricity is applied, the starter can be seen to glow as the electrons pass through to the cathodes in the tube ends. This glow is actually from a bimetal strip, and, just like the thermostat in the aquarium heater, it heats up and turns itself off, taking no further part in the process (it can even be removed once the tube is on). It will not be needed until the tube is turned off and then back on. If the tube fails to light always check this starter first - it is best to have a spare one standing by - as the starter often fails before the fluorescent tube does.

The cathodes in the tube are heated via the starter and emit a stream of electrons that 'fire' the gas into making the phosphor glow. You can see this happening when the ends of the tube glow, and then the whole tube flickers and floods with light (often you can hear this happening too - the 'clinking' noise).

To maintain the process once it is underway, a higher voltage than the mains supply is needed and the rest of the starter unit has a 'choke' where the voltage is stepped up (unlike the transformer of TV games machines or computers, where the voltage is stepped down). Chokes and transformers are heavy because they contain many yards of Copper wire and magnetic plates. This is why the starter units are so big and heavy.

Once the glowing process is under way, the large number of electrons needed initially is much reduced and since it is the total number of electrons we use that determines the electricity bill, fluorescent tubes are much cheaper to run than filament bulbs for the same amount of lighting. This is also why they are cooler than filament bulbs and so more lights can be fitted into an aquarium hood without heat damaging the top surface.

Incidentally, the electron flow can actually push the phosphor coating along the tube so an ageing light can be seen to have dark rings (absence of a coating) at the ends. The phosphor also breaks down eventually which is why the luminosity reduces with time and makers recommend new tubes after a year or so, even though they seem to be still working. The plants will know that they are not as bright, and suffer accordingly, even though you may not notice the fading.

### DEVELOPMENTS

Technology marches on: fluorescent lamps are being made in miniature sizes so less power is needed to start them. Other units have the starter and choke built into the ends, reducing the amount of wiring needed. Long-life tubes are being made and some models no longer fade with age but remain bright until they fail altogether, whilst others have the phosphor fixed to prevent migration.

Remote and highly efficient 'smart' ballasts are now available for Mercury lamps.

Tubes can have internally reflecting coats to increase light efficiency, or are twisted for increased surface area. The colour of the photons are designed for specific use with makers declaring the actual range produced - this is in temperature terms as degrees Kelvin (K). Read the manufacturers data sheets to see what colour range they offer. For guidance, the tropical sun at midday is 5000K.

# CUTTING EDGE

THE BURMESE CHOCOLATE GOURAMI,  
*Parasphaerichthys ocellatus*

One of the advantages of living in an age where ecological havoc is being wrought, is that development eases access to areas that harbour previously unknown or unobtainable fish species. Most of the labyrinth fish have only been described in the past 20 years and great rarities have emerged for the first time. About fourteen years ago, we saw *Ctenops nobilis* for the first time and the latest fish to arrive in this country has been *Parasphaerichthys ocellatus*, the Burmese Chocolate gourami.

The fish most closely resembles the other Chocolate gouramis of the genus *Sphaerichthys* but differs sufficiently to occupy its own genus by virtue of having unequal jaws (those of *Sphaerichthys* are equal), an absent vestigial lateral line, a lower number of rays on the dorsal and anal fins, lower spines on the dorsal but a higher number on the anal. Finally, the ventral fins originate behind the pectorals while those of *Sphaerichthys* originate in front. But these comparisons were made in the days when only one chocolate gourami was known, today there are at least four (*S. osphromenoides*, *S. selatensis*, *S. acrostoma* and *S. vaillanti*).

In the original description, the fish were said to come from small, muddy streams along the Kaimang Jade Mines Road, a few miles from Kaimang in the Myitka District. The authors noted it was not found in the Indawgyi lake or adjoining streams although two other labyrinths, *Anabas*, the climbing perch and *Cofisa fasciata*, the Striped gourami, were. Walter Foersch noted that little was known of their natural habitat but that 520 km further south, the waters of Inle Lake were hard and about 21°C. However, in 1998 specimens were collected by Ralf Britz from two localities, one being the Indawgyi Lake, (where the water temperature was probably about 22-26°C). The second location was close to Myitkina (where the air temperature was only 15°C and the water probably only 20-22°C), in a larger stream where they were among vegetation

along the banks and in adjoining ditches with a new species of *Badis*, *Doryichthys danckeri* and *Indostomus paradoxus*. The plants growing there, *Utricularia* (bladderworts) indicated that the water was soft and slightly acidic. Tyson Roberts apparently found this species in the market at Mandalay.

Ralf Britz's 1998 specimens were maintained for over a year in tap water at 22-25°C, a pH of 7.5 and about 15 DH and they grew to about 3 cm when some began to look quite plump, indicating they were close to spawning. Unfortunately, at this point *Oodinium* (Velvet) struck although there were no signs on the body, the gills were apparently affected so this disease needs to be guarded against. Ralf had found that a change to slightly acidic (6.4-

6.8) and very soft (100-200 microS) water had helped spawning in other species from the same habitat. Walter Foersch kept two 3.5 cm specimens successfully in medium hard water in a 10 l aquarium, he noted that at 24°C, their respiration was rapid and dropping the temperature to 22°C made it calmer.

Our limited experiences so far, indicate that the fish are quite skittish and require some cover to give them security. Smaller, 1 cm fish are almost colourless or with a broad lateral line, some with dark pelvics, and seem braver than 2 cm specimens which display the characteristic mid-body ocellus. So far, they are taking live foods: the smaller specimens are eating brine shrimp and grindal worm, the larger ones are taking *Daphnia*, *Cyclops* and *Tubifex*. However, like Chocolate gouramis, Ralf Britz found they will take flake and frozen food in time.

These fish were discovered in BAS, Bolton who had about 20 specimens at 2 cm and another 20 at half this size. At £13 each, and being such an unknown quantity, these tiny brown fish are unlikely to interest any but the hardened specialist as we have yet to determine optimum conditions, sexual differentiation or even whether they are mouthbrooders like the other Chocolate gouramis.

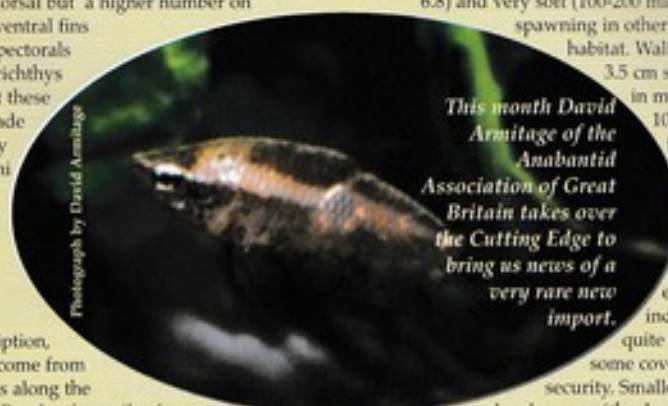
#### Acknowledgements

Thanks to Ralf Britz and Kai Eric Witte for information and to Andrew Smith for alerting me to the UK fish.

#### References

- Britz, R. 2000. Natural habitat and maintenance of *Parasphaerichthys ocellatus* Prashad & Mukerji, 1929. AAGB Labyrinth, June 2000.  
Foersch, W. 1984. Erste Beobachten bei *Parasphaerichthys ocellatus* Das Aquarium 177, 115-118.  
Prashad, B. and Mukerji, D. 1929. The fish of the Indawgyi lake and the streams of the Myitkyana district (Upper barma) Rec. Ind. Mus. 31, 161-133.

Most of the labyrinth fish have only been described in the past 20 years and great rarities are still emerging for the first time. The latest fish to arrive in this country has been *Parasphaerichthys ocellatus*, the Burmese chocolate gourami.



Photograph by David Armitage

This month David Armitage of the Anabantid Association of Great Britain takes over the Cutting Edge to bring us news of a very rare new import.

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# MY FIRST MALAWI SET-UP

All photographs: MP & C Pedrinet

A stunning example of a young *Pseudotropheus crabro*



*Sonia Guinane of the British Cichlid Association looks at some Colour Coordinated Cichlid Fishes from Lake Malawi*

Following the purchase of our first tropical fish tank and a cichlid spawning success, Dave and I were definitely "hooked" on this family of fishes. We soon acquired two more tanks, a 2ft x 15" x 12" for our breeding pair of Kribia, *Pelvicachromis pulcher* and a 4ft x 18" x 12", in which we intended to house some rock dwelling cichlids from Lake Malawi. Dave took great delight in telling me that these fishes are called Mbuna, for unbeknown to me he had sneaked off to a local aquatic store while I was at work and bought himself a small reference book on African cichlids. He had read it from cover to cover and now considered that he was an expert! I have to admit that at that time, I was far more excited at the prospect of having a tank full of yellow and bright blue fishes, rather than reading up on the dos and don'ts that go with keeping Malawis.

I was informed by "he who now knows everything", that it is necessary to crowd these rock dwelling fishes to prevent them from becoming too territorial and aggressive. It is also not advisable to house them with the quieter Haplochromine species that frequent the more open water areas in Lake

Malawi. Dave had already decided on the filtration and décor of the tank, while I was happily deciding which species should occupy the new tank. So far so good, we were almost in total agreement on most aspects of our potential Mbuna aquarium! By the time, I had finished reading Dave's book, I too learnt a great deal more about the maintenance of these colourful fishes.

## PATIENCE AN IMPORTANT PART OF SUCCESS.

To an impatient person like me, the new tank and filtration system seemed to take forever to mature, in spite of adding some water from our original established community tank. I had read and Dave kept reminding me that these Rift Valley cichlids require clean, well filtered, oxygenated water to emulate the natural waters of Lake Malawi, so to try to stock the tank too soon would probably mean certain death to them.

The local Brighton water, which drains off the chalky South Downs, is alkaline, with a pH of about 7.7 and therefore very suitable for both Malawi and Tanganyikan cichlids. The tank was filtered with undergravel filtration, using a deep layer of fine gravel and a gravel tidy, as a friend had warned us that most cichlids love to dig the substrate. It is not advisable to use coral sand as this can cause irritation to the gills. Limestone rocks, larva rocks and large pieces of granite, providing many caves and hiding places were positioned along the back and sides of the tank. This left a large open swimming area at the front, with a large rock placed in the middle to make two smaller sections and to block the line of sight from either end of the tank.

With the tank décor completed and the water



A typical Mbuna set-up with lots of rocks and caves. Good filtration and aeration is important to the health of these fish.

parameters within acceptable levels, the big day finally arrived! We made straight for a very nice aquatic store located in the next town, which stocked several species of Malawis, at reasonable prices. Our previous "fishy" expeditions were now paying dividends as we knew exactly where to go to purchase quality fishes. As we entered the shop, the proprietor greeted us and stated, "It is always a pleasure to see the lady who insists on buying colour co-ordinated fish! On one previous occasion, I had decided that I needed some blue fish, to enhance the colours of the other tank inhabitants of the community tank, and headed straight for the Mbuna tanks. Luckily reason prevailed and Dave and this gentleman were able to dissuade me from this idea, so I went home with four blue Platies instead."

However, this particular day, I took great delight in telling him that this time was different and Dave and I were now in a position to buy some real blue and yellow African cichlids.

Dave had worked out that the tank could house about 25 to 30 adult Mbuna, so we decided to initially purchase 12 juveniles and then add groups of four or more later. His book advised not adding single fish, as they would probably perish in the strict pecking order that occurs in these set-ups. There was a good selection of fishes on offer, so it was agreed that Dave would choose six and I would choose another six, as his fishy preferences were not exactly the same as mine.

Obviously the compatibility of the chosen species was another aspect that had to be considered, which was more useful advice given to us by the extremely helpful fish store manager. He also advised buying one male and at least two females, rather than just a pair to avoid an over zealous male continually harassing a single female who made the mistake of straying into his territory. We appreciate to this day the guidance and advice given to us by him in our early days of cichlid fish keeping.

Dave chose a trio of *Melanochromis auratus* and a trio of *Labretropheus fuelleborni*, whose thick lips he found fascinating. My choice on this occasion was a trio of *Pseudotropheus lombardoi* and three *Pseudotropheus socoffi*. As all these fishes were juveniles, it was not possible to be absolutely certain that we had the ideal scenario of one male and two females, but as luck would have it, we got it right. This was definitely a case of beginner's luck!

All 12 Mbuna juveniles seemed very happy with their new home and took great delight in exploring all the



*Melanochromis auratus* male. Here we see one of the other colour forms of this stunning Cichlid.



*Melanochromis auratus* male. This specimen is very similar to the one Sonia and Dave had in their final setup.

caves and other "Play areas" that Dave had created for them. The water conditions were monitored regularly, (pH 7.7 x 7.8, KH x 8dH, GH x 15dH, temperature 25C, 77F) and weekly

25% water changes were carried out, (usually by Dave, as he always complained when I spilt water from the bucket onto the carpet. Was it my fault that he insisted on walking through the wet patches in his socks).

These fishes ate absolutely everything that was offered to them, spirulina flake, frozen brine shrimp, daphnia and mysis shrimp. We were well aware that they need a high percentage of vegetable additives in their diet, so blanched, (as it is necessary to remove the cellulose) lettuce appeared on their menu at least once a week.

What really amazed us was the intelligence (or maybe greed!) of these fishes, as the sight of either Dave or I entering the room, would result in a mass of fins and tails at the end of the tank nearest the door. They soon learnt that I was the very nice person who fed them, whereas, Dave was the nasty person who cleaned them out and put horrible things in "their" tank. Eventually, they would appear only for me, and could only be persuaded to come out occasionally, if Dave appeared with a bucket in his hand. It was very tempting to feed these beautiful little fishes too often, as they were continually "begging" for food, but just a small amount once a day is more than sufficient. In fact many species of Mbuna grow much larger in aquaria than in their native Lake Malawi, due to an excess of food.

#### RAPID GROWTH

After just a few weeks, it was obvious that these juvenile fishes were growing very quickly and were beginning to set up territories. As the tank was now well established, we decided to add some more juvenile Mbuna to the set-up. During one of our many fishy excursions, which now occurred on a regular basis most weekends, we visited two shops in the London area, both of which had a good selection of cichlids, including several species from Lake Malawi.

At the first store, Dave purchased a trio of *Pseudotropheus crabro*, which is another of his favourite species, but dare I say not one of mine (I like pretty fish). I bought a group of four young O/B Zebras, as well as four juveniles from a mixed Malawi tank, whose identity was unknown to us at the time. On reflection, this was probably not a good idea, as hybridisation between Mbuna species can and does occur

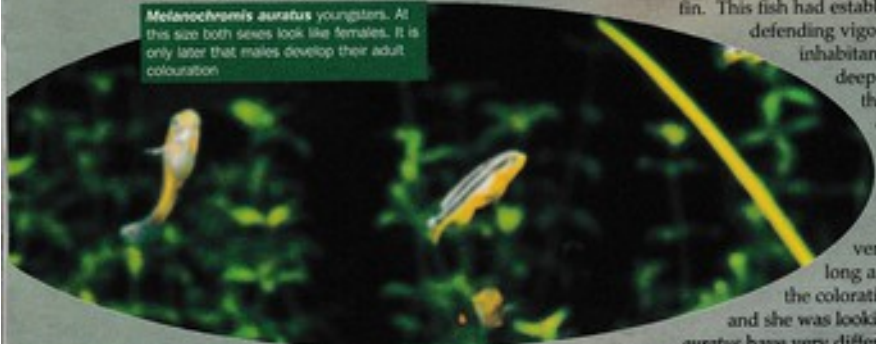


*Melanochromis auratus* eggs and fry are at risk of being spat out by brooding females if they are treated roughly.



## TROPICAL

*Melanochromis auratus* youngsters. At this size both sexes look like females. It is only later that males develop their adult colouration.



and any resulting fry may end up in one of these mixed aquariums. Most of the new fishes were smaller than the current residents, and were accepted without too much aggression. It is definitely advisable to always add several fishes at a time to an established set-up! Dave and I were delighted with our Malawi set-up as it was a real pleasure to watch all the activity in the Mbuna tank of these beautifully coloured fishes.

The largest *Melanochromis auratus* was definitely a male, with the two distinctive black stripes covering most of his body, but separated by a white line running along the flank, from the operculum to the caudal peduncle. A narrower yellow band, which extended the length of his body and onto his face, was present just beneath the dorsal fin. The tail, which was mainly black, and the dorsal fin were edged with yellow, with a large single yellow egg-spot on his anal

fin. This fish had established a territory, which he was defending vigorously, chasing off the other the tank inhabitants. He insisted on digging quite a deep pit in the substrate and before long the gravel-bidy was visible. Whenever one of his two females appeared, he would display to her by quivering and moving around her at the same time.

Initially, neither females appeared very interested in his performance. Not long after, however, Dave and I noticed that the coloration of one of them had intensified and she was looking fatter. Female *Melanochromis auratus* have very different coloration to the males, with the underside of the body, below the mid-lateral black line completely yellow, extending into the bottom half of the tail fin. There is a second black stripe running from the top of the head to the top of the caudal peduncle, just beneath the black dorsal fin, which like that of the male is edged with yellow.

### OUR FIRST SPAWNING

The male was very persistent and continued to display and quiver at the fat female whenever she was in his territory, and most of the other tank residents had the sense to keep well out of his way. On one particular Saturday, when Dave and I were going out for the day, she seemed to be "visiting" the male more and more often and it was becoming obvious that the pair might be spawning very soon. While we were delighted that this was about to happen, it was very

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disappointing to realise that we might not witness the actual event, as we were going to be out of the house for most of the day!

Most of the conversation that day centred around our prospective first Malawi spawning. Even the non fishkeeping friends that we were visiting were almost as excited as Dave and I by the time we left to return home. Leaving Dave to sort out the car, I rushed through the front door and peered into the Mbuna tank and sure enough, there was the Auratus female up in one corner. She was looking much thinner, but her cheeks were fat and she was gently moving the eggs around in her mouth.

Now a decision had to be made as to whether we should leave her in the main tank or move her to one of two nursery tanks that had been set up in anticipation. Both of these little tanks contained water from the main tank, a heater set at 26C, (79F) and were filtered by sponge filters, which had been up and running for a while. Dave suggested that for the time being, we should monitor the situation to see if the male or any of the other fishes harassed her too much and to also give her a chance to get used to her new role of maternal mouthbrooder, incubating her eggs.

In Lake Malawi, *Melanochromis auratus* males can reach 10cms TL, with females slightly smaller, but the male of this pair was only about 7cms. The female was almost the same size, but really looked too small to be able to cope with the copious mouthful of eggs she was carrying. Combining that fact, with the prospect of virtually no food for about 21 days, I actually felt rather sorry for her!

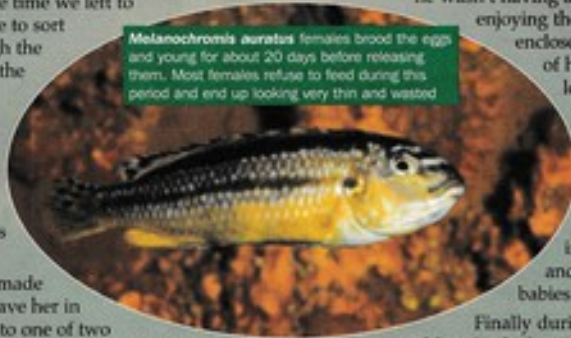
For three or four days, the other tank residents left her alone, but for some obscure reason known only to him, the male Auratus began pursuing her, even when she was hiding in one of the many caves that were available. Her coloration had darkened to resemble that of a male and it really worried me to see her distressed, so we decided to move her immediately to one of the nursery tanks. (Subdominant males often take on female coloration in a tank where there is more than one male). However, before moving her, one of us would have to catch her!

Dave filled a small plastic bowl with water from the Mbuna community tank, into which he intended to put the net, plus fish, so at no time was she out of water. She had other ideas, for as soon as the net went into the tank she disappeared, whereas all the other inhabitants were still swimming around quite happily. To this day, it really fascinates me as to how an individual fish knows that someone wants to catch it! We had hoped that it would be possible to catch her without taking out all the rocks, but as the Bard once said, the best laid plans of mice and men"! With all the tank décor removed from the tank, Dave was able to catch her quite easily, using the net and his little plastic bowls. She spat out a couple of eggs during the upheaval, but thankfully, most remained in situ and she soon settled into her little tank, which contained two small plastic tubes to give her a choice of protective areas in which to hide.

During the incubation period, a tiny amount of food was offered occasionally but she did not attempt to eat any,

although some females have apparently been known to do so. I marked the days off on a calendar and, after exactly 20 days, I noticed a little tiny fish, with coloration identical to that of his mother, (male Auratus babies have female coloration, but change later), hiding underneath one of the tubes. She was trying to scoop him up into her mouth, but he wasn't having any of it as he was obviously

*Melanochromis auratus* females brood the egg and young for about 20 days before releasing them. Most females refuse to feed during this period and end up looking very thin and wasted



enjoying the freedom, having being enclosed in the protective confines of her mouth. The female was looking very thin not having eaten for nearly three weeks, but was still very reluctant to release her brood. I tried to tempt her to eat by offering some live brine shrimp, but she insisted that she knew best and continued to keep the babies in her mouth.

Finally during the early evening, Dave and I noticed a lot more movement in the nursery tank and sure enough, there were fifteen little *Melanochromis auratus* fry in one corner, near the sponge filter. Dave immediately moved the skinny female to the other empty nursery tank and I gave her some brine shrimp, which she really seemed to enjoy! We intended to leave her in the small tank for a few days, feed her up and give her an opportunity to recuperate before returning her to the main tank.

Re-introducing fishes back into the Mbuna community tank is not without risk, so it is better, if at all possible to add more than one female at the same time. Unfortunately, on this occasion, the little female Auratus was our only brooding female, so we decided to move her back into the main tank at night, just before bedtime and then turn all the lights out. Thankfully, the following morning, all was fairly quiet in the tank and apart from a small split in her tail, she seemed to have been accepted by the other residents, including the male, *Melanochromis auratus*.

Initially, the fry were fed three times a day on baby brine shrimp, cyclops and crushed flake and grew very quickly. Within a few weeks they had more than doubled in size. Not long afterwards, two more Mbuna females were holding eggs, so more tank space was needed fairly quickly to accommodate our rapidly increasing fish population! Added to this, Dave had decided, with a little persuasion from me, that perhaps we should purchase a really large tank, possibly a 6ft x 18" x 18", to house some Central American cichlids!



Group of *Pseudotropheus lombardoi* which have just been caught in Lake Malawi, originally Sonia was far more excited at the prospect of having a tank full of bright yellow and blue fishes like these, rather than reading up on the dos and don'ts that go with keeping Malawis.

# PURPLE LOOSESTRIFE

(*Lythrum salicaria*)

Purple Loosestrife belongs to a genus of some 35 species of mainly summer flowering herbaceous perennials which contain two excellent watergarden plants. These thrive in moist or wet soil and are adaptable enough to do well in full sun and semi-shade. They are fully hardy and can take temperatures down to at least -15°C which means they should survive even the hardest U.K. winter weather.

Purple Loosestrife grows to between 60 and 150cms in height and spreads to form a sizable clump 50cms or more across. The flowers have four petals and are star shaped. These are densely clustered along spike like racemes and tend to be shades of pink through to red depending upon variety. Small lance shaped leaves occur along these spikes which can be up to 30 cms long.

This species can be propagated by dividing the clump in spring or autumn, alternatively you can collect seed when ripe or take basal cuttings. Seed should be sown during April in a cold frame or greenhouse at a minimum temperature of 16 °C. Once large enough to handle the

seedlings can be planted into nursery rows and left to grow on until the following autumn. 6 - 7 cm long basal cuttings should also be taken in April. These should be planted into a mixture (equal parts by volume) of peat substitute and sand. Once rooted they should be planted out into nursery rows in just the same way as the seedlings.

Apart from the true species there are several commonly seen cultivars in cultivation. Good varieties include 'Dropmore', the best purple, 'Lady Sackville', rose-pink and 'Robert', a rosy-red. Firecandle (sometimes seen sold as "L. salicaria 'Feuerkerze") has gorgeous rose-red flowers, whilst 'The Beacon' has deep rose-crimson flowers which appear from August through to September. These require slightly different propagation than the species because they do not tolerate division during autumn and plants raised from seeds will not come true.

Another species you may come across is *Lythrum virgatum*. Hailing from Eastern Europe it is just as hardy as its cousin but tends to stay smaller. It likes similar conditions and can be propagated in the same way. Once again there are several cultivars offered for sale with 'The Rocket' probably the best available. This produces lovely slender spikes of reddish-pink flowers from August and is a vigorous plant which will quickly establish itself in a new site.

Whilst both these plants are basically moisture loving marsh plants they can adapt to normal garden soil providing it has plenty of compost or manure worked into it. This characteristic is very useful where a plant which naturally occurs by rivers and streams is needed to create a particular effect but you cannot create a special bed for it.

These are generally trouble free plants which are well worth adding to a bog garden. Since Purple Loosestrife (*Lythrum salicaria*) is a native of northern temperate areas including the U.K. it is an excellent plant for a wildlife garden.



Photograph by Keith Lambert