

NEWS

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 **New Jewels for the Freshwater Aquarium**



 **TerralogKids: Chinese Firebelly Newt**



 **The Cumberland Turtle**



Aquaristic

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Preview:

News No 111
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Don't miss it!

Front Cover:

Above: *Hemichromis* sp. Fire Lips

Below: Banggai-Kardinalbarsch,

Pterapogon kauderni

Photos: F. Schäfer

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Filialen mit Zoofachabteilung



Cichlids

The mystery of Hemichromis sp. "Fire Lips"

by Frank Schäfer

The red jewel cichlids are some of the most beautiful freshwater fishes on Earth. They are also very easy to keep and breed. But identifying the species is one of the most difficult exercises in ichthyology.

Until 1979 things were all very easy in both the aquarium hobby and science alike. Only two species of cichlids were recognized in the genus *Hemichromis*, namely the Jewel Cichlid, which was termed *Hemichromis bimaculatus*, and the Green Jewel or Five-Spot Cichlid, which was called *Hemichromis fasciatus*. In fact several other species had been described prior to 1979, but the complexity of characters in *Hemichromis*, more precisely the highly individual variation in color and body form depending on ecological circumstances, coupled with massive mood- and age-dependent variability in color, invariably led to the species characteristics given in the descriptions being regarded as insufficiently distinctive.

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The great revision

Then Paul V. Loisel published a revision of the genus *Hemichromis* in which he distinguished three species of green jewel cichlids - namely *Hemichromis fasciatus*, *H. elongatus*, and *H. frempongi* - and eight species of red jewel cichlids - *H. bimaculatus*, *H. cristatus*, *H. paynei*, *H. guttatus*, *H. stellifer*, *H. cerasogaster*, *H. letourneauxi*, and *H. lifalili*. From this time on aquarists took a somewhat closer look and interpreted the revision (which unfortunately contained mixed-up illustrations) in a variety of ways. Repeated attempts were made to resolve the resulting confusion. Thus Freyhof (1995) corrected a number of fundamental points and was



These two photos were taken on the day of arrival and document the extraordinary beauty of the fishes. The blood-red lips, which look as if painted on, are the reason for the name "Fire Lips"

All photos: Frank Schäfer





followed by many authors, for example LINKE & STAECK (2002) and LAMBOJ (2004). Nevertheless a number of misapprehensions obstinately persisted, for example the idea that a (rather aggressive) cultivated form of red jewel that didn't exist at all in the wild, was being mis-labeled as *Hemichromis lifalili*. The "true" *H. lifalili*, by contrast, was hardly ever maintained in the aquarium and kept only by a few specialists.

Hemichromis sp. "Fire Lips"

This background information is required in order to understand why determining the specific identity of red jewel cichlids is so tricky. But is that really so important? Do you need to know what an animal is called in order to get enjoyment from it? Of course not. But even so the question of specific identity isn't unimportant, as unfortunately increasingly more species of animals are disappearing forever from our planet without our ever registering their existence at all. Given that Man is responsible for the majority of these extinctions of animal and plant species, because he - often without realizing it! - alters their environment to such a degree that the animals and plants can no longer exist there, humanity has a responsibility to record the diversity of the life forms found on Earth. We can only protect what we know

Hemichromis elongatus, an example of the green jewel cichlids.



This cultivated form or hybrid of *Hemichromis guttatus* is usually incorrectly labeled as *H. lifalili*.

about! The aquarium hobby is the most important aid to science when it comes to achieving this task in the realm of the small fishes. Apropos of which, it cannot be repeated often enough that the maintenance and breeding of wild-caught fishes in the aquarium is active species conservation! No species has ever become extinct as a result.

Hemichromis sp. "Fire Lips" arrived at



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Aquarium Glaser in the form of captive-bred specimens, and nothing could be learned of their provenance. Naturally, in my role as resident zoologist I was asked to identify the species, but had to pass: quite simply the combination of characters doesn't concur with any species of *Hemichromis* known to date! The body shape and distribution of the iridescent blue spots (the so-called iridophores) most closely matches the species *Hemichromis guttatus*, but that species always has a readily visible, elongate-oval spot on the center of the body. And no lateral spot of any kind is apparent In the "Fire Lips" (there are around 25 specimens). Be that as it may, the fishes looked so attractive even in the photographic aquarium that I decided to take a pair home with me in order to breed them and see what the offspring turned out like.

Hemichromis guttatus

This small red jewel cichlid - males grow to about 10 cm long, females remain smaller - is undoubtedly the most widespread species of the genus in the hobby. And the majority of the so-called "lifalili" cultivated forms were



probably *H. guttatus* crosses, as this cichlid exhibits a wide range of color variants even within one and the same population. While the body shape and the form and position of the lateral spot are fairly uniform within a population, the coloration varies considerably. Thus there are not only brilliant red but also gray-green individuals as well as numerous transitional and intermediate forms. This is independent of sex. The number of iridophores, ie the iridescent blue spots, is likewise highly variable. There are specimens with very many iridophores and also individuals with very few, and this applies to both the red and the gray-green fishes. The reasons for the polychromatism - the technical term for color variation - are a complete mystery. Because we aquarists always prefer to breed the fishes that are most beautiful in our eyes - ie as red as possible and with numerous iridophores - and this coloration can evidently be fixed genetically, aquarium strains look very uniform compared to wild-caught stocks.

Aquarium Glaser has recently obtained wild-caught *H. guttatus* from the Benue River in Nigerian and I also took home a pair of these fishes for comparison with the "Fire Lips". In so doing I simply made sure I had a pair and deliberately ignored their coloration.

Red jewel cichlids in the aquarium

Male and female red jewel cichlids can be told apart very readily. Males are larger, and have



All the photos on this page show wild-caught *Hemichromis guttatus* that originated from the same population and were collected at the same time. Nigeria, Delta State.



The base color of the body can tend to greenish or reddish, and the number of iridescent blue spots (iridophores) likewise varies.



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The pair of *Hemichromis* sp. Fire Lips described in the text, in brood-care coloration. These are the same individuals as on page 3.



more prolonged ventral fins and a steeper forehead. I have never yet known a pair put together arbitrarily that didn't get along. The various wild forms of *Hemichromis guttatus* at least are usually very peaceful fishes, towards both conspecifics and other species. Of course you need to keep an eye on them when they are spawning and leading young, as they are exceptional parents and will vigorously defend their territory and their offspring. Red jewel cichlids of this group are all open spawners with both adults

performing parental care: that is, they spawn on a hard substrate (a rock, a piece of bogwood, etc), but not in a cave, and both parents guard and shepherd the young.

Water chemistry (hardness and pH) is unimportant as long as it lies within normal parameters, ie if possible pH not appreciably less than 6 or more than 8.5 and hardness between 3 and 25 °dGH. The water temperature should be between 22 and 28 °C. These cichlids will eat any of the usual fish

foods, be it dry, frozen, or live. The fry initially have a typical black longitudinal streak and are slightly reminiscent of *Nannostomus* species. They can be fed with *Artemia nauplii* from the first day on. Later on they lose the longitudinal stripe and at the same time abandon their juvenile shoaling behavior. Interestingly, however, the young can be left with the parents for a long time, and aren't attacked even at a length of 2-3 cm, when they already look like miniature copies of their parents. Sexual maturity is attained at the age of around four months, by which time the young males are around 5 cm long. In my view they are at their most attractive a length of 6-7 cm, as they are fully colored but still graceful. Later on (at least in the aquarium) they become very "beefy" and are less aesthetically pleasing, and the coloration looks a bit washed out.

The way the aquarium is set up is all the same

Almost all the juvenile Fire Lips exhibit a clearly visible lateral spot at the age of eight weeks. In only a few is it absent or only weakly expressed.





Wild-caught male *H. guttatus* from the Benue River in Nigeria in brood-care dress.



This wild-caught female, seen here in normal coloration (above, small photo) and brood-care dress (below, large photo) also originates from the Benue River. Both photos show the same individual.



to red jewel cichlids. It shouldn't be too brightly illuminated and include some hiding-places. A standard off-the-shelf 60-cm aquarium is perfectly adequate for breeding, though in that case there should be no other fishes in the aquarium. Plants aren't usually vandalized by these fishes.

The solution to the puzzle

Both of the pairs I took home did justice to

their kind, spawning in short order and almost simultaneously (at an interval of only two days) so that I had a good opportunity for comparison. Except for the missing lateral spot the "Fire Lips" resembled the wild-caught *Hemichromis guttatus* in every detail. Both females assumed a breathtakingly beautiful brood-care dress, in which they became bright yellow from the back to somewhat below the center of the body, while the belly was brilliant red in color. By contrast both males assumed a rather modest coloration in which the area from the back to well below the center of the body was warm yellow and the breast a delicate red. The eyes were bright yellow in the females, but only brass-colored in the males.

The moment of truth came when the "Fire Lips" young lost their infant stripes. Almost all of them developed a perfectly normal *Hemichromis guttatus* spot! Only eight out of the 134 juveniles that I raised exhibited a greatly reduced lateral spot or none at all. So it can be stated with a high degree of certainty that *Hemichromis* sp. "Fire Lips" is a selectively cultivated form of *Hemichromis guttatus*. The question remains as to whether the lateral spot will disappear in all individuals later on (at the time of writing the young are just eight weeks old). We will wait with bated breath.....



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Lexicon

Hemichromis

Hemichromis means "half Chromis";
Chromis is another fish genus.
guttatus means "spotted"
fasciatus means "banded"
elongatus means "elongate"
bimaculatus means "with two spots".



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Marine fishes

Cardinalfishes - fascinating and beautiful!

by Levin Locke

Cardinalfishes can be termed ideal fishes for the marine aquarium. They are brightly colored, exhibit interesting behavior, remain manageably small, don't tend to be susceptible to disease, ignore sessile invertebrates, and are essentially energy-saving fishes as they require little light. Who could ask for anything more?



King of the Mullet, *Apogon imberbis*, from the Mediterranean.

All photos: Frank Schäfer



The identification of cardinalfishes is often a tricky business. Many species look extraordinarily similar, for example those shown here: *Ostorhinchus sealei* (above) and *O. chrysopomus* (below).

euryhaline species, that is fishes that can live both in the sea and in fresh water; one of them, namely *Apogon amboinensis*, is occasionally, albeit very rarely, imported as an aquarium fish for freshwater aquaria. You will find a special Info Box on these species on page 18.

The cardinalfishes received their popular name from the only species originally native to the Mediterranean, the Cardinalfish or King of the Mullet, *Apogon imberbis*. Its red attire was apparently thought very reminiscent of the robes of the church dignitaries. The second popular name of this species comes from the legend that this fish ruled over the Red Mullet (*Mullus barbatus*), one of the most prized food fishes among the ancient Romans. Even the scientific genus name reflects this legend, as "Apogon" means "without barbels" - in comparison to the mullets with their two flexible barbels on the chin.

Pterapogon kauderni, the Banggai Cardinalfish, is probably the easiest of all marine fishes to breed.

Marine and freshwater aquarists are often very committed to their particular branch of the aquarium hobby. Marine aquarists don't usually maintain any freshwater aquaria, and vice versa. At the same time very many freshwater aquarists continue to subscribe to the argument that marine fishes cannot be bred in private aquaria, or at least only at great expense and effort. And for these people breeding is the crowning achievement of keeping fishes. Cardinalfishes are thus ideally suited as beginner's fishes, as at least one species, *Pterapogon kauderni*, is no more difficult to breed than an easy-to-breed freshwater fish and in addition it is always easy to find homes for the young.

Cardinalfishes - an overview

Cardinalfishes constitute a family - scientifically known as the Apogonidae - within the perciform fishes. At present almost 350 different species are recognized, divided among 33 genera. The largest species of cardinalfish grows to around 20 cm long, but the vast majority remain below 10 cm in total length. For this reason alone the majority of species are well-suited to long-term maintenance in the aquarium.

Almost all cardinalfishes live in the sea; only one genus, *Glossamia*, with 11 species, restricted overall to New Guinea and Australia, lives exclusively in fresh water. There are also a small number of





Juvenile *Sphaeramia nematoptera* are really gorgeously colored....



....but they are also a sight to see when full grown (the species attains around 8 cm long).

Cardinalfishes occur in all the warm seas of the Earth. Originally the only species living in the Mediterranean was the above-mentioned *A. imberbis*, but in the interim a whole series of species have migrated from the Red Sea into the Mediterranean via the Suez Canal, the so-called Lessepsian migrants (after the engineer Lesseps, under whose direction the Suez Canal was opened in 1869) *Apogon queketti*, *A. smithi*,

Apogonichthyoides nigripinnis, *A. pharaonis*, *A. taeniatus*, and *Ostorhinchus fasciatus*. The influence of these newcomers - the technical term is neozoa - on the indigenous fauna of the Mediterranean remains unknown, although the Pharaoh Cardinalfish (*Apogonichthyoides pharaonis*) is a direct competitor for habitat with *Apogon imberbis* and populations of *A. pharaonis* are constantly growing (Oral,

2010). But the King of the Mullet is still considered a common species and not endangered, and it remains to be seen how well *A. pharaonis* can adapt to the low temperatures in the western Mediterranean. At present its occurrence is restricted to the eastern Mediterranean.

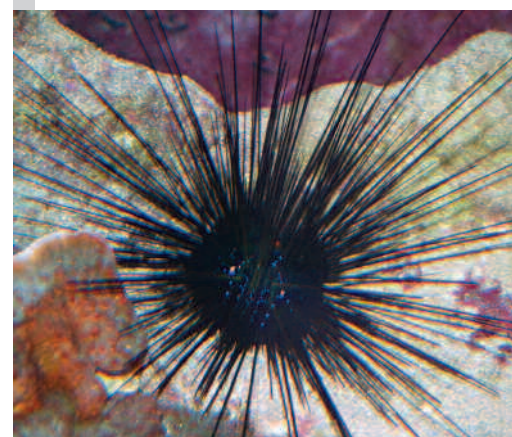
Unusual relationships

It is known that many cardinalfish species live in close association with other creatures. Thus some species live among the long venomous spines of sea urchins of the genus *Diadema*. The Banggai Cardinalfish (*Pterapogon kauderni*), already mentioned above, is particularly well known for this association, but the species most highly specialized on this partner is undoubtedly *Ostorhinchus chrysotaenia*; this cardinalfish has even been observed to clean the sea urchin. So the relationship is probably a true symbiosis offering reciprocal benefits, while the use of sea urchins by other cardinalfishes, without the sea urchin gaining anything, is termed commensalism.

There are cardinalfishes (*Astrapogon stellatus*) in the Caribbean that live inside the mantle cavity of giant snails of the species *Lobatus gigas* (formerly *Strombus gigas*). A closely-related species, *Astrapogon punctulatus*, lives in the shells of dead snails, similar to the behavior known from some cichlids from Lake Tanganyika.

The list of the commensal associations between cardinalfishes and invertebrates is long. The Caribbean species *Apogon*

Diadem sea urchin.





Zoramia leptacantha is regularly imported. Like all Cardinalfish species it should be kept in a shoal.

quadrisquamatus lives with anemones like clownfishes do, albeit with cave- and crevice-dwelling species. The species of the genus *Phaeoptyx*, likewise from the Caribbean, live with starfishes and gorgonians, and the Indo-Pacific species of the genus *Siphamia* with the venomous

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Crown of Thorns Starfish and sea urchins. Some species, including the frequently imported Threadfin Cardinalfish *Zoramia leptacantha* (formerly *Apogon leptacanthus*) also live among stands of coral. Only some 15 Caribbean species and around 80 Indo-Pacific species are regarded as coral fishes in the strict sense, ie species that are always or regularly associated with coral reefs.

Cave-dwellers

In general cardinalfishes can be described as fishes that prefer to spend the day in caves or other shelter. Only at twilight do they venture further away from their hiding-places. At the same time cardinalfishes aren't very specialized. The two species of the genus *Sphaeramia*,

Above brooding male, below female of *Zoramia leptacantha*. The species grows to around 6 cm long.



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namely the Pajama Cardinalfish *S. nematoptera* and the Orbiculate Cardinalfish *S. orbicularis*, are noted for living their lives among mangroves. But these fishes also like to live in somewhat murky water, for example in harbors. The symbiosis with luminescent bacteria seen in many small cardinalfishes is an

(which belong to the genera *Siphamia* and *Acropoma*, plus species of the genera *Pempheris*, *Parapriacanthus*, *Archamia*, *Jaydia*, and *Rhabdamia* are capable of bioluminescence without symbiotic bacteria) haven't yet been imported. A special aquarium with these little fishes would be a fascinating sight at night!

saving fishes", as the aquarium lighting above a cardinalfish aquarium needs only to satisfy the requirements of the owner, it's all the same to the fishes.

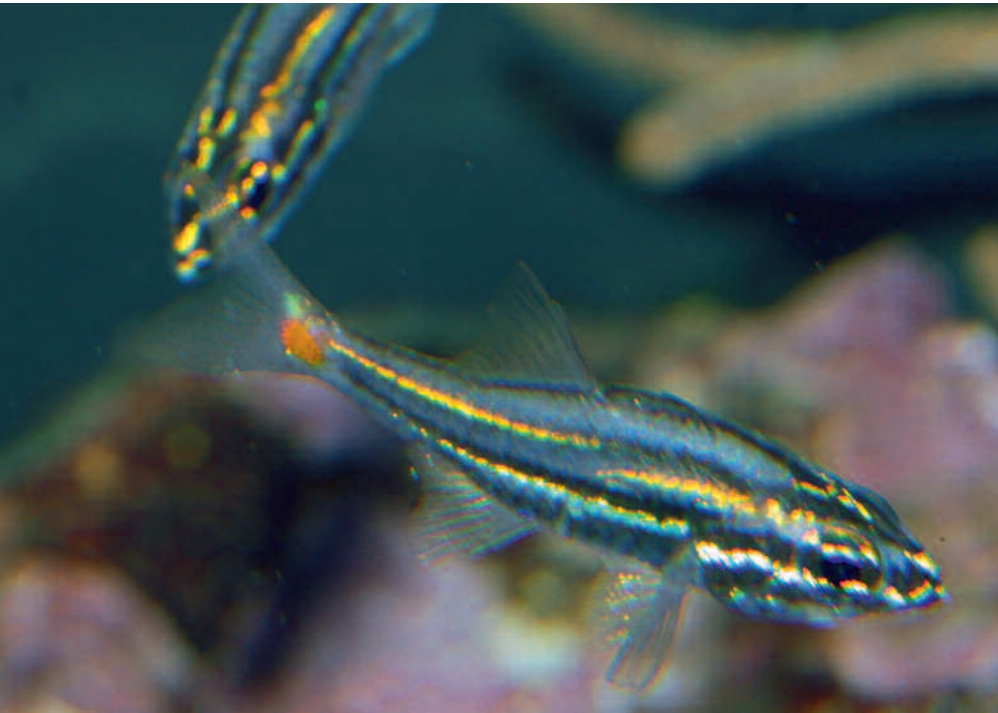
Social behavior

Essentially, the majority of cardinalfishes are found in large groups in the wild. The small species in particular exploit the relative safety of the shoal. Pairs form from among the groups, and retire to a shared living cave at breeding time. In the aquarium pairs of the Banggai Cardinalfish, for example, may remain together for many years and become ever more compatible in their breeding behavior.

In the aquarium it can also often be observed that after spawning females remain in the vicinity of brooding males. In the wild such observations are only very rarely possible for obvious reasons. In *Apogon notatus* at least the female remains in the living cave after spawning, while the brooding male often leaves to join a shoal of conspecifics. The female then entices another random male into the cave (he may even be a brooding male) and spawns with this new mate as soon as the opportunity arises. So marital fidelity appears to be more aquarium artifact than typical behavior - at least in cardinalfishes.

Reproductive behavior

As far as is known to date all cardinalfishes are paternal mouthbrooders, but obviously only a very small percentage of the cardinalfishes in existence are actually so well known that any definite statements can be made about their reproductive behavior. Even such interesting details as the question of how fertilization of the egg-ball takes place in the mouth of the male have been only inadequately studied to date. Intensive observations of the spawning behavior of the King of the Mulletts in the Monaco Aquarium by J. Garnaud in the 1960s were interpreted as suggesting internal fertilization, as female Cardinalfishes lay their eggs at a stroke in large balls, and the males then pick up these balls within a few seconds without any act of fertilization being observed. But



Ostorhinchus parvulus are breathtaking dwarfs that grow to only around 3-4 cm long.

adaptation to life in dark, murky water and enables them to glow in the dark (this is termed bioluminescence). Unfortunately to the best of my knowledge these species

Cardinalfishes may tolerate the strong lighting in modern reef aquaria, but don't require it at all. For this reason they can be classified without hesitation as "energy-

The attractive *Ostorhinchus margaritophorus* grows somewhat larger, specifically 6.5 cm.





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Von L.A. geht es in den Südpazifik nach **Französisch Polynesien**. Vom Flughafen auf Tahiti reisen wir weiter zur Nachbarinsel **Moorea**, die perfekte Korallenriffe für Meerwasserforschung bietet.



Von Moorea geht es über Neuseeland weiter in den tropischen **australischen Nordosten**. Im Bundesstaat **Queensland** reisen wir zuerst in die Regenwälder, um dort Bach- und Flussläufe sowie Seen und den Regenwald selbst kennen zu lernen. Zum Abschluss geht es noch zum **Großen Barriere Riff** vor der Küste, um einen direkten Vergleich zu Moorea zu ziehen.

Fast schon auf dem Rückweg liegt das **Outback Australiens**, in dem wir per Jeep und zu Fuß nach Wüstenbewohnern suchen werden und dieses extreme Biotop gründlich mit Messgeräten unter die Lupe nehmen werden. Nach einem Besuch des **Ayers Rock** geht es zum Abschluss in den tropischen Norden bei Darwin zum **Kakadu-Nationalpark**, der für seine artenreiche Fauna bekannt ist.

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Die Reise könnte ein Jahr dauern, wird aber auch in 16 Tagen möglich sein. Diese Expedition wird kein Erholungsurlaub, sondern randvoll mit Abenteuer, Forschung und Herausforderungen gefüllt sein.

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Brooding pair of *Ostorhinchus cyanosoma*. Male below, female above.

a more probable explanation is that the male doesn't release sperm until after he has picked up the eggs and that the striking, excited way in which the female swims around the male after he has picked up the eggs serves to enrich the water he breathes with sperm such that fertilization of the eggs can take place in his mouth (Kuwamura, 1983). Even though the hypothesis of internal fertilization in the King of the Mullet can still be found in the latest literature and is portrayed as fact,

recent research instead indicates that the theory is untenable (Petersen et al. 2005), not least because male cardinalfishes lack any anatomical structures that might make such internal fertilization possible.

Productive fishes

Cardinalfishes are in general very common, and are not only widely distributed but also found at high population densities. At the same time they have highly variable strategies as regards numbers of offspring.

Ostorhinchus hartzfeldii is one of the larger cardinalfish species with a maximum length of 12 cm.



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The only 7-9 cm long *Apogon notatus*, for example, lays egg-balls containing several thousand eggs, while at the other extreme *Pterapogon kauderni*, the Banggai Cardinalfish, produces only some 24 fry per spawning on average and 170 young per year (Mai, 2004). The Banggai Cardinalfish also has one of the smallest natural distribution regions of any tropical marine fish, and thus represents an exception in practically every respect.

There are all sorts of intermediates between these two extremes of breeding. *Ostorhinchus*

Ostorhinchus cyanosoma grows to 6-8 cm long. Females stay with "their" males after spawning, at least in the aquarium.





Cheilodipterus quinquelineatus grows to around 13 cm long. Females have less yellow on the caudal peduncle.



Apogonichthyoides pseudotaeniatus can grow up to 14 cm long.



Male *Cheilodipterus quinquelineatus*.

rueppellii, for example, produces relatively large and at the same time few eggs (50-280).

Here is a summary of the clutch sizes published to date (after Neira, 1991):

Apogon affinis, size of parent fishes 5.5-9 cm, 21,000 eggs per egg-ball

Apogon imberbis, size of parent fishes not given (the species grows to a maximum of 15 cm long), 22,000 eggs per egg-ball

Apogon lineatus, size of parent fishes 5.5 - 8.5 cm, 3,200 -13,250 eggs per egg-ball

Apogon maculatus, size of parent fishes around 6 cm, 75-100 eggs per egg-ball.

Ostorhinchus rueppellii, size of parent fishes 4.5 - 8.5 cm, 50-280 eggs per egg-ball.

Sphaeramia orbicularis, size of parent fishes 7-9 cm, 6,100-11,700 eggs per egg-ball.

Vincentia conspersa, size of parent fishes 9.5

cm, 150 eggs per egg-ball.

In some species, for example *Sphaeramia orbicularis*, a link has been established between reproductive behavior and the phases of the moon in the wild, but not in others. The brooding period varies from eight days (at 27-30 °C) in *Sphaeramia orbicularis* to up to 28 days in *Pterapogon kauderni*.

When we consider that there are actually very many species of cardinalfishes and each of them probably has its own special characteristics, then there is obviously a wide field of activity available to experimentally-minded aquarists with breeding ambitions.

Cardinalfishes in the aquarium

Cardinalfishes can without reservation be

described as suitable beginners' fishes for marine aquarists. They don't pose any especially high demands as regards water quality and are not particularly susceptible to disease. Almost all cardinalfishes prefer to feed on small crustaceans and can be fed without problem on frozen foods (*Mysis*, *Gammarus*, *Artemia*, etc). Obviously cardinalfishes will also eat small fishes and shrimps that will fit into their mouths, and so care is regarded in the selection of tankmates. But corals, anemones, and all other sessile invertebrates plus echinoderms (starfishes, sea urchins, etc) have nothing to fear from cardinalfishes.

It is best to buy a group of 8-12 specimens right from the start. As with many other perciforms, intraspecific aggression is appreciably less in large groups than if only a few specimens are kept.

Sexual dimorphism

Naturally it is essential to have individuals of both sexes for successful breeding. There are, however, only relatively few reliable sex differences in cardinalfishes. As a rule males have a larger head and a larger mouth and are also somewhat larger overall than females. In the case of the Banggai Cardinalfish the form of the genital papilla has also been described as a sex difference (Mai, 2004).

It is, however, very unlikely that you won't get both sexes if you buy 10 individuals. Pairs that form naturally from a group are also more likely to breed reliably than pairs put together arbitrarily, or at least that is what breeders of the Banggai Cardinalfish say.



The majority of freshwater cardinalfishes live in Australia and New Guinea. They belong to the genus *Glossamia* and aren't imported. One species of the genus *Apogon* - *Apogon amboinensis*, pictured here - is, however, very widespread in East Africa and South-East Asia. The photo shows a specimen from Thailand. *A. amboinensis* is actually a brackish-water fish but is often found in completely fresh water. *Apogon amboinensis* is slightly reminiscent of the glassfishes of the genus *Parambassis* popular in the aquarium. But its mouthbrooding makes it a lot more interesting behaviorally. As with the majority of cardinalfishes, to the present day practically nothing is known about the details of the life history of this species. It is, however, assumed that *A. amboinensis* belongs to the species with relatively few, but large eggs. In that case then between 200 and 300 fry per brood can be expected from a breeding pair of this species, which grows to around 7 cm long.

Lexicon

Cardinalfishes

Apogon means "without barbels";
amboinensis means "from (the island of) Amboina";
Apogonichthyoides means "similar to Apogonichthys" (another fish genus).
barbatulus means "with a little beard";
Cheilodipterus means "with a two-pronged fin";
chrysopomus means "gold belly";
cyanosoma means "with a blue body";
Glossamia means "Amia with a tongue"; Amia was formerly used as a genus name for cardinalfishes.
hartfeldii: named in honor of the collector of the type material of the species, Dr. J. Hartzfeld.
imberbis means "beardless";
kauderni: named in honor of Walter Kaudern (1881-1942).
leptacantha means "small-spined";
maculatus means "spotted".

margaritophorus means "pearl-bearing";
Mullus is the name used for the Mullet back in antiquity.
nematoptera means "thread-fin";
notatus means "notable, marked";
orbicularis means "circular";
Ostorhinchus means "bony nose";
parvulus means "very small";
pharaonis means "of the Pharaoh(s)";
pseudotaeniatus means "false taeniatus";
Pterapogon means "winged Apogon";
quinquelineatus means "with five lines";
sealei: named in honor of Alvin Seale (1871-1958).
Sphaeramia means "spherical Amia";
Zoramia: meaning unclear, literally "Amia from Zor".

Apogon maculatus is one of the commonest fishes in the Caribbean. Because of its small egg numbers it should also be readily breedable in the aquarium.



Life expectancy

Natural life expectancy is usually linked to size in cardinalfishes. The smallest species live less than a year, the King of the Mulletts around five years. But fundamentally fishes live a lot longer in the aquarium than in the wild. The Banggai Cardinalfish has still been breeding at the age of five years (Mai, 2004).

All in all, cardinalfishes are ideal aquarium fishes for marine aquarists and anyone who aspires to become one. There is still much to discover and study about them, and aquarists have an important role to play in this. That includes you!

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New freshwater imports

From all over the world The latest imports

by Roman Neunkirchen

Relative to the huge number of fish species that exist - some 32,700 species are currently known to science, half of them from fresh water - only very few are maintained at least now and then in the aquarium. In fact only around 400 species of freshwater fishes are always available in the trade. So it is no wonder that new species are constantly being discovered. On the following pages we would like to summarize some of the latest new imports from Aquarium Glaser.



Synodontis pardalis

These gorgeous catfishes, which attain around 20 cm in length, come from Cameroon. The species is so far known only from the River Dja and its tributary the Libi, and hence is unfortunately regarded as an endangered species, as the Dja is severely polluted due to intensive cobalt mining. Which makes it even more pleasing that the species is occasionally imported, and that (conservation) breeding can be considered. *Synodontis pardalis*, like *S. decorus* and *S. brichardi*, belongs to the very slender *Synodontis* species. They are astonishingly peaceful among themselves. This *Synodontis* species should be kept in a group of 5-8 specimens. *S. pardalis* is undemanding as regards food and water chemistry.

Pipa parva

This dwarf honeycomb toad from Venezuela is a true rarity in the aquarium. The specimens in the trade are German captive-bred. At first glance these nice little animals are reminiscent of the dwarf clawed frogs (*Hymenochirus*), but can always be told apart from them by the branched fingertips typical of all *Pipa* species.



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Ladigesia roloffi

This gorgeous West African characin - imported from Guinea - grows to only some 3-4 cm long. Even so these active swimmers shouldn't be kept in too small an aquarium. Males can be easily recognized by the remarkably modified anal fin, whose function hasn't been studied. Breeding this characin is relatively easy, but it isn't very productive.



New: *Brachygobius* sp. Ozelot

This dwarf goby (the species grows to at most 2 cm long), recently imported for the first time, can't be assigned to any of the species currently described. According to our supplier these little fishes originate from Indonesia.

Brachygobius possess an important identification character that can be readily seen even in photos. Specifically, in some species the back in front of the start of the first dorsal fin is scaled, in others not. Our newly-imported species is unscaled in this area. This fact, together with the coloration and provenance, suggests that the new import is probably an as yet undescribed species.

The variation in color in the newly-imported fishes is unbelievable - no two individuals have exactly the same pattern. For this reason we decided to give it the temporary name of "Ocelot". That aside, it is a very attractive new species, ideally suited to small aquaria.



Renova oscar

Aquarium Glaser has for the first time obtained a splendid killifish species from Venezuela. It was at first provisionally labeled *Moema* sp. Venezuela, but it soon became apparent that it was a population of the monotypic (= containing only one species) genus *Renova*, first described in 1995. *Renova* differs from *Moema* only in minor anatomical details (fewer vertebrae, different head profile, smaller eventual size, etc). Prior to its scientific description as *Renova oscar* the species was known among killie fans as "*Moema* sp. from Isla Raton". It is an annual (= lives for only one season), bottom-spawning species. The type locality is the Isla Raton, an island some 14 km long and 6 km wide in the Orinoco, where *Renova oscar* is found together with an undescribed *Rivulus* species, *Micromoema xiphophorus*, and *Terranatos dolichopterus*.



Yasuhikotakia eos

This beautiful and interesting loach, which can grow to some 12 cm long, originates from Thailand. Loaches of the genera *Botia*, *Chromobotia*, *Sinibotia*, *Yasuhikotakia* have the reputation of being aggressive, some of the time at least, and *Y. eos* is regarded as particularly quarrelsome. But in the majority of cases this characterization is based on incorrect maintenance. *Y. eos* is extremely social and immediately establishes an order of rank within the group. This involves violent beating with the body and the production of loud cracking noises. The dominant, alpha individual can be recognized by the intense red coloration of the fins. Serious injuries hardly ever occur within a group of loaches, only the fins are occasionally shredded to some extent, but they heal again of their own accord.

If loaches are kept in too small a group or singly, they transfer their need for social contact to other fishes. Because all species of the genera *Botia*, *Chromobotia*, *Sinibotia*, *Yasuhikotakia* have a razor-sharp, protrusible, sickle-shaped spine beneath the eye, this can lead to nasty injuries to other fishes. So these loaches should always be kept in larger groups of 8-12 specimens.



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Corydoras sp. Eder

This extremely rare, fabulous long-snout from the Madre de Dios Region in Peru has been imported once again, under the names *Corydoras* sp. Eder I and II. Zoologically speaking both are the same species, which is extremely variable in coloration and has already received various names in the hobby, such as C115, C116, and *Corydoras* sp. Manu 1, 4, 7, and 8. They can be distinguished as follows:

Corydoras sp. Eder I

With a large distinct shoulder spot, also C116 or Manu 4, Manu 7, Manu 8

Corydoras sp. Eder II

Without shoulder spot, also C115 or Manu 1
The distinction is, however, rather arbitrary and the fishes are also able to change color to some degree.



Pseudobagrus trilineatus

From China comes this very interesting catfish, recently imported for the first time. The species grows to around 7.5 cm long and is endemic to (= lives only in) the Dong Jiang drainage in Guangdong Province. These fishes have proved peaceful among themselves in the importer's aquarium but essentially maintain a certain distance from each other. So every specimen needs to be provided with its own hiding-place in the aquarium. In line with their provenance these fishes are best kept at room temperature. An aquarium decorated with rocks and sand, set up to imitate a small river or large stream, will probably best satisfy the requirements of these catfishes. They are carnivores that will take any dry, frozen, and live foods. They shouldn't be kept with very small species or young fishes as these might be taken for food.



Semaprochilodus laticeps

This gorgeous *Semaprochilodus* has recently arrived from Venezuela. Unfortunately the identification of *Semaprochilodus* species has been full of errors in the past. On the basis of current knowledge the imported fishes are undoubtedly *S. laticeps*. However, in the aquarium literature and on the Internet the species is usually identified as *S. taeniurus* (which is another species, from Brazil) or *S. theraponura* (this species is now regarded as a synonym of *S. insignis* and comes from Peru). For this reason it is usually sold under the name *S. taeniurus* in the trade.



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Pterophyllum leopoldi

This is the third of the angelfish species currently generally accepted as valid. The other two are *P. scalare* and *P. altum*. However, since time immemorial the species *P. leopoldi* has been labeled *P. dumerili* in the hobby and in the trade; but *P. dumerili* is in fact a synonym of *P. scalare*.

P. leopoldi comes from Brazil, where it is found together with *P. scalare*. *P. leopoldi* always swims in a typical "head-up" position, very reminiscent of the flag cichlids of the genus *Mesonauta*, with which the angelfishes are closely related. The typical swimming position of *P. leopoldi* has even led to the lower caudal-fin filament always being longer than the upper. This character is so typical that it can be used to identify the species!

P. leopoldi grows to around 15 cm long and its maintenance requirements are the same as those of the well-known *P. scalare*.



L137 *Hypostomus soniae* / *Cochliodon soniae*

The attractive blue-eyed L137 from the Rio Tapajós is only very rarely imported. It is a medium-sized *Hypostomus* species that can grow to around 20 cm long. The species is very variable in coloration, there being specimens with brown fins, spotted fins, and orange-red fins. The latter look very similar to the "Bruno" from Paraguay (*Cochliodon* sp.), but L137 can always be identified unequivocally by the blue eyes, unique within the genus *Hypostomus*.



Hyphessobrycon axelrodi

This dainty dwarf characin was originally described from the island of Trinidad. Maximum length is around 2 cm in males and 3 cm in females. Aquarium Glaser has recently received a wild-caught consignment of breathtaking fishes from Venezuela that accord very well with the description of *H. axelrodi*, the Calypso Tetra; in 1992 the scientist Taphorn cautiously designated this fish as *Megalymphodus cf. axelrodi*.

This tetra has made a veritable Odyssey where as far as its genus name is concerned. It was originally described as *Aphyocharax*, then in 1977 Géry transferred it to the genus *Megalymphodus*, but with a question mark. When the genus *Megalymphodus* was invalidated by Weitzman & Palmer in 1997, the Calypso Tetra was placed in *Hyphessobrycon*. *Megalymphodus* is now regarded as valid again but the assignment of the Calypso Tetra to this genus still appears questionable such that the majority of scientists currently place it in *Hyphessobrycon*.

Be all that as it may, it is a gorgeous and easy-to-keep fish, which could have been made for the so-called nano-aquarium.



***Benitochromis finleyi* Mungo**

This medium-sized cichlid from Cameroon attains a maximum length of around 12 cm. These splendidly colored fishes are biparental ovophilous mouthbrooders.

These fishes are astonishingly adaptable as regards water chemistry. They should be kept in larger aquaria as they can be rather boisterous among themselves.



Betta splendens Mustard Gas

Tastes differ. But there is no question that the name "Mustard Gas" (one of the most repugnant substances in chemical warfare) for this gorgeous fish is a gross error of taste. A breeder named Jude Als in the USA supposedly originally developed this fish, although it then looked quite different - a blue or green body with yellow fins. These bettas supposedly bred true.

Nowadays the bettas traded under the name "Mustard Gas" are bred mainly in Asia and are black with orange or yellow fins and dark fin edgings, and called Melano Butterfly Bettas by the breeders.

The breeding of the attractive black (Melano) fightingfish is difficult enough in itself as the females are sterile; this means that females of other colors have to be used and the recessive gene then brought out by back-crossing the "normal" colored females (which, however, carry the Melano gene) to a Melano male, or else siblings can be bred together to produce a percentage of fishes with the desired color combination. In addition a very good understanding of genetics and breeding skill are required. The combination of black body, yellow fins, and black fin edgings is even rarer than black fishes and so there are only ever a few specimens of *Betta splendens* Mustard Gas available.



Xiphophorus hellerii Yucatan

In 1975, during a vacation trip to the federal state of Quintana Roo in Mexico, Berlin aquarist Günter Daul caught and brought back a number of swordtails. Subsequently this strain received the confusing name *Xiphophorus hellerii* "Yucatan". The federal state of Yucatan lies to the west of Quintana Roo. This means that the fishes should correctly be named *Xiphophorus hellerii* "Quintana Roo"; but the form has by now so often been labeled *Xiphophorus hellerii* "Yucatan" in books that changing the name would make no sense. For the history of this fish see Wagenknecht, U. (2012) Der Yucatan-Schwertträger. Viviparos 1/2012 26-29 (online at [http://www.lebendgebaerende-aquarienfische.de/media/files/Wagenknecht%20\(2012\)%20Der%20Yucatan-Schwerttraeger.pdf](http://www.lebendgebaerende-aquarienfische.de/media/files/Wagenknecht%20(2012)%20Der%20Yucatan-Schwerttraeger.pdf)).

It is particularly interesting that this local population has by now survived among enthusiasts for 38 years. The genetics of color inheritance in this many-colored (polychromatic) form is likewise interesting. Specifically there are females with yellow bellies which, when paired with males with a lot of in their coloration, breed true to produce red-bellied males and yellow-bellied females, while white-bellied females mated with blue-green males likewise breed true and produce offspring the color of the parents.

However, fans of wild forms of live-bearing toothcarps usually breed them in mixed shoals so that the genetic diversity of these fishes is retained in future aquarium generations.

This variant is sometimes available at Aquarium Glaser in the form of German-bred stocks.



Ornamental fishes aren't always small. Recently we received this hefty fellow, a *Panaque* sp. "L191". The fish took the transfer from Colombia to the fish rooms at Aquarium Glaser very well and has now settled in nicely.



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Oddballs

A ghost fish ?!

by Wolfgang Löll



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For some time now there have been strange, snow-white to ivory-colored, cigar-shaped fishes with ruby-red eyes in the trade. So what are they?



Albino Senegal Bichirs are bred commercially as aquarium fishes in Asia.

All photos: Frank Schäfer

They are in fact albinos of one of the most ancient fish species on our planet, a so-called living fossil, namely the Senegal Bichir, *Polypterus senegalus*. Fossil finds of this species have been discovered that purportedly date from 60 million years ago, a time when the dinosaurs still ruled the Earth!

Inventors of gene technology

The dinosaurs are long gone, but the bichirs remain. Their existence - at present 13 species are recognized - is a mystery. Why have they survived for so long, even though entire classes of animals have disappeared from our planet within much shorter time frames? And how have they adapted to the repeated dramatic

changes in environmental conditions? The last question at least has been answered by DNA studies - through hybridization! Their genes clearly indicate that various species of bichir have repeatedly crossed with one another. In fact the hybrids that result from such crosses are unable to breed together (at least there is no indication that anything of the sort takes place in the wild), but they are able to mate with the parent species. In domestic animals this is termed back-crossing. The result is that new genetic material is introduced into the population, apparently fitting it for the battle for survival. So it seems that gene technology isn't a human invention, some fishes have been practicing it for millions of years.

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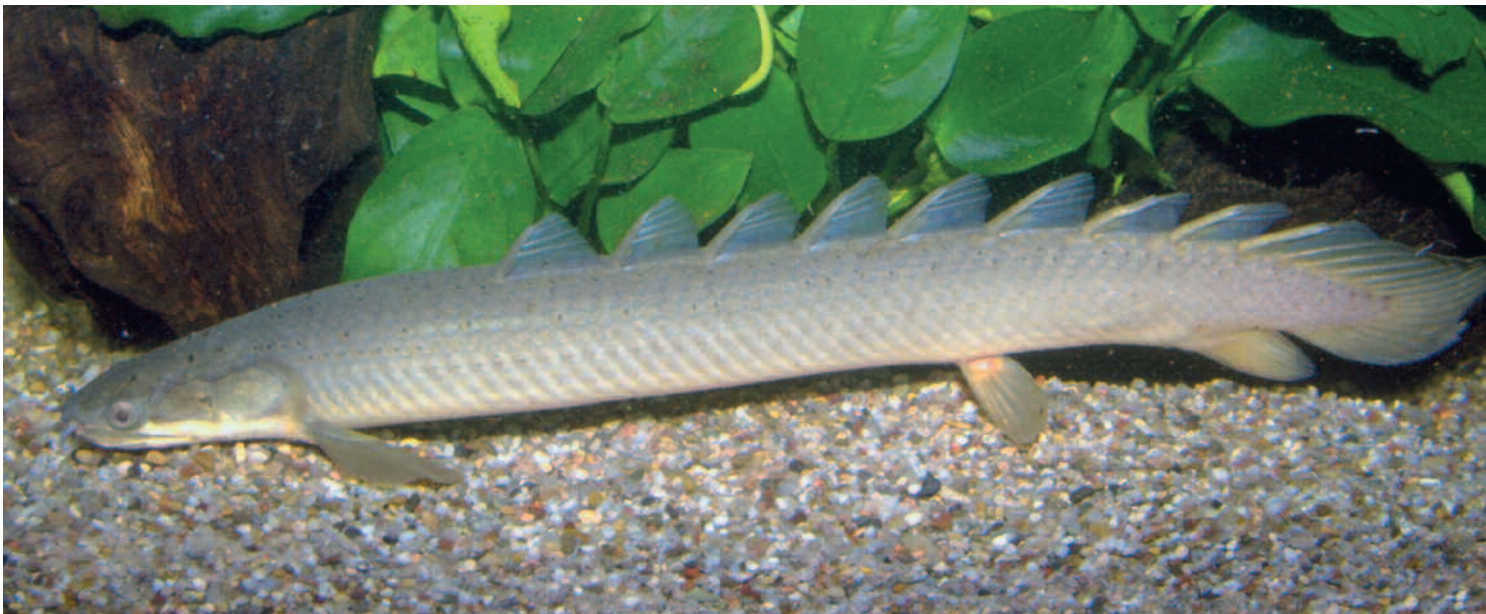


Survival specialists

In addition a part has undoubtedly been played by the legendary "survival pack" that Mother Nature has created for the bichirs. Their construction is so designed that it would appear impossible to improve in any way. Thus these fishes breathe not only via gills, but also with lungs. Their bodies are enclosed in a chain-mail shirt of rhomboid bony plates termed ganoid scales, which make these fishes almost invulnerable (at least compared with the delicate scales of most other fishes). Bichirs are exclusively carnivorous, and, because they are poikilothermic and hence do not - unlike us humans - have to use the majority



Half-grown wild-caught Senegal Bichir from Nigeria.



A full-grown wild-caught male measuring somewhat over 25 cm in length.

This elderly female has become almost black with age.



of the energy obtained from food in order to maintain body temperature, they can get by for a long time on little food. For their own part, bichirs have little attraction

for predators. Their individual little dorsal fins, the so-called finlets, are razor-sharp - and well and truly scratch if swallowed! Human medicine hasn't yet turned its

attention to the bichirs, but it seems very likely that these survival specialists may even offer means of overcoming cancer and pathogenic viruses.

Little dragons

Bichirs are readily maintained in the aquarium and make interesting objects of study. But because they are predators, in Europe they are maintained mainly by specialists. By contrast they are very popular in Asia. They are reminiscent of the dragon, the mythical beast that brings good luck. And South-East Asia is also the source of the albino tank-breds of *Polypterus senegalus*. Albino creatures exercise a great fascination for humans, not only in Asia, but also here in the west. Just



think of the myths and legends regarding white hinds. Unicorns are always portrayed as white. And in his novel *Moby Dick* Herman Melville chose a white Sperm Whale as a symbol of invincible Nature, opposition to which always results in harm.

The albino cultivated forms should also be viewed in this context. They divide aquarists into two camps - those who abhor them as supernumerary unnatural creations and those who are fascinated by their pure white color.

Facts about the Senegal Bichir

Polypterus senegalus is widespread in West and Central Africa. Wild-caught imports usually come from Nigeria. The species varies little in color, and looks essentially the same



everywhere - gray with a few little black spots. The fins are whitish gray, except in a dwarf form from Nigeria that exhibits sexual dimorphism at just 10 cm in length and has yellowish fins. Normally maximum length is around 30 cm in the Senegal Bichir, and references to different sizes in the literature are the result of confusion with other bichir species. Sexual maturity is attained at a length of around 20 cm and an age of about two years. Males are smaller and slimmer

This dwarf form of the Senegal bichir grows to only barely 10 cm long.



Above: An albino peering curiously at the world.

Below: Very young *P. senegalus* are striped and have external gills like newts.



than females and have a much-enlarged anal fin that is wrapped around the female during spawning to form a "bowl" in which the millet-sized eggs are caught and fertilized. The young that hatch from the eggs look totally different to the parents and are more reminiscent of newt tadpoles, as they have bushy external gills. In addition very young Senegal bichirs are striped brown and white, but they soon lose this juvenile pattern at a length of around four centimeters.

Senegal Bichirs in the aquarium

The maintenance of these fishes is very easy.



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Some specimens are yellowish with black eyes, and are termed lutos.

They make no demands at all regarding water chemistry, and can be kept in any water suitable for humans to drink. Senegal Bichirs are completely peaceful among themselves and towards any fishes too large to be viewed as food. They are best kept in a small group of 4-6 specimens. The aquarium for this should be around 120 cm long. The decor is of no importance to the bichirs but these rather stiff-bodied fishes should be allowed sufficient swimming space and the tank shouldn't be too densely planted. A moderate current, a substrate of soft sand, muted light (bichirs are crepuscular/nocturnal), and a water



Below: Portrait of the old black female, a so-called melano; above: a fully albino specimen with typical red eyes.



finally the temperature should be raised to around 28 °C.

The males drive rather vigorously and display with the anal fin spread wide, and the eggs are scattered loose in the tank. Depending on the size of the female there may be several hundred eggs.

Lexicon

Bichirs

Polypterus means "many-finned" referring to the dorsal finlets.
senegalus means "from Senegal".

temperature of 24-28 °C (sometimes lower to stimulate breeding, but best if the temperature doesn't drop below 18 °C) will ensure the well-being of Senegal bichirs. The best food to offer is larger frozen foods (mussels, shrimps, Stint, cuttlefish, etc), plus occasional live food in the form of earthworms. Around 25% of the water should be changed weekly.

For breeding the water changes should cease for a number of weeks and the usual maintenance temperature be simultaneously lowered. Then several large water changes (80-90% of the tank volume) should be performed in rapid succession (at intervals of 1-2 days), if possible using somewhat softer water. And




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Turtles

The Cumberland Turtle

by Frank Schäfer

The Red-Eared Turtle is probably the best-known of the swamp turtles, though this turtle (sub)species has no longer been imported into the EU for many years. Much less well-known, but frequently available, is the closely-related Cumberland Turtle, *Trachemys scripta troosti*.

The reason for the fame of the Red-Eared Turtle (*Trachemys scripta elegans*) is that this gorgeous turtle is bred in vast numbers on commercial farms. The

extremely cute little babies were sold as pets for very little money from the 1970s to the end of the 1990s. Many buyers simply suppressed the thought that the



All swamp turtle babies are gorgeous and cute. But it should always be borne in mind that they attain a length of 20-30 cm. They then need a really large amount of space and indoor maintenance requires a lot of work. The photo above shows baby Red-Ear Turtles, and below is a baby Cumberland Turtle.

All photos: Frank Schäfer



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cute little babies would one day grow into large adults requiring a lot of space, and as a result innumerable Red-Ears were released into the wild. To the present day such individuals can still be found in Germany.

Release is a bad thing!

The release of unwanted pets has been strictly prohibited for decades - and with good reason! It is completely immaterial whether it is dogs, cats, or turtles that are released. It is wrong, because the released animal will either die a slow and painful death as it cannot find anywhere suitable to live, or it will survive and compete with the indigenous wildlife. And abandoned, feral dog will, obviously, hunt deer and hares and become a carrier of dangerous diseases. The situation is very similar when ornamental turtles are released and survive (though the majority don't). It is true that there are no turtles in Germany for them to compete with (for various reasons the European swamp turtle has been practically extinct in Germany for 150 years), but just as dogs hunt game, a swamp turtle will hunt newts, frogs, and other animals and plants that already have more than enough to contend with in our orderly cultivated landscape. This really must be avoided!



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A released Red-Ear in the south of France.

children and so the "Four-Inch Law" has also had a positive effect in that maltreatment of turtles by small children has also been prevented.

A European solution

Instead of simply adopting the tried-and-tested US legislation on the Red-Ear (and all other swamp turtles), in Europe they came up with a trick and arranged for the Red-Eared Turtle to appear on the list of "endangered species". Fortunately that is utter nonsense, the Red-Ear is not endangered and certainly not by the trade, because, as already mentioned, it is

Bad legislation

Animal shelters and similar institutions generally have little use for adult swamp turtles, as these animals are unsuitable as pets. They are terrarium animals and belong in the hands of genuine terrarium keepers, not those of children. But while nobody ever dreamed of banning people from keeping and breeding dogs and cats because every year thousands of them end up in animal shelters, in the case of the Red-Eared Turtle the terrarium enthusiast was published in short order for the irresponsible behavior of non-enthusiasts, and the importation of Red-Ears quite simply wasn't allowed any more. It isn't forbidden to keep Red-Ears, but importation into the EU requires a permit and such permits quite simply aren't granted. At the same time there is a simple solution to the problem: all that is required is to establish a minimum size at which these turtles can be sold. In that way serious terrarium keepers could obtain Red-Ears but the spontaneous purchase of babies would be prevented.

The Four-Inch Law

The practice of banning the sale of turtles of less than a certain size (for example 10 cm) has long existed in the USA, albeit for totally different reasons - *Salmonella* infections where small children were



Baby Yellow-Ear Turtle.

allowed to play with baby turtles. The children were putting turtles in their mouths and falling ill, albeit rarely in comparison to *Salmonella* infections from foodstuffs. So they devised the "Four-Inch-Law", a law that prohibits the sale of live turtles with a shell length of less than 4 inches (= 10.2 cm). Leaving aside *Salmonella* (there is no real danger of this from turtles as long as minimal standards of hygiene are maintained) turtles are fundamentally unsuitable as pets for small

Lexicon

Swamp turtles

Pseudemys means "false Emys"; Emys is another turtle genus.

Trachemys means "rough Emys".

scripta means "with writing".

elegans means "elegant".

troosti: named in honor of Gerald Troost of Nashville, Tennessee (1776-1850).



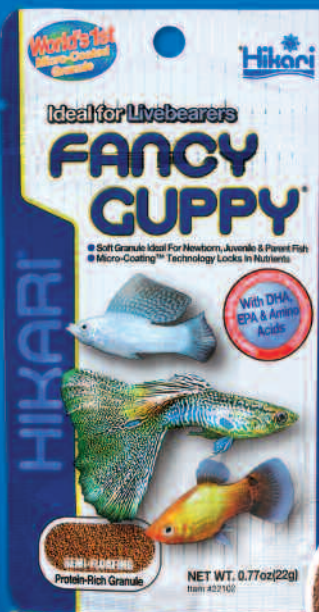
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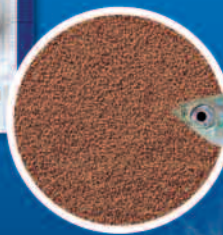
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Der Hauptpreis, ein blaues Aquarium inklusive Organix-Futterset, ging an eine Grundschule in Salzgitter, die insgesamt 20 Bilder eingesandt hatte.

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a question of exclusively captive-bred stocks. But in that way they were easily able to prevent the unwanted importation of these animals, because a species on the "endangered" list requires a permit to be imported alive into the EU.

This "European solution" has (not for the first time and quite certainly not for the last) made a complete laughing-stock of the authorities. Because, firstly, it has simply resulted in the demand for baby turtles being satisfied by other species, which are now being released instead of Red-Ears; and secondly this piece of imbecility makes it difficult for people working in nature conservation to catch released turtles and pass them on to interested terrarium enthusiasts. Because what wasn't taken into account is that the people involved in drafting conservation legislation aren't biologists but officials. They haven't the first idea of why an animal species is listed as "endangered" and the majority of them believe that the Red-Ear and the American Bullfrog (*Lithobates catesbeianus*, formerly *Rana catesbeiana*, which presents similar problems) actually need to be protected in the wild - ultimately such species are strictly or specially protected under federal conservation legislation. In the final analysis the listing of the Red-Ear and the Bullfrog is a misuse of legislative powers by politicians, who act as if we were living in a feudal system rather than a democracy, and the results are morally highly questionable. Whether or not trade restrictions contribute to species conservation remains a matter of debate in each individual case. But it is extremely disturbing when generally accepted laws, designed solely for the purposes of conservation, are misused for power politics and populist purposes.

The alternative subspecies

Because Red-Ear babies can no longer be brought into the EU, the trade has turned its attention to other turtles. These are mainly two further subspecies of *Trachemys scripta*, namely the Yellow-



Adult male Cumberland Turtle. Note the typical claws.



Eared Turtle (*T. scripta scripta*) and the Cumberland Turtle (*T. scripta troosti*). Both are again bred on farms. All the subspecies of *Trachemys scripta* are distinguishable only on the basis of head pattern. In the Red-ear there is a broad, horizontal, bright orange-red band behind the eye, in the Yellow-Ear a yolk-yellow vertical band. In the Cumberland Turtle the band is horizontal but yellow and much narrower than in the Red-Ear. Even so the Cumberland Turtle has been regularly incorrectly identified as a "faintly marked" Red-Ear.

Subspecies - what does that actually mean?

Until the 1970s the term subspecies was used rather indiscriminately. A form would be called a "subspecies" if it was thought that it was a geographical variant of an otherwise very similar, already known species.

With advances in our knowledge of species this poorly-defined concept has

met with some opposition. Nowadays there are zoologists who completely reject the term subspecies and speak exclusively of species. But that doesn't accord with the situation in the wild, as an important characteristic of subspecies is that mixed populations occur where the distributions of two subspecies meet, and in such places individuals resemble neither one subspecies nor the other, but have characteristics somewhere in between the pure subspecies. Such populations are termed intergrades and their existence supports the classification of the main populations as subspecies. Only if the zone of contact ceases to exist - for whatever reason - and geographical isolation of the main populations results, is there any justification for describing them as separate species. Ultimately this is the way in which species have evolved since time immemorial in the course of evolution. Usually, at any rate.

Keeping the subspecies pure

In the terrarium hobby the object of keeping animals isn't so much one of social contact with other life forms, as amphibians and reptiles are spiritually too distant from us humans. Anyone interested in owning a pet would be better off with a dog or a parrot, even though some large lizards occasionally become really nice pals. But never swamp turtles. Anyone who is interested in



Female Cumberland Turtle.

swamp turtles will get their enjoyment from watching their charges grow and thrive, in much the same way that it is enjoyable to see a plant grow and thrive in the garden or on the windowsill. A nice side benefit of this observation is that you learn a lot about the creatures that you keep. You get to know their special characteristics and their life history, develop an interest in their natural environment, and so on. Only in this way can someone become knowledgeable about the conservation of animals, species, and the environment, and not by coming up with esoteric theses without having the faintest idea about the animals themselves.

Because all swamp turtles are constantly in danger of becoming subject to ban on their importation or even their maintenance, we need to make an increased effort to breed them. In so doing it is important to keep the subspecies separate and pure-blooded, as only in this way can we ensure that pure-strain stocks will be available in the future for scientific study in the terrarium.

Maintenance of the Cumberland Turtle

The object of this article is not so much to go into maintenance and breeding as to highlight the problems linked with the trade in swamp turtle babies. Even so a number of basic hints on their care will not go amiss here.

Anyone interested in these turtles should start by obtaining a handbook on them and studying it in detail. The next step is to acquire a group of juveniles of the desired species or subspecies. Juveniles always get along well together. Because it isn't possible to tell the sexes apart in hatchlings, purchasing five, or better ten youngsters is the surest way to obtain both males and females. It is often difficult to get hold of suitable individuals later!

The situation is somewhat different if you are able to buy stock from a breeder, as the sex of the hatchlings can be controlled to some extent by the incubation temperature of the eggs. But this too works only up to around 90% of the time. It should also be borne in mind that if these turtles are maintained as Nature intended then they require 6-8 years to attain sexual maturity. That is a long time, during which you may lose one or more individuals due to accident or disease. This is another reason to buy a sufficiently large starter group.

Swamp turtles are active swimmers, so the rearing tank for the first two years should have a bottom area of 80-120 cm x 40-60 cm. The water depth should be 15-20 cm, with another 40-50 cm of air space above. The large air space is required because these turtles need a heat lamp above the land area. A source of UV light should also be provided, and in addition these turtles require a brightly illuminated tank. The



Head pattern of the three subspecies of *Trachemys scripta* mentioned, for purposes of comparison:

1+2 Red-Ear, *T. scripta elegans*

3 Yellow-Ear, *T. scripta*

4 Cumberland, *T. scripta troosti*

water area doesn't need additional heating in the living-room but should be well filtered. It is essential to ensure that the filter inlet is shielded so that the babies can't be sucked in. Air-powered filtration is best.

Adult swamp turtles require really large aquaria of at least bath-tub size and a land area to match. If possible they should be kept outdoors from the end of May to the end of September. Permanently high temperatures and too rich a diet lead to far too rapid growth, which will have consequences for the turtles later and often leads to premature death. So even when they are kept indoors you should regularly simulate periods of bad weather and use only food designed specially for swamp turtles. with a vegetable component appropriate to their age.



Endangered species

The Bala Shark

by Frank Schäfer

Our aquaria contain lots of fish species that owe their continued existence on this planet to their importance as ornamental fishes, and which are extinct or presumed dead in the wild. These species include the Bala Shark, *Balantiocheilos melanopterus*.

It is unknown why the Bala Shark is so endangered in the wild. A book on the endangered fauna of Thailand asserts that overfishing for the aquarium hobby may be responsible for the decline in numbers, but there is no proof of any kind for this. On the contrary, it is a demonstrable fact that all the Bala Sharks currently in the aquarium hobby originate from captive breeding.

who is interested is referred to the original description of *B. ambusticauda*). But differences between *B. ambusticauda* and *B. melanopterus* in the coloration of the anal and ventral fins mentioned in the description are incorrect, as they cannot be seen in historic photos of *B. ambusticauda*.

B. ambusticauda originates (or used to) from the middle and lower Mekong and Chao

first mentioned in the magazines *Aquarien-Terrarien* and *DATZ* in 1959. But these early reports of importations all probably relate to *B. ambusticauda*.

Bala Sharks are large, peaceful fishes that are splendid occupants for larger community aquaria. It should never be forgotten that they owe their survival to their commercial relevance. It is thus important that the species should continue to be traded extensively in order to remain of interest to commercial breeders.



Bala Shark, *Balantiocheilos melanopterus*

Two very similar species

Until recently (2007) it was thought that there was only one species of Bala Shark, namely *Balantiocheilos melanopterus* (the genus name is often spelled incorrectly with -us at the end). Then scientists Ng and Kottelat described a second species, *B. ambusticauda*. The two species cannot be told apart from one another as juveniles; only in adult specimens (*B. ambusticauda* grows to 20 cm long, *B. melanopterus* 35 cm) is there an obvious difference in head form (any one

Phraya basins (past imports came from Thailand), but the species is now regarded as most probably extinct. *B. melanopterus* comes from Malaysia, Borneo, and Sumatra, where populations are in dramatic decline. All aquarium stocks since 1980 have been captive-bred and derive from fishes originally imported from Indonesia.

The first importation of the Bala Shark to Europe took place in 1955 via the Tropicarium in Frankfurt, and the species is



Die thailändische Glückswanzharke

Balantiocheilos melanopterus (Bleeker 1851), von der eine sehr seltene Artform von Dr. H. Jesse eine recht lebliche Vorstellung vermittelt, ist ein ganz anderer Bala-Shark von Hinterindien, der allerdings zu uns gelangte. Es ist zu hoffen, daß die Fische auch in der Gefangenschaft Bala-Sharks, allerdings sind sie, die sie etwas größer werden können, von etwas für den Besitzer geringerer Kosten. Die Gattung *Balantiocheilos* stellt die Gattung *Jahn* nahe, von der besonders die Fische

scheint; Jahn heißt U. M. Smith dem Namen nach bekannt geworden ist. Die Glückswanzharke gehört zu den Fischen, die man schon nicht mehr als eingezogenen Zierfische" bezeichnen kann, die aber gerade deshalb für den hochpreisigen internationalen Aquarienfisch von besonderem Interesse sind.

Dr. K. H. Lüling hat von in diesem Heft eine erste Beschreibung der thailändischen Fische gegeben, doch helfen wir, bald mehr berichten zu können.

This is the first published color photo of a Bala Shark in the German aquarium literature (*Aquarien-Terrarien*, June 1959, back cover). The photo, by Dr. H. Jesse, shows the species *B. ambusticauda*, probably now extinct, as the fishes originated from Thailand.

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Lexicon

Bala Sharks

Balantiocheilos means "purse lip"
melanopterus means "black-finned"
ambusticauda means "with a burnt tail"



Natural materials in the aquarium

The magic tree

Walnut trees can produce more than tasty nuts...

by Birgit Bautz-Schäfer

In the last issue of the News we told you about the fundamental benefits of leaves in the aquarium. In this issue we will discuss one of the most effective sorts of leaves - those of the Walnut tree.

Walnut leaves have been used in medicine since the time of the Ancient Greeks. Applied externally, they are useful for many skin diseases, in particular inflamed wounds and boils, for eye infections, and other troubles. Walnut leaves are particularly effective in the treatment of tuberculosis of the lymph glands, so-called scrofula. And a decoction of the leaves has also been used since time immemorial for internal use against irritation of the mucus membranes and diarrhea.

Green or brown leaves?

As described in detail in the above-mentioned article in News 109, essentially it is better to use brown autumn leaves in the aquarium, as green leaves contain inter alia sugars that can have a harmful effect on the aquarium water. These sugars are used and broken down by bacteria, and so cloudy water and lack of oxygen can result from over-generous use of green leaves.

However, some sorts of green leaves contain



useful substances that are absent from the brown autumn leaves. If you want to use Walnut leaves for medicinal purposes, ie for healing skin infections in fishes, then you will need to use green leaves. And for use as food the Walnut leaves should be harvested green and then carefully dried - juveniles of many loriciid catfishes, plus other herbivores such as shrimps and crabs, like this food.

On the other hand the brown autumn leaves can be used in exactly the same way as those of Cattappa (the Sea Almond tree). They have a gentle disinfectant and antibiotic effect. The brown autumn leaves have proved particularly effective when placed in soft-water aquaria, as they apparently have an inhibitory effect on

the dreaded soft-water parasite *Piscinoodinium* (velvet disease, generally incorrectly known as *Oodinium*).



The green outer shell of walnuts contains a particularly large amount of juglone.

Numerous effective ingredients

According to a publication (Lagoni, 2008) from the Bayerischen Landesanstalt für Wald- und Forstwirtschaft (Bavarian State Institute for Woodlands and Forestry) the green leaves of the Walnut contain a very large number of active substances, including around 10% hydrolyzable tannins, 3-4% flavonoids, various plant acids, relatively large amounts of vitamin C, and the famed juglone. Juglone is a natural dye that produces an intense brown color. Anyone who has shelled fresh walnuts will know all about that. The tree uses the juglone to prevent other plants from growing and thus avoiding competition. Juglone has an antibacterial and fungus-inhibiting effect. The amount of juglone in Walnut leaves is heavily dependent on the time of year. The highest level is found in the young foliage (until around the end of June), while brown autumn leaves contain virtually no juglone. So it is important to know which type of leaves to collect for a particular purpose.

Walnut leaves are now offered by some suppliers, for example by the Aquariana-Onlineshop, where you can buy late green leaves (without a high juglone content, as food) and brown autumn leaves (for prophylactic use against disease). But the study of the use of the healing powers of Walnut leaves in the aquarium hobby is still in its infancy, and lots of additional, beneficial products can be expected in the near future.

References:

Lagoni, N. (2008): Der Walnussbaum – nützlich für Pharmazie und Medizin. LWF Wissen 60: 54-58 in Bayerische Landesanstalt für Wald und Forstwirtschaft (Herausgeber): Beiträge zur Walnuss. LWF Wissen No. 60, 70 pp.

Left on the tree, right dried ready for use in the aquarium: green (back) and brown (front) Walnut leaves have quite different uses in the aquarium.





Aqualog
KIDS

The White Cloud Mountain Minnow - ideal for kids!

The legend goes that a Chinese scout named Tan discovered a small colorful fish in a stream on White Cloud Mountain in China. Tan took the fish to a biologist, who named it "Tanichthys albonubes", which translates as "Tan's fish from White Cloud (Mountain)". This took place in 1932, ie more than 80 years ago. Shortly thereafter (1938) the fish arrived in Germany, where it met with great enthusiasm and was named the Cardinal Fish, because of its red color (a Cardinal is a high-ranking Catholic priest who wears red robes). In the English-speaking world, however, it is known as the White Cloud Mountain Minnow, or White Cloud or WCMM for short.



The long-finned form of the White Cloud is sometimes called *Tanichthys linni*, but that isn't a scientific name, but a made-up one.

The superfish

It is hard to imagine a more terrific fish for the aquarium. The White Cloud remains small (at most 3 to 3.5 cm long), is completely peaceful, has gorgeous colors, can be kept in any water, doesn't require any heating but tolerates up to 30 °C in the summer without problem, eats any food, and is very easy to breed. The young have a splendid iridescent stripe. In the past, when Neon Tetras still cost a very large amount of money, the White Cloud was sometimes known as the "working man's Neon" because even a simple workman with little money could afford these fishes.

Threatened with extinction!

White Clouds can be bought cheaply in the aquarium trade at any time. All the stocks in the trade are captive-bred and have never known freedom. Until 1980 it was thought that the White Cloud was extinct in the wild. To survive it needs clear streams with lots of aquatic plants but because of deforestation soil had washed into the streams, the water had become murky, the plants had died out, and with them the White Clouds. The White Cloud has survived as a living species only because it is such a popular aquarium fish that aquarists saved it! Not until a few years ago were a number of new locations for wild White Clouds discovered, but there are no longer any on White Cloud Mountain.

Two wild and two cultivated forms



There are two species of *Tanichthys* in the wild: one is the White Cloud Mountain Minnow (*Tanichthys albonubes*) and the other is the Vietnamese Cardinal Minnow (*T. micagemmae*). The Vietnamese Cardinal Minnow remains smaller than the White Cloud and requires temperatures above 15 °C in order to stay healthy (White Clouds come to no harm even at temperatures as low as 8 °C). Golden White Clouds and long-finned White Clouds are cultivated forms of the White Cloud, and do not exist in the wild. All the White Clouds can be crossed with one another. They lay eggs, and these need to be kept separate from the parents or else they will be eaten.

i Infobox for Parents

Dear Parents,

White Clouds are the ideal beginner's fish for your child, and there isn't much you can do wrong with them. But please start by reading a good handbook on aquarium maintenance with your child before actually buying any fishes. Pet stores, bookshops, and public libraries have a wide range of books for beginners. It isn't possible to keep fishes successfully if you don't first find out basic information on their requirements and the correct way to set up and maintain an aquarium (water changes, etc).

General hints

White Clouds should always be kept in a shoal. Aquarium size is basically unimportant, but a beginner's tank should be no smaller than 60 cm so that overfeeding (commonest beginner's mistake) doesn't immediately turn the water bad. Because White Clouds usually eat their eggs and young there is no need to worry about a population explosion. White Clouds aren't subject to any legal restrictions of any kind (conservation legislation).



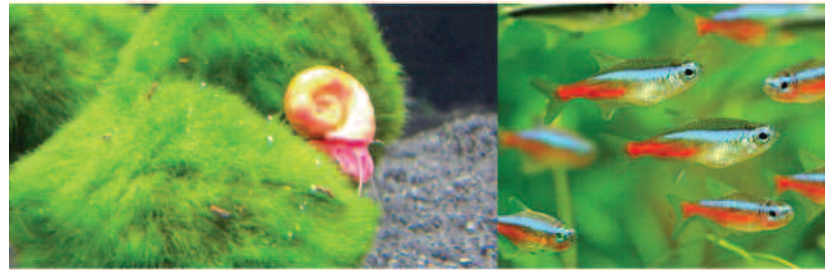
The Vietnamese Cardinal Minnow was first discovered in 2001 and described as a distinct species, *Tanichthys micagemmae* (which means "sparkling jewels").

Hazards

Essentially the maintenance of an aquarium isn't dangerous, but do impress on your child that the combination of electricity and water should be treated with great respect. In general there is only one disease that fishes can transmit to humans, a tuberculosis of the skin that manifests as wounds that are reluctant to heal. The infection is, however, extremely rare and more likely to be picked up by visiting swimming baths than via aquarium fishes.

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Cool: the Chinese Firebelly Newt

In the past the maintenance and breeding of salamanders and newts was very popular with terrarium enthusiasts, but unfortunately only a few specialists work with them nowadays. This is because the vast majority of salamanders and newts do well in the long term only if kept at low temperatures (10-15 °C). In warmer conditions they aestivate, and nowadays the temperature in our homes is always on the warm side. But luckily there is the Chinese Firebelly Newt.



The upper side of the Chinese Firebelly Newt is uniform black-brown, the underside bright red.



Males grow to around 6 cm long, and have a shorter tail and a swollen cloaca.

The warm-blooded newt

The Chinese Firebelly Newt comes from eastern central China, where it is very common. The peculiarity of the Chinese Firebelly Newt is that it prefers temperatures between 20 and 25 °C. This makes it the newt best suited for maintenance in the home. In water these newts find their food by smell, and so they will also eat dry and frozen fish foods in water. On land, by contrast, these newts eat only living food that is still moving, for example worms, as they can't smell well out of water and use their eyes to search for food.



The tail is longer in females, which grow to a total length of around 8 cm.

Life in water and on land



Newts, salamanders, frogs, and toads are termed amphibians, which translates as "those that live on both sides". The majority of species live in water at breeding time and the rest of the year on land. However, the Chinese Firebelly Newt almost always lives in water. Only when conditions get very warm (significantly over 25 °C) for it does it leave the water. And it can even drown if no land area is available! On land the skin becomes smooth and water-repellent, and the newt looks much smaller and thinner. Although these newts are active all day in water, on land they become nocturnal and spend the day in hiding.

Other things you need to know....

The scientific name of the Chinese Firebelly Newt is *Cynops orientalis*, which translates as "oriental dog-eye". Males can most easily be recognized by their shorter tails. Chinese Firebelly Newts lay eggs, which are produced singly or in batches of 3-4 and are then hidden among the leaves of aquatic plants by the female, who uses her hind legs to fold the leaves to create a bag. The male displays in front of the female while fanning his scent towards her with his tail.



i

Infobox for Parents

Dear Parents,

Children love newts. But you must make it clear to your child right from the start that newts should be handled only when absolutely necessary. Otherwise the very delicate skin of the newt may be damaged, leading to infection or even the death of the newt.

Setting up the terrarium

The terrarium for these newts should consist of an aquarium measuring at least 40 x 30 x 30 cm, and larger is better. It should be filled to a depth of 20 cm with water, and the water area should be set up in the same way as an aquarium for fishes. If possible avoid using a motorized filter and use an air-driven type instead. There is too great a risk of injury to newts if motorized filters are used, plus the motor emits heat.

To create a land area, place a piece of floating cork bark in the aquarium. If the newts spend a lot of time sitting on land (ie on the cork) then they should be placed in a moist terrarium with moss and decaying wood; a water dish filled with fresh water should always be available. If the newts spend all their time sitting in the water dish then they can be transferred back to the original terrarium.

A terrarium for newts should always be tightly covered and escape-proof, as they can even climb up vertical glass surfaces! The terrarium should never stand in the sun, and the temperature in the terrarium should ideally be 15-22 °C. These newts require a winter rest at around 10 °C from January to March.

Maintenance tasks

Because they are poikilothermic and not very active, newts are very cheap to run. It is perfectly adequate to feed them every other day, and as a general rule of thumb it is better to feed too little than too much! As with an aquarium, perform a weekly partial water change of around 1/4 - 1/3 of the water volume. The new water should be roughly the same temperature as the old, though 2-3 °C cooler will be tolerated and do no harm. When you go on holiday it is better not to feed at all for 2-3 weeks (this will do no harm) than to risk over-feeding, which can result in the death of the newts.

Hazards

Your child can learn the normal rules of hygiene through dealing with these newts, ie washing hands after working on the terrarium. There are no known diseases that can be transmitted to humans by newts. These newts are completely harmless! It must be stressed again that newts should never be handled unless necessary; handling is unpleasant for them and can, in the worst case scenario, result in their death.

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