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NEWS

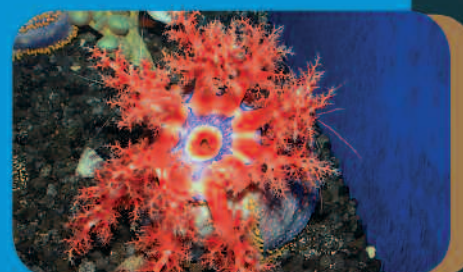
The Magazine for Aquarists and Terrarists



Unusual Fishes for the Gardenpond



Coral Snakes



Sea Cucumbers



Aquaristic

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Evergreens

Emperor Tetras - Gorgeous Colombians

by Sarah Nieten

In 1958 William A. KYBURZ, an ornamental fish exporter based in Bitaco, Colombia, discovered a gorgeous tetra, never before seen alive. The species was subsequently identified as *Nematobrycon palmeri* (EIGENMANN, 1911). KYBURZ exported the species to the United States in 1960 and portrayed it for the first time in the magazine "The Aquarium." He gave it the name Emperor Tetra. And thus began the victorious progress of this fish all over the world...

KYBURZ collected the first Emperor Tetras in the late 1950s and early 1960s in the Choco region of Colombia. Unfortunately we don't know exactly where he made his collections, as when scientists Stanley H. WEITZMAN and William L. FINK were scientifically describing another species of emperor tetra in 1970 and tried to obtain this information, Kyburz was already dead. But note that his name will live on for as long as humans exist, as a further species of tetra, and one relatively closely related to the Emperor Tetra, was named *Pseudochalceus kyburzi* (SCHULTZ, 1966) in his honor.



Pseudochalceus kyburzi was named in honor of the discoverer of the Emperor Tetra. The species is a particular rarity in the aquarium.

Ideal aquarium fishes

So what actually makes for an ideal aquarium fish? It must look attractive, be peaceful, remain small, be easy to feed, not eat aquatic plants, and be easy to maintain. All attributes that can be applied unreservedly to the Emperor Tetra, which



55 years of captive breeding have had little effect on the Emperor Tetra - they still look just like wild-caught specimens.

Miniature salmon?

The name tetra is widely used in English-speaking countries for small members of the family Characidae. It is an abbreviated form of the scientific genus name Tetragonopterus. The majority of the species of tetras kept in the aquarium were formerly assigned to this genus.

In Germany members of the characin family are sometimes likewise known as tetras, but more often by the term Salmmler, meaning "little salmon". The name was invented for them when the first aquarium fishes of the family Characidae were imported at the end of the 19th century. The name is based on the fact that very many species have a small, rayless, fatty fin (the adipose fin) on the caudal peduncle. In the past an adipose fin of this type was known in Germany mainly from trout and salmon, i.e. members of the family Salmonidae (derived from the Latin word Salmo).



The females of *Nematobrycon* species (here *N. palmeri*) can always be easily recognized, as they lack the prolongation of the central caudal-fin rays.

How many species?

The genus *Nematobrycon* was erected in 1911 by Carl H. EIGENMANN. The type species is *Nematobrycon palmeri*, which EIGENMANN described immediately following the



grows to only four to five centimeters long. And because breeding the Emperor Tetra doesn't present any major problems either, the worldwide requirement for the species can be easily satisfied whenever necessary.



This as yet scientifically undetermined fish from Brazil (imported by Aquarium Glaser in 2009) is undoubtedly very closely related to the emperor tetras.

description of the genus, in the same paper. EIGENMANN defined the genus on the basis of the unique combination within the characin family (Characidae) of a three-pointed caudal fin and the absence of the adipose fin normally so typical of characins. The type specimens of *N. palmeri* were 8-20 mm long, and collected by Mr. M. G. PALMER (a wildlife collector who also collected reptiles and amphibians for the British Museum) near Condoto on the Rio Condoto and Novita on the Rio Tamana, both in south-west Colombia.

Just three years later EIGENMANN and his colleague Charles WILSON described the species *Nematobrycon amphioxus*. This species was said to be very similar to *N. palmeri*, but more robust in build. In addition they distinguished it by the dark longitudinal band not being bounded dorsally by a sharply defined, light longitudinal band, but instead rather diffuse. The original description was based on 79 specimens measuring between 14 and 54 mm in length. The type locality is Boca de Raspadura, with one specimen apiece from Tambo, Manigru, and Istmina. When another *Nematobrycon* species was exported alive by KYBURZ in 1961, he assumed that it was none other than this *N. amphioxus*.

The second species of emperor tetra exported alive has brilliant red eyes in life, and this is the best way of distinguishing it from the blue-eyed *N. palmeri*. Until the beginning of the 1970s this gorgeous emperor tetra, also known as the Rainbow Tetra, was widely available in the hobby as *N. amphioxus*.

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Only then did the two scientists mentioned earlier, WEITZMAN and FINK, examine the matter more closely. Their detailed detective work revealed that the red-eyed Rainbow Tetra was in reality a species new to science, which they named *Nematobrycon lacortei* in honor of ornamental-fish breeder Rosario La CORTE of Elizabeth, New Jersey. Because the type specimens were captive bred and the original collector (KYBURZ, in 1970) was no longer alive, WEITZMAN and FINK were able to specify the type locality only on the basis of indications (personal correspondence from KYBURZ to La CORTE and Leonard P. SCHULTZ). It probably lay in the upper course of the Rio Calima.

Emperor Tetra, *Nematobrycon palmeri*.



So where did that leave *Nematobrycon amphioxus*? Well, a number of very dark specimens had unexpectedly turned up among the offspring of the first wild-caught stocks of *N. palmeri*. La CORTE deliberately bred this strain further. It still exists today under the name *Nematobrycon palmeri* "Black", though the current strains are even darker than the original specimens - the result of the continuing efforts of breeders. WEITZMAN and FINK were able to demonstrate that it was precisely such dark-colored specimens on which the description of





The Rainbow Tetra, *Nematobrycon lacortei*, is best distinguished from *N. palmeri* by its red eyes.



Above: two competing males of the black form of the Emperor Tetra, *Nematobrycon palmeri*.
Below: female of the black form of the Emperor Tetra.



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Nematobrycon lacortei male.

Nematobrycon amphioxus was based. Hence *Nematobrycon amphioxus* is now regarded as no more than a synonym of *N. palmeri*.

Geographical isolation

It cannot be ruled out that the Emperor Tetra is currently undergoing a speciation phase and that the dark amphioxus is already in the process of becoming a distinct species. All emperor tetras live in small forest pools that are linked to the upper reaches of the rivers of the Colombian Choco region only during periods of inundation.

In the case of *N. palmeri* it is the drainage of the Rio San Juan and Rio Atrato, and in the case of *N. lacortei* the Rio Calima. The San Juan and the Calima do indeed unite eventually, but the main rivers are insuperable barriers to the inhabitants of forest pools. They cannot come into contact with one another. It is likely that the populations of the typical *N. palmeri* and the dark *N. amphioxus* were also originally separated in this way. But within historic times the Spanish colonial rulers dug a canal between the Rio Atrato and the Rio San Juan. One can well imagine that such a canal, containing still, almost stagnant water, would not represent a serious barrier

to a species such as the Emperor Tetra. And thus the originally isolated populations of the Atrato and the San Juan probably became mixed together again through the influence of Man.

It can be regarded as certain that the emperor tetra species scientifically described to date are closely related to one another. There are no barriers to hybridization between *N. palmeri* and *N. lacortei* in the aquarium. Anyone lucky enough to obtain wild-caught stocks should always breed the strains true to type. It is very probable that there are as yet unknown *Nematobrycon* populations in the drainages of the numerous rivers of south-western Colombia.

Surprise!

But there is also at least one species of characin found outside Colombia that can perhaps be assigned to the emperor tetra group. This species, which is as yet undescribed scientifically, originates from Brazil (unfortunately no more precise details are available). The adipose fin is absent, as in *Nematobrycon*, but the central prolongation of the caudal fin is also lacking. The caudal fin is more like that of *Inpaichthys*, the Royal Tetra, which can be distinguished from *Nematobrycon* by two



Courting male *N. palmeri*

characters: a caudal fin lacking any central prolongation and the possession of an adipose fin.

In the aquarium

The maintenance of *Nematobrycon* species is easy, and feasible even for beginners. These fishes like richly-decorated aquaria with lots of plants. The substrate should be dark, as then the colors of the fishes will be seen at their most brilliant. Emperor tetras are somewhat territorial among themselves. They may like to swim in a loose group some of the time, but males also defend small spawning territories. Hence these fishes are best kept in a group of 10 or more individuals in aquaria with a length of 50 to 60 cm upwards. Quite small tanks with a volume of a few liters are adequate for breeding. If the fishes are left to spawn regularly then they can be bred very effectively, easily producing more than 150 young per pair per spawning. If these fishes don't spawn regularly then many of the eggs are non-viable.

Emperor tetras are peaceful towards other species. Hardness and pH are unimportant except for breeding. All the usual foods for ornamental fishes are eagerly accepted. All in all, emperor tetras are not only attractive but also very interesting fishes. Sure, the novice will initially buy them largely for their striking appearance, but even the advanced aquarist can undertake numerous interesting studies of them.

Literatur:

Weitzman, S. H. & W. L. Fink (1971): A new species of characid fish of the genus *Nematobrycon* from the Rio Calima of Colombia (Pisces, Characoidei, Characidae). *Beaufortia* 19 (248): 57-77

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Das Ziel für die JBL Expedition 2016 steht nun fest: 40 Teilnehmer können im April 2016 mit dem JBL Forschungsteam für 8 Tage in das Orinoco-Delta und zu den berühmten Tafelbergen an der brasilianischen Grenze. Diese JBL Expedition wird ein 100%iger Naturtrip: Die Übernachtungen im Dschungel des Orinocos finden in offenen Palmenhütten ohne Fenster und Türen mit freiem Blick auf den zweitgrößten Fluss Südamerikas statt. Von dort geht es in Tagesausflügen zu den umliegenden Biotopen. Auch wenn das Wasser nicht sehr klar ist, so ist die Fischvielfalt kaum zu überbieten: Buntbarsche, Salmier, Welse und Messerfische leben in diesen Gewässern. Auch das Überlebens-training im Regenwald steht auf dem Programm: Wasser aus Lianen, „Blutende Rinde“ gegen Verletzungen, Palmenherzen gegen den Hunger und dicke Maden für die ganz Hungrigen. So etwas muss man einmal live und nicht am Fernseher erlebt haben!

Nach dem Orinoco geht es per Flugzeug tief in den Süden zu den Tafelbergen, auf denen früher tatsächlich noch Dinosaurier wegen der vollkommenen Isoliertheit ihrer Plateauregionen vermutet wurden. Mit Kanus fahren die JBL Expeditionsteilnehmer vier Stunden lang tief in die Schluchten der Tafelberge hinein. Abseits aller Straßen und Wege liegt das zweite JBL Dschungelcamp mit Hängematten unter Palmenwedeln direkt gegenüber

des höchsten Wasserfalls der Welt, dem Salto Angel. Hier finden sowohl Terrarienfreunde ihre Lieblinge: Vogelspinnen, Grubenottern und unzählige Echsen leben in dieser abgeschiedenen Region der Erde. Die Fischfreunde finden im klaren und rot gefärbten Wasser perfekte Schnorchelbedingungen und können mit Sicherheit noch neue Fischarten entdecken. Mit ca. 1.700,- € wurde der Reisepreis so niedrig wie möglich gehalten. Genaue Information finden Sie im neuen JBL Aquaristik-Terraristik Katalog 2015 oder auf der JBL Homepage unter: www.jbl.de/de/expeditionen





Lake Malawi Cichlids

A dwarf zebra

Cynotilapia pulpican from Lake Malawi

by Andreas Jung

Blue-black-yellow: these are the predominant colors of the small, rock-dwelling cichlids of Lake Malawi, the so-called Mbuna. When the first species were sent to Europe and the USA in the 1960s they triggered a real storm of enthusiasm. They included a cichlid that was identified as *Pseudotropheus zebra*.

Of course, back then people had no idea of the immense number of species of Lake Malawi cichlids in general, and the Mbuna in particular, that existed. Nowadays we know that the Mbuna have evolved differently colored local forms in the numerous isolated rocky areas of the gigantic Lake Malawi. The distinction between just color variants, subspecies, and separate species is often rather random and highly dependent on the species concept of each individual worker. But this question is of secondary importance in the hobby. We also know today that the beauty of the local forms can be retained only by breeding them true. The majority of unattractively colored "aquarium zebras" that exist today are a shocking example of what happens if this basic rule is ignored.

Larger in the aquarium

Every aquarist soon comes up against the fact that almost all Mbuna remain considerably smaller in the lake than in the aquarium. The reason for this isn't really understood. The same also applies to other groups of fishes from completely different regions of the Earth, for example numerous characins from South America, while on the other hand many non-Mbuna from Lake Malawi remain smaller in the aquarium than in the wild. Diet undoubtedly plays an important role, as it is the Mbuna that frequently feed on very calorie-poor foods in the natural habitat, while our modern ornamental-fish foods are often real "calorie bombs". But it certainly isn't a case of food alone, as the Mbuna include not only Aufwuchs-feeders but also predators and planktonivores. All grow larger in the



Brooding female.

ancestral species, and hence are fairly closely related to one another. But even today new



Dominant male of the dwarf zebra, *Cynotilapia pulpican*.

aquarium than in the lake.

A confusion of genera

Lake Malawi is rather like a huge genetic laboratory. It is an ancient lake, and the many hundreds of cichlid species that live there have evolved from just a small number of



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species are constantly evolving, while others become extinct.

Group of female *Cynotilapia pulpican*.





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Subdominant male *Cynotilapia pulpican*.

It is very difficult for scientists working on these fishes to clearly define the species and genera in the lake. Fundamentally, dentition is a fairly well tried-and-tested means of doing so in cichlids. But even in this respect the "zebras" of the currently valid genera *Cynotilapia*, *Maylandia* (= *Metriaclima*), and *Microchromis* make things very difficult for researchers. *Cynotilapia* and *Microchromis* are planktivores and hence have only unicuspid teeth in the outer row (in Aufwuchs-feeders there is a mix of unicuspid to tricuspid teeth in this row of the dentition). It has, however, only recently been shown (TAWIL, 2011) that practically all the small "zebras", hitherto assigned to *Cynotilapia afra* on the basis of dentition, are in reality *Microchromis*, and that *Cynotilapia afra* has probably never been maintained in the aquarium or even seen alive!

The dentition is an important character for determining the zebra cichlids of Lake Malawi.



A true dwarf

This group includes the dwarf zebra *Cynotilapia pulpican*, which grows to only 6-8 cm long in the wild, usually around 10 cm in the aquarium, and only in exceptional cases attains as much as 12-13 cm. The species was first scientifically described in 2002, but had already been known in the aquarium for decades. Even today it is still often sold under the invalid names *Pseudotropheus "Kingsizei"* and "Likoma Blue Frost". The species is known to occur only around the island of Likoma, but there are very similar fishes in other parts of the lake as well.

Aquarium maintenance

Cynotilapia pulpican should be kept in the same way as all other Mbuna in the aquarium. It is best maintained in large groups of 10 individuals or more. The sex ratio

Lexicon

Dwarf zebras

Cynotilapia: means "dog Tilapia"; the name refers to the unicuspid canine teeth". *Tilapia* is another cichlid genus.

pulpican: from the mythical Breton *poulpicans*, a kind of quarrelsome elf or gnome that lives in stone houses.

Literatur:

Tawil, P. (2002): Description de *Cynotilapia pulpican* n. sp. (Pisces, Teleostei, Cichlidae), nouvelle espèce du lac Malawi, avec remarques sur les genres *Cynotilapia*, *Microchromis*, *Maylandia* et *Metriaclima*. L'an Cichlidé v. 2: 72-82.

Tawil, P. (2011): Description of a new cichlid species from Lake Malawi, with reexamination of *Cynotilapia afra* (Günther, 1893) and *Microchromis zebroides* Johnson, 1975. *Cybiurn* v. 35 (no. 3): 201-211

within the group is of secondary importance. Anyone wanting to produce as many young as possible can combine one male with lots of females, but the aquarium will look a lot more attractive if there are more males than females. There will then always be one or two males in dominant coloration in the aquarium - and that is breath-taking!

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Sea water

Do you know what are the commonest animals in the world?

Sea Cucumbers are a model of evolutionary success!

by Levin Locke

Hand on heart: did you answer the opening question with "sea cucumbers"? And yet it is true! Sea cucumbers represent some 90% of the biomass of the ocean depths, and around 70% of the surface area of the Earth lies beneath the oceans, so the calculation is correct.

Sea cucumbers make up the class *Holothuroidea* in zoological systematics. Around 600 species are known from all over the world. They live exclusively in the sea and all species feed on small organisms. Fundamentally they use two methods of doing this. The first group consumes vast quantities of sand and mud, sorts the digestible from the indigestible inside the body, and then excretes the indigestible as purified sand. The second group catches plankton from the water using modified mouth tentacles.

Extra-terrestrials?

All non-sessile*, multicellular animals on Earth are bilaterally symmetric - except for the echinoderms! Bilaterally symmetric means that there is a matching right and left half to the body. By contrast echinoderms - which include the crinoids, brittle stars, starfishes, sea urchins, and, of course, the sea cucumbers - are radially symmetric, and have five body axes or a multiple of that number.

Life on Earth probably arose on just one occasion, and for this reason all life forms - be they bacteria, fungi, plants, or animals - are related to one another in some way. This can be seen most clearly in biochemistry, where the obtaining of energy and metabolism are based on the same principles in all life forms. But there are also fundamental agreements in anatomy. So how did the radial symmetry of the echinoderms come about? Are they ultimately extra-terrestrial life forms that

*Many sponges and a number of other sessile animals are amorphous, i.e. without a regular form.



Colochirus crassus is a gorgeous plankton-feeding sea cucumber.

originally came here from another galaxy? No, probably not. As the larvae of echinoderms are perfectly normal bilaterally symmetric. The fundamental development of the animal egg cell after fertilization has even been studied using the eggs of sea

urchins, as sea urchin eggs are so large, damage-resistant, and above all transparent. The initial development of a human embryo doesn't differ from that of the embryo of a sea cucumber. Sea cucumbers are natives of

The mouth tentacles of *Pseudocolochirus* look like soft corals.

All photos: F. Schäfer





Large numbers of *Holothuria edulis* - the name means "edible sea cucumber" - are processed into trepang.

Planet Earth, just like us.

Breathing via the backside

The better-known sea stars and sea urchins have only one important body opening, sited in the center of the underside of the body. This opening is used to eat food, excrete feces, and release sex cells. Sea stars and sea urchins don't have any respiratory organ in the normal sense. They take in water via a sieve-like plate (the so-called madreporite plate) and pump it through the body using a sort of hydraulic system. This not only serves to supply oxygen, but also provides mobility. The numerous little feet found on the bodies of starfishes, sea urchins, and sea cucumbers, the so-called ambulacral feet, are operated via a hydraulic system!

A sea cucumber is fundamentally a very elongated starfish lying on its side. The change in body form resulted in the madreporite plate ending up on the inside of the body. So how does water get inside? Apparently it was impractical for sea cucumbers to do everything via a single body opening. It is probably more beneficial to process the ingested sediment along the length of the body as if on a conveyor belt and excrete it at the rear: the anus was invented by echinoderms! In addition the

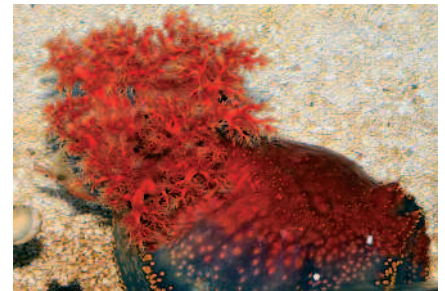
existence of an anus improves the efficiency of food intake. If the indigestible sediment residues were to leave the sea cucumber via the mouth opening, then a comparatively large amount of this redundant material would be picked up again. Sea cucumbers also breath via their anal opening! They have developed sac-like internal organs, so-called respiratory or cloacal trees, whose extremities are finely branched. These organs are pumped full of water via the anus, and extract oxygen from it. Sea cucumbers also require water for their hydraulic system.

Beware, highly poisonous!

Holothuria edulis looks a bit like human faeces.



Sea cucumbers have no sensory organs worth mentioning and only a very simple nervous system. Flight from predators is not an option. Because sea cucumbers are so numerous and widespread everywhere, one might think that many fishes and crustaceans would have specialized on this easy prey. Not so! All sea cucumbers possess an extremely potent poison, known as holothurin. This is concentrated in the so-called Cuvierian tubules, threadlike appendages in the end of the gut. In the event of a serious attack the sea cucumber expels these Cuvierian tubules through its anus towards the aggressor. The Cuvierian tubules are not only highly toxic for fishes, but also very sticky.



Pseudocolochirus sp.

Despite this sea cucumbers are eaten in the Tropics! If you continue to irritate a sea cucumber after it has expelled its Cuvierian tubules then it will expel its entire innards, which smell atrocious to us but are eaten by people in the South Seas, either raw or as the basis of a soup. The entire emptied and



Holothuria atra - this species can grow to more than 30 cm long.

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Pseudocolochirus sp.

skinned sea cucumber is smoked or boiled and is used, under the name trepang, for medicinal and culinary purposes, especially in China and the Philippines. Incorrect preparation can lead to poisoning, though holothurin isn't very dangerous for humans. Skin contact can lead to burning pain, and contact with the eyes can even cause blindness. If you swallow holothurin then the result is muscle cramps, stomach pains, and in severe cases death through respiratory paralysis.

In the aquarium

Their toxicity for fishes makes sea cucumbers potentially dangerous to keep. The mere presence of some species can lead to the demise of the entire fish population, though usually a sea cucumber needs to be seriously irritated or hurt in order to represent a

danger in the aquarium.

The greatest danger lies in pump intakes. Anyone who wants to keep sea cucumbers - and there is no denying some species are extremely attractive - must be sure to take appropriate measures to prevent them from being sucked in. It is also inadvisable to keep them with large crabs or other crustaceans, as these ever-hungry creatures may attack a sea cucumber and thus endanger the entire population of the aquarium.

Sea cucumbers themselves have an immense capability for regeneration. Their entire internal organs can be replaced within a few weeks.

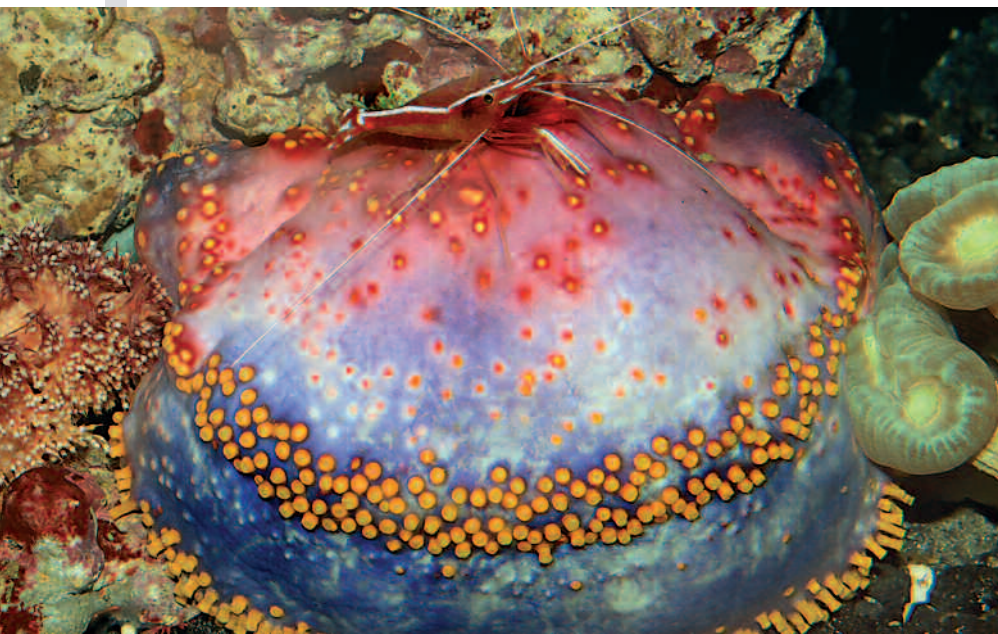
The attractive sea cucumbers of the genera *Colochirus* and *Pseudocolochirus* are plankton feeders, and can readily be fed on *Artemia* nauplii, frozen plankton, *Cyclops*, etc in the aquarium. The less attractive species of

the genus *Holothuria* are also increasingly being maintained, and can be outstanding biological helpers in aquaria with large areas of sand. They don't usually need any extra feeding.

Sea cucumbers are sexually dimorphic. If they are hermaphroditic then they are male for some of the time and female for some of the time. There are as yet no reports of breeding in the aquarium.

The risks of poisoning should always be taken into consideration before purchasing sea cucumbers. Holothurin doesn't have any toxic effect on corals, etc, but is deadly for fishes. It must be made quite clear, however, that to date there have been only very rare reports of mishaps with sea cucumbers in the aquarium!

Pseudocolochirus are also known as sea apples. They seek out quiet spots for themselves in the aquarium.



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Terrarium

The community terrarium: a world full of wonder (II)

by Thorsten Holtmann

The terrarium literature is very comprehensive, and the hobby at an extreme high. Never before in the history of mankind have we known so much about reptiles, amphibians, bird-eating spiders, scorpions, & co - thanks to the terrarium hobby! But there is one topic that is as good as never discussed - the community terrarium. It sometimes seems almost as if there is something disreputable about this area of the terrarium hobby. But that is utter nonsense, a properly designed community terrarium is something quite splendid!



A typical Mediterranean garden.

A Mediterranean garden

The maintenance of animals and plants for pleasure is an exclusively human activity. No other life form on Earth does it. One might even define the human species by this characteristic! The Mediterranean area is the region where many human civilizations began; in North Africa there was Egypt and Carthage, in Europe ancient Greece and Rome, and in the Asian part the Byzantine Empire. All these cultures established gardens, not just vegetable gardens but also places of relaxation. And naturally these gardens were also home to reptiles and amphibians. Perhaps they weren't (and aren't) always seen as welcome, but as a rule they were tolerated as they helped the gardeners by decimating unwanted insects, slugs, and snails.

Species associated with human civilization

Wild animal species include those that follow and those that shun human civilization. The followers profit from the presence of people in an area and even seek out the proximity of humans. By contrast those that shun humanity disappear as soon as people begin to settle in their surroundings. A well-known example is the two species of stork resident in central Europe. The White Stork (*Ciconia ciconia*) is a follower of civilization, that lives and breeds almost without exception in proximity to humans, while the Black Stork (*Ciconia nigra*), which is otherwise practically identical in size and habits, is a species that



Podarcis sicula campestris, the Ruin Lizard, is a very common follower of human civilization. All photos: F. Schäfer

totally shuns human civilization.

Hence the "Mediterranean Garden" community terrarium should be occupied only by those species that count as followers of civilization.

The focus of the activity

There are a whole lot of such followers, but it is the lively, gorgeous lizards of the genera *Podarcis*, *Lacerta*, and *Timon* that constitute the main actors. The very first decision that faces the terrarium keeper is which of these lizards should it be? As they can't be kept together. Different species of wall lizards (*Podarcis*) will fight among themselves, ocellated lizards (*Timon*) and emerald or green lizards (*Lacerta*) likewise won't tolerate one another and both will eat *Podarcis*. So only one pair of *Timon* (*T. lepidus*, *T. pater*, *T.*

princeps, or *T. tangitanus*) or one pair of emerald lizards (*Lacerta bilineata*, *L. schreiberi*, *L. strigata*, or *L. viridis*) or a group of wall lizards (*Podarcis*, most species of which are civilization followers) can be kept in the limited space of the domestic terrarium.

Additional species

The remaining species of lizards that are suitable for this type of community terrarium are normally well behaved towards all of the above-mentioned species. They include the wall geckos (*Tarentola mauritanica* and *T. annularis*), the Turkish Gecko (*Hemidactylus turcicus*), and the cylindrical skinks (*Chalcides* spp.: the majority of species are civilization followers).

Toads are very typical garden creatures. The

* This list contains only the most commonly traded species and is far from being complete!





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African Common Toad, *Amietophrynus* (formerly *Bufo*) *regularis*, from Egypt.

Mediterranean region is home to the Mediterranean Spiny Toad (*Bufo bufo spinosus*), the European Green Toad (*Bufo viridis*), the African Common Toad (*Amietophrynus regularis*), and the Berber Toad (*Amietophrynus mauritanicus*). You need to bear in mind that females of the Mediterranean Spiny Toad grow very large and generally regard wall lizards as snacks, but the other species can always be kept together with all the species named above without concern.

Mediterranean Tree Frogs (*Hyla meridionalis*) also like to live in gardens and enjoy the relative abundance of water there. They are very nice, easy-to-keep fellows, though be

warned that males utter extremely loud mating calls that can generally rob you of your sleep!

Avoid keeping snakes in this community terrarium. They will either eat their fellow-occupants or be regarded as a threat and bitten to death.

By contrast such a terrarium is an ideal environment for babies of the European tortoise species (*Testudo*). Only very large, aggressive *Timon* may represent a threat to them. But before you buy them you should give some thought to where they are going to go when they attain a carapace length of 8-10 cm, as they are then generally too large

Young tortoises are eminently suitable for the terrarium described here.



and too destructive for a domestic terrarium. Only in set-ups with a bottom area of around 3 m² upwards are their unpleasant habits of no concern. The recommended size for a Mediterranean garden terrarium starts at around 90 x 60 x 60 cm.

The decor

Even though it may appear to some people that we have put the cart before the horse by discussing the livestock first, that isn't the case at all. The decision whether to obtain a terrarium is often based on the desire to keep a particular species of animal. For that reason it is perfectly acceptable to enumerate the suitable livestock first!

The "garden" type of decor is a bit of an artifice, as on the one hand it permits the creation of a biologically correct biotope, while on the other allowing a rather large amount of scope regarding the plant species. Very many plants of the typical Mediterranean landscape can be cultivated only unsatisfactorily in the long term in an indoor setting. Unlike an animal, a plant, once set in place in the terrarium, can't change position in order to seek out areas with more or less light, more or less warmth, and more or less moisture. The overall terrarium "climate" must be suitable for plants, while that isn't necessary for a mobile animal that can seek out a niche with a specific micro-climate.

For this reason many typical Mediterranean plants can be grown long-term (i.e. for many years) only in outdoor set-ups protected from frost. Of course all the animals mentioned here can also be housed there, but a lot of people don't have a garden of their own in which to realize such a project. Hence we will discuss only what can be achieved indoors in the long term.

The dry-stone wall

A dry-stone wall is a very typical and essential element of a Mediterranean garden



A dry-stone wall constructed in this way is an important component of this terrarium.

and should always be included in a terrarium of the corresponding type. It can be constructed by layering flat, 5-10 cm thick, roughly hand-size stones one above the next. Instead of cement mortar you use clay or sand with a very high clay content. Both are processed wet. Once it has dried out this mortar becomes rock hard and there is no danger of it softening as a result of regular spraying.

Large gaps should be deliberately included in the dry-stone wall. These are where wall lizards and geckos will make their homes.

The dry-stone wall doesn't have to occupy the entire height of the rear wall of the terrarium. In adequately high terrariums (1-1.5 m high) the wall can be topped with very attractive terracotta pots containing flowering decorative plants. Ideal plants include trailing geraniums (*Pelargonium peltatum* hybrids), which will thrive and flower for quite a long time even in the domestic terrarium. If they stop growing they should be placed on a balcony or outside window ledge to recover. The overwintering of these geraniums should take place outside the terrarium, as they need cool and light conditions (e.g. a basement) at this time.

If the geraniums are watered somewhat generously, so that a little excess water overflows from the drainage tray beneath the pot, then this water will rapidly establish a preferred path. You can try to establish the

Cretan Brake Fern (*Pteris cretica*) between stones in these places. If the terrarium is sited in a very well lit spot or is itself very well lit then you can try growing stonecrop species (*Sedum* spp., e.g. *S. rupestre*) between the stones, but if the light is too weak they will rapidly etiolate.

At present no long-term data are available, but first experiments with Herb Robert - *Geranium robertianum* - in the dry-stone wall are very encouraging. This annual plant is - surprisingly - very shade-tolerant, although it may also grow in full sunshine in the wild. It is a common plant that grows everywhere on rubbish heaps and in gardens, so you can easily collect it yourself from March to October for attempts at cultivation in the terrarium.

The watering place

In front of the wall you should place an attractive terracotta tile topped by a bird water dish around 20 cm in diameter. But in this case it isn't intended for birds but as a water dish for the reptiles and also to provide toads and frogs with the opportunity to bathe. A large flowerpot drainage dish, again around 20 cm in diameter, can also be used for this purpose.

The hedge

At the end(s) of the stone wall there should be a small area of evergreen shrubs. You can use Box (*Buxus sempervirens*) for this purpose, but once again it will usually do better outside in the fresh air. And it would



White Stonecrop, *Sedum album*



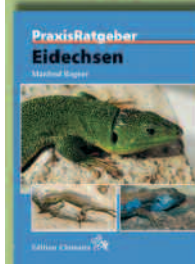
Herb Robert, *Geranium robertianum*



Houseleek, *Sempervivum* sp.

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The Berber Lizard, *Timon pater*, originates from North Africa.

be a real shame to use older specimens with thick, picturesque wood for experiments. An ideal substitute, which will last for years, is a member of the fig tree genus, *Ficus retusa*. This tropical species is usually available fairly cheaply as an "indoor bonsai". Because of its tropical origin this plant also thrives year-round indoors and looks very similar to the evergreen hardwoods of the Mediterranean area. Four or five of these indoor bonsai will create a very attractive effect and really look like a small hedge in a Mediterranean garden.

Two points need to be borne in mind when using these indoor bonsai. Firstly, the substrate needs to be deep enough, at least 15 cm. It can consist of proprietary potting compost covered with a few handfuls of garden soil. Secondly, you should be aware that the leaves are poisonous. Hence if you keep tortoises you need to make sure that they can't feed on these plants.

The gaps between these little trees can be filled with dry oak leaves. Small lizards will enjoy rustling around among these leaves in search of food.

The finishing touches

With a dry-stone wall, drinking dish, and hedge in place, the terrarium now contains practically all that is required for the animals to express their natural behavior. All that is missing is a few tall branches sited near the front. You can buy some tubes of cork bark, which are perfectly suitable both geographically and from a visual viewpoint. The tubes will provide ideal hiding-places as

well as daytime retreats for toads, not to mention quick getaways for any lizards that find themselves harassed during the frequent intraspecific squabbles or the rather importunate courtship of males.

One of the special features of this terrarium is that, just as in a real garden, you can regularly introduce beautiful flowering plants in attractive terracotta pots, and replace them when they have finished blooming. In this way the terrarium will have a constantly changing appearance, always with something new to offer.

Equipment and maintenance

The most important element in the maintenance of this terrarium is the light. Ideally the terrarium will receive at least a few hours of natural sunlight every day, though obviously you must make sure that the terrarium doesn't overheat! The temperature in the terrarium as a whole shouldn't rise above 30 °C, though there can be strictly limited localized sunning places perhaps 20 x 20 cm in area where temperatures of up to 40 °C occur. The lowest "activity temperature", at which the animals remain healthy, feed well, and digest their food properly, is around 18-20 °C. The temperature should drop to this level at night. It will be beneficial if the daytime temperature in winter doesn't rise significantly above 25 °C. It is, however, more important that the lighting regime is maintained at 14-16 hours of light in summer and 8-10 hours of light in winter, as otherwise the hormone budgets of the animals and plants will be cast into disarray and breeding



Splendid flowering pot-plants (this is Oleander, *Nerium oleander*) are typical of Mediterranean gardens.

and flowering will cease.

Independent of any other lighting, a UV light should be in operation for the entire daytime photoperiod, as UV light plays a major role in keeping this terrarium community healthy year-round.

The terrarium should be sprayed lightly with hand-warm water every morning, and the plants watered when required. The water dish should always contain clean water. That apart, all that is required is feeding. This terrarium is easy to maintain in all respects.

We will be portraying further attractive and interesting community terrariums in subsequent issues of the News. Your pet dealer can also provide you with advice on such matters, just as your pet dealer can himself obtain information from a wholesaler that he trusts, e.g. Tropenparadies in Oberhausen, Germany: Fax +49-208-665997.



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Garden pond

Unusual fishes for the garden pond

by Tobias Körbel



The nuchal hump is typical of *Gymnogeophagus balzanii*.
All photos: F. Schäfer

Fishes in the garden pond? The choice is yours. The most typical garden-pond fishes are Goldfishes and Koi. Only a few plants and small native organisms will thrive in their pond. Hence many pond owners prefer biotope fishes such as Sunbleak (*Leucaspius delineatus*), Bitterling (*Rhodeus amarus*), and Sticklebacks (family Gasterosteidae), etc. But a garden pond can also be run as an outdoor aquarium with observation of the fishes the main purpose. There are a whole series of exotic species with which such an experiment can be very

Prerequisites

Anyone who wants to use a garden pond as an outdoor aquarium must take the conservation of nature and welfare of livestock into consideration.

Conservation comes first!

For conservation reasons you must make sure that neither animals nor plants can escape into the wild. Please bear in mind that during wet weather some fishes, crustaceans, reptiles, and amphibians undertake lengthy migrations across land in their natural habitats in order to colonize new bodies of water. Given the opportunity they will do the same here in Europe. This must be prevented come what may! There must be a completely escape-proof barrier round the pond if you want to keep eels, snakeheads (*Channidae*), exotic crustaceans, clawed frogs, etc in the garden pond. Newts and salamanders will overcome any barrier, which fundamentally rules out their maintenance in the garden pond. Only Axolotls (*Ambystoma mexicanum*), giant salamanders (*Andrias*), mudpuppies (*Necturus*), and sirens (*Sirenidae*) are acceptable exceptions.

Very small exotics, such as the majority of small shrimps, as well as the eggs and larvae of large species, can get into the drains during a water change and hence into the wild. So precautions against this must also be put in place. The waste water from a water change must be passed through net fine enough for 100% of the eggs, larvae, and

juveniles it contains to be trapped.

Please also spare a thought for the native fauna. Nowadays garden ponds play an enormously important role as spawning waters for amphibians, as numerous natural waters have become unusable for newts, frogs, and toads as a result of pollution and usage as angling waters.

Animal welfare

Eat and be eaten: this motto applies both in nature and in the garden pond. There is

The most important conservation measure is to make sure our brains are switched on before we purchase an animal. Please bear in mind that almost without exception the livestock available in the pet trade is accustomed to comparatively high temperatures. Even though the species discussed earlier are fundamentally able to tolerate very much lower temperatures, sudden changes in temperature are nevertheless often lethal. For this reason please don't put your newly purchased animals into the outdoor aquarium/pond until the water temperature is permanently above 15 °C. Prior to that they must be kept in the house.



Two males of *Zacco platypus*

nothing to be done to prevent it, but we must nevertheless not forget that we have a certain moral obligation towards the animals we keep, as we have the power of life and death over them.

Zacco minnows

Enough of the lecture! For some years minnows of the genus *Zacco* have been regularly available in the trade. Even though they don't look like it they are fairly close



Gymnogeophagus meridionalis

relatives of the danios, and hence, like Goldfishes and Koi, belong to the cypriniform fishes. There are three species, with *Zacco platypus* most usually available. These minnows grow up to 20 cm long, but usually only 12-15 cm. It is important to be aware that fishes can continue to grow throughout their lives, and hence it makes sense to give not only the record size (i.e. maximum length) but also the size that 80-90% of individuals will normally never exceed.

Zacco platypus is widespread in eastern Asia, with imports coming mainly from southern China and the island of Taiwan. The species has a fairly high oxygen requirement, and hence is more suitable for shaded ponds. A cascade water feature is ideal for this species. It is a shoaling fish that prefers to swim close to the water's surface. These fishes are little predators, and in the wild they consume any small creatures that will fit into their mouths, mainly insects. In the aquarium and garden pond they will very readily accept flake and frozen foods.

Given adequately deep ponds (more than a meter) these fishes are even winter-hardy in mild areas, otherwise they should be overwintered in an aquarium at least 120 cm in length.

Cichlids

Cichlids in the garden pond? How can that

be? There are in fact no cichlid species that are truly winter-hardy in central Europe (for an exception see below under *Australoheros*). There are, however, several species that require the somewhat harsher living conditions of the outdoor aquarium or pond from spring to autumn in order to develop optimally. Many species can't generally be kept healthy otherwise! This applies mainly to the species of the genus *Gymnogeophagus* from southern South America. If you want to keep these gorgeous fishes then they should always be housed outdoors from May to October. The various species can grow to 10-20 cm long, but usually stop at the lower limit. Some of these cichlid species are mouthbrooders, usually larvophilous, that lay their eggs on leaves, stones, etc and guard them there, and only when the larvae hatch are the latter taken into the mouth for further rearing. Others are open brooders (see next species).

This treatment isn't so essential for the Texas Cichlid, *Herichthys cyanoguttatus*, the only cichlid species indigenous to the USA, where it is found in the Rio Grande. If kept outdoors in summer this species too develops into splendid specimens such as are rarely seen in the aquarium. The Texas Cichlid can grow up to 30 cm long, but 15-20 cm long is more usual. These fishes are open-brooders; both parents tend the



Chanchito, *Australoheros facetus*.

eggs and numerous offspring together.

Australoheros species live in similar biotopes to *Gymnogeophagus* species. *A. facetus*, the Chanchito, was the first cichlid to be imported for the aquarium hobby, back in 1890. Because it tolerates low temperatures



A splendid Texas Cichlid seen on netting out in autumn.

so well, it was ideal for the aquarists of the late 19th century, when heating the aquarium still posed problems. There is also a report, dating from 1920, of Chanchitos having survived the winter unscathed in the garden pond at water temperatures of only 2-3 °C!

The photo shows *Herichthys carpintis*, a very close relative of *H. cyanoguttatus*. *H. carpintis* comes from Mexico, however, and is NOT suitable for the garden pond as it requires higher temperatures. *H. cyanoguttatus* has a lot fewer spots on the body, but otherwise the two species look similar.





Nowadays you need to be really lucky to find Chanchitos in the aquarium trade. Hardly anyone keeps this up to 30 cm long species (normally 10-15 cm) any more. There are also problems with the systematics. Until 1995 only two species of chanchito were known, but currently there are 28 accepted by science plus a few known to the aquarium hobby but not yet unequivocally classified scientifically. There are, however, a few aquarists that have taken e.g. the small-growing *Australoheros minuano* under their wings, so that this and a number of other species are available now and then. *A. minuano* grows to barely 10 cm long and the males become red or pink at spawning time!

Darters

Darters are little known in Europe. They are a species-rich family that occurs exclusively in North America. All darters are relatively small, with the majority growing no larger than 10 cm. One species, *Etheostoma oweni*, is regarded as the most colorful fish of North America! Darters are usually encountered in running water, but they are readily adaptable to still water and aquarium life. These fishes are ideally suited to garden ponds with a cascade feature. In addition very many species are completely winter-hardy. Unfortunately they are available only extremely rarely, and then at excessively high prices. But you should try them if you get the chance! The individuals shown here were recently imported to Jung's ornamental fish

Etheostoma zonale, junges Männchen.



Etheostoma variatum, courting male.



Etheostoma variatum, female



Etheostoma camurum, male

farm from Ohio.

Darters are fairly peaceful among themselves. They are bottom-dwellers that feed predominantly on small invertebrates. In the aquarium and garden pond they also relish frozen foods. Interestingly, the brilliant colors of some species can be seen only when the fishes are viewed from below. This is a protective measure against fish-eating

birds. When the males swim briefly in the open water during courtship, the females can nevertheless spot their stunning colors at a glance. Darter females are basically smaller and less attractively colored. The majority of species lay in gravel, but the splendid green *E. zonale* is a plant spawner. Darters are interesting, gorgeous little creatures that ought to be kept by more fish fans!

Buchtipps !

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Snakes

Coral snakes

by Frank Schäfer

Coral snakes don't live in the sea at all. Quite to the contrary, they are exclusively terrestrial. They received their name on account of the coral-red rings around their bodies. There are coral snakes that are lethally venomous, others whose bite is mildly venomous but extremely painful, and yet others whose bite is completely harmless. The roughly 75 species are not all closely related but resemble one another in appearance. This is termed mimicry. The well-known German expert Robert Mertens asked as long ago as 1958 who was actually imitating whom. Since then the special mimicry in coral snakes has been known as Mertensian mimicry.

Mimicry - a strange word, don't you think? It may not have been invented by him, but it was introduced into general use in zoology by Henry Walter BATES in 1862. It is derived from the English word mimic, meaning to copy or emulate. BATES studied insects and discovered mimicry in Amazonian butterflies, among which he found

But you don't need to travel to the Tropics to observe this sort of thing. Here in Europe there are insects that are known to be totally harmless - the hoverflies (Syrphidae) - and are very successfully camouflaged as wasps or bees. Wasps and bees deliver painful stings, but are otherwise harmless. Here too the inexperienced animal rapidly learns when something is best left alone.



An example of classic Batesian mimicry from the native European fauna. Above: a venomous wasp. Below: a totally harmless hoverfly. All photos: F. Schäfer

coral snakes, as any creature bitten by the extremely venomous members of the genera *Micrurus* or *Micruroides* doesn't survive the experience. Hence species that resemble these extremely venomous coral snake genera cannot benefit from the bad experiences of potential predators! MERTENS deduced from this that the moderately venomous snakes of the genera *Erythrolamprus*, *Plicocercus*, *Rhinobothryum* and *Scaphiodontophis* must have invented the "coral-snake pattern" consisting of black, red, and yellow or white rings. The bite of these genera doesn't kill the predator but generally causes it pain. The fact that an animal that had had a bad experience of this kind would in future avoid similar-looking species benefits not only the extremely venomous species, but also the completely harmless king snakes of the genus *Lampropeltis*!

Still under discussion

Mertensian mimicry remains the subject of discussion among experts to the present day, without any truly conclusive result. Against the hypothesis put forward by MERTENS is the fact that species specialized in feeding on snakes - this is termed ophiophagy - don't seem to care much whether the species in question is venomous or not. In the distribution region



Coral snakes indicate whether they are venomous. In the venomous species red follows yellow, in the non-venomous red follows black. This is the non-venomous *Lampropeltis triangulum campbelli*.

extremely similar species that weren't closely related to one another at all. One of them tasted dreadful and was avoided by predators such as birds, etc. The other profited from this in that a bird that had once eaten a horrible-tasting butterfly would never try one again.

And the hoverflies benefit thereby.

This obvious form of mimicry is named Batesian mimicry, after Henry Walter BATES.

Not the case in coral snakes

But MERTENS discovered that Batesian mimicry couldn't apply in the case of the



of the coral snakes - mainly Central America but also parts of the USA - these predators are mainly skunks, coatimundis, herons, and Common Collared Lizards (*Crotaphytus collaris*). While these species aren't in fact specialized on snakes as food, the snakes of the genus *Clelia*, popularly known as mussuranas, pose a serious threat, as they feed exclusively on other snakes. And Common King Snakes (*Lampropeltis getulus*) prefer snakes over any other type of food. Both mussuranas and Common King Snakes are immune to the bites of venomous snakes!

Pro MERTENS

The most important argument for the correctness of the hypothesis of Mertensian mimicry lies in the life style of the genus *Erythrolamprus*. These are the only diurnally active species among all the coral snakes! Both the deadly venomous *Micrurus* and *Micruroides* and the completely harmless snakes of the genus *Lampropeltis* are nocturnal and remain in hiding during the day. The likelihood of a diurnally active creature coming into contact with them is very small. In addition the extremely venomous species hardly ever bite during the day. The coral coloration is pretty much irrelevant to nocturnal creatures, as the striking colors aren't then visible.

Contra MERTENS

Because the most important predators on coral snakes are other snakes and the latter are also immune to snake venom, it appears rather unlikely that the coral coloration is aimed at predators at all. In any case the venomousness of the prey snake species plays no significant role in protection from predators.

Other options?

It is very probable that the coral coloration really is mimicry, i.e. imitation, as an interesting detail has been withheld from you thus far, Dear Reader: within a single snake population with the coral coloration there may be sudden aberrations in pattern (e.g. spotted instead of striped individuals), and then the same is seen in



Because of their cannibalistic tendencies, king snakes - this is *Lampropeltis triangulum sinaloe* - are better kept singly outside of the mating season.

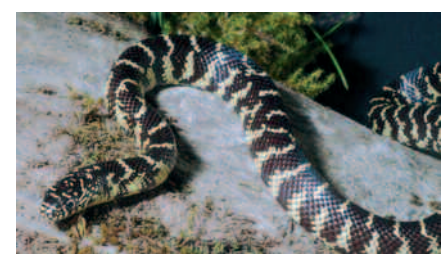
both coral snake species in the region (for example, in both *Micrurus* and *Pliocercus*, see KÖHLER, 2003). Perhaps the coral coloration is a defense against cannibalism and the mimicry helps counter ophiophagy? As one thing is very noticeable: both the extremely venomous *Micrurus* and *Micruroides*, the moderately venomous *Erythrolamprus*, and even the non-venomous *Lampropeltis* eat snakes, although in different measure and not exclusively!

In my view whether and how snakes can register the coloration of another snake hasn't been studied. As a terrarium keeper, and someone familiar with snakes, one isn't inclined to place too much reliance on the

visual sense in snakes. Undoubtedly scent and tactile stimuli play a larger role in intraspecific recognition. The specialized snake-eaters already mentioned, the mussuranas, are uniformly black when adult, for example. But - interestingly enough - the completely differently colored juveniles are red with a dark crown followed by a yellow and then a black neck band! Coincidence? Who knows...

Coral snakes in the terrarium

Because coral snakes are among the most colorful of all snakes, they were maintained in the terrarium quite early on, though the extremely venomous species and the moderately venomous members of the genera *Erythrolamprus*, *Pliocercus*,



Various *Lampropeltis* species, above without, below with the coral coloration. Top left to bottom right: *L. getulus californiae*, *L. g. floridana*, *L. pyromelana*, *L. mexicana greeri*.





Top left to bottom right: *Lampropeltis pyromelana knoblochi*, *L. triangulum gentilis*, *L. t. hondurensis* "Tangerine", *L. t. hondurensis*.



Rhinobothryum and *Scaphiodontophis* have been, and still are, kept only by specialists, if at all. By contrast, the king or milk snakes of the genus *Lampropeltis* are very popular and easy to keep. Although at the same time it has to be said that not much is to be seen of their splendid coloration in the terrarium, as the king snakes are crepuscular creatures that almost always spend the whole day in hiding. Nevertheless *Lampropeltis* are among the most frequently kept and bred snake species in captivity. This is undoubtedly linked to the generally considerable variability in the majority of species, which means you can build up a whole collection of king snakes. At present 21 species are distinguished, plus there are numerous subspecies, variants, and more recently cultivated forms as well.

Best kept singly

In the case of very many snakes it is advisable to keep them singly, as they are not very sociable animals. If they are kept in a group then competition for food can repeatedly lead to unpleasant situations. And if they are permanently kept in a group then they are often reluctant to mate. There may be exceptions, but they don't include the king snakes! They are

Lampropeltis ruthveni



fundamentally solitary. Moreover, because they are inclined towards cannibalism, it is wisest to put them together only for breeding and then under supervision.

The terrarium for a single king snake doesn't have to be too large: as long as the snake, with height and width half this measurement. King snakes live mainly on the ground, so the branches and other wood introduced as decor and for climbing should be thick rather than thin. It is very important for the snake to have a nice place to hide during the day, ideally in the form of a hollow piece of cork bark, positioned horizontally and so that its interior can be easily monitored.

Maintenance requirements in brief

The daytime temperature should lie between 25 and 30 °C, 5 °C lower at night. A winter rest at a temperature between 18 and 22 °C will do these snakes a lot of good. A water dish should be provided, initially at least. You will very quickly notice whether or not the snake uses it for bathing. These snakes should be fed on mice, one per snake per week is sufficient. Because practically all king snakes are captive bred nowadays, they will usually have been accustomed from an early age to accept frozen mice, defrosted and brought up to room temperature before use.

All coral snakes, venomous or otherwise, breed by laying eggs. Anyone especially interested in breeding is referred to the copious literature available on the subject.

If you are now filled with the desire to keep and breed coral snakes, your pet dealer can undoubtedly order them for you from a trustworthy wholesaler, for example Tropenparadies in Oberhausen, Fax +49 0208-665997

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Lexicon

Coral snakes

Micrurus: means "small tail"

Micruroides: means "similar to Micrurus"

Lampropeltis: means "shining scales"

Erythrolamprus: means "brilliant red"

Pliocercus: means "more tail"

Rhinobothryum: means "Bothryum with a nose"; Bothryum is another snake genus

Scaphiodontophis: means "snake with spatulate teeth"

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Cold water

Profile:

Goldfishes & Koi

by Frank Schäfer

Since 1st August 2014 new animal protection legislation has been in force in Germany, under which the vendor is obliged to provide every new customer with extensive written information on the newly purchased animal. In the case of fishes that is totally impracticable for every individual species. For this reason AQUALOG has developed "Profile" sheets to complement its "Labels" system, in order to comply with the legal requirements and cover each individual fish group. Labels and Profiles are an unbeatable "dream team". Here is the Profile for "Goldfishes and Kois".

General

Goldfishes and Koi are the oldest ornamental fishes of all. Goldfishes have been bred in the Far East for ornamental purposes for around 1,000 years, and Koi for even longer, 1,500 years. It should be noted that this breeding was originally mainly for religious reasons. The Goldfish is a mutant of a cypriniform species that is native to China and has the scientific name *Carassius auratus*. The maximum length of the basic Goldfish forms is around 30-40 cm, while Veiltails and other fancy forms grow to 10-20 cm long. The Koi is a colored cultivated form of the Common Carp, *Cyprinus carpio*. Hence maximum length in Koi is normally around 60 cm, with 80-90 cm being attained extremely rarely. Carp are river fishes and require a certain degree of water quality, and for this reason, and because of their size, Koi are by preference kept in ponds. By contrast, Goldfishes are members of the Crucian Carp group, which are specialized for life in small bodies of water, often with very poor water quality, and so are also very good for the aquarium. Koi and Goldfishes can easily be told apart externally by the fact that Koi have barbels at the corners of the mouth and Goldfishes don't.

Important requirements

The long period for which these fishes have been captive-bred has produced strains that are very undemanding and well-adapted to maintenance in captivity. Goldfishes and Koi are domesticated and



Koi and other carp always have barbels.

genetically very tame, plus they don't readily succumb to stress. However, Koi fundamentally require clean water, a soft



A high quality tricolor Koi, a so-called Sanke.

All photos: Frank Schäfer



substrate suitable for digging, a pH between 6 and 8.5, and a lot of swimming space. Goldfishes are less demanding as regards water quality, but can otherwise be treated as for Koi. Koi and Common Goldfishes are completely winter-hardy and can be overwintered at 4 °C, while in summer they will tolerate up to 30 °C.

Appropriate feeding

Both species are omnivores. Their natural food consists of small organisms such as insect larvae, snails, small crustaceans, etc, plus decaying plant material (detritus) and soft-leaved aquatic plants. In the aquarium or garden pond they can readily be fed on all the usual frozen, live, and dry foods available in the aquarium hobby. There are also special foods for both Koi and Goldfishes available in the pet trade. Dead leaves (autumn leaves) of native deciduous trees (Beech, fruit trees, Oak, Alder, Birch, Maple, Walnut, Willow, etc) should always be available in small quantities as supplementary food, and will also provide the fishes with secondary plant substances. Like almost all fishes they should be fed several times per day with small portions that are eaten completely within five minutes. Both Goldfishes and Koi can do without food for a number of days (e.g. during holidays) without problem. At water temperatures of less than 10 °C they should not be fed at all.

Correct maintenance

In the aquarium regular large partial water changes are the most important element of maintenance. Depending on the population this can be 50% of the tank volume weekly, but in tanks with a low population density can be reduced to 25% every 14 days. The temperature of the new water should be roughly in line with that of the tank water, but up to 5°C temperature difference is nothing to worry about. The new water should always be colder, never warmer, than the aquarium water. Water changes are impracticable in the garden pond. Koi ponds require a filtration system, but well designed Goldfish ponds don't need any equipment.

Aquarium and tankmates

Goldfishes and Koi are slow swimmers with



There are also long-finned Koi.

a moderate need to move around. The bottom area of a tank for Koi should be about 8-10 times body length by 4-5 times body length. The same formula applies to the basic Goldfish types (Common, Wakin, Shubunkin, Comet), while the size can be reduced by about a third for the long-finned types (Veiltail, Ryukin, Celestial, Pearl Scale, Bubble-Eye, Oranda).

The depth of the tank will depend on the space available, but outdoor ponds should be at least a meter deep to protect the occupants from frost. Veiltail types are generally not winter-hardy in central and northern Europe. The tank decor should be

Spartan: sandy substrate, rounded water-worn stones, and aquatic plants. In the case of the Goldfish forms with modified eyes (Dragon-Eyes, Celestials, Bubble-Eyes) particular care is required to ensure that the fishes don't damage their eyes on decorative objects.

It is best to keep Koi and Goldfishes in groups though they can be kept singly. The ratio between the sexes in the group is unimportant.

Life expectancy

Koi generally live to be 30-40 years old, and there have been rumors of specimens more

A Common Goldfish of the "Super Red" strain.





Kohaku Koi, a top quality specimen.

than 100 years of age. The maximum life expectancy depends largely on the water temperature. Specimens that are kept in warm conditions year-round never live as long as those that spend a large part of the year in winter rest. Much the same applies to Goldfishes, which usually live for 15-20 years, but are known to have attained up to 40 years of age.

Size

Koi and Goldfishes grow very rapidly during their first two summers of life. Those that are kept in warm conditions year-round are often 15-20 cm long before the end of their first year of life. Goldfishes are already sexually mature at this point, while Koi attain sexual maturity in their second year of life at the latest.

Special details

Koi with a particularly beautiful body shape and exceptional coloration fetch very high prices, while "normal" Koi are very cheap. The same applies to the fancy forms of the Goldfish. Always bear in mind that many of the specimens available in the trade come from breeders in the Tropics. These fishes won't appreciate being put into a relatively ice-cold garden pond in the early spring.



In the case of Goldfishes with modified eyes - this is a Red Dragon-Eye - you need to take special care to avoid damage to the delicate eyes.



A red and white Comet (= Sarasa Comet)

Hence the best time for populating the garden pond with such fishes is end May/early June.

Fancy cultivated forms of the Goldfish such as this Pearl Scale are very delicate creatures.



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Sie können ein Aquarium in Ihrem Wohnzimmer oder auf Ihrem Balkon aufstellen, oder vielleicht haben Sie ja in Ihrem Garten Platz für einen Teich? Ein Blickfang wird das Aquarium immer sein, ob nun durch die Gestaltung und Deko – wie Bepflanzung, Steine oder Hölzer – oder durch die Bewohner, die dann in ihrem Aquarium leben. Die Auswahl ist riesig: Krabben, Garnelen, Barsche, Schnecken, Fische für draußen oder für drinnen. Wichtig ist auf jeden Fall, die richtigen Mitbewohner zu finden, sie sollen zueinander passen und sich verstehen.

Als nächstes stellt sich die Frage, wie Sie das Aquarium einrichten wollen: Sie können sich ihre ganz eigene, individuelle kleine Unterwasserwelt erschaffen. Sie haben verschiedene Möglichkeiten – es gibt „ein Aquarium für Faule“, „ein Aquarium für nicht ganz so Faule“ oder richten sich eine Unterwasserwelt „Von Indien bis nach Thailand“ oder „Kleinafrika“ ein. Wenn Ihr Plan ist, eine Traumwelt für bestimmte Bewohner zu gestalten, in der sich diese mit Sicherheit pudelwohl fühlen, gibt es das Aquarium für „Malawiseeaquarien – einfach nur ein Steinhafen?“ oder spezielle Aquarien für „Schneckenbuntbarsche“, „Zwerggarnelen“ oder „Killifische“ oder Sie bringen Ihre „Zebras in Höhlen“ unter.



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The natural aquarium

Medicinal trees

Part 1: The Common Alder

by Birgit Bautz-Schäfer

It is increasingly being recognized within the framework of close-to-nature fish-keeping that the maintenance and breeding of fishes, shrimps and other crustaceans, gastropods, bivalves, and aquatic plants goes better and is more satisfying the more closely it imitates the example of nature. Anyone who wants to take this route will very soon encounter the largest of all the terrestrial plants, the trees, along the way. Their branches and roots provide hiding-places, their leaves form the basis of the food chain in almost all the waters that are home to ornamental fishes in the wild, and provide a lot of small creatures with their daily bread. But only a few aquarists are aware of their medicinal properties - pity!

Siehst, Vater, du den Erbkönig nicht?*

Der Erbkönig, written in 1782, is probably the best-known poem by Johann Wolfgang von Goethe, and tells how the Erbkönig (= Alder King) tries to carry off a small boy being borne on horseback in his father's arms, while the latter is unaware of the evil presence. Since time immemorial the Common Alder (*Alnus glutinosa*) has had a sinister aspect in folklore. The Alder King may be a figment of the imagination, but the Alder's habit of growing in wet, swampy surroundings has historically given it a less than favorable reputation among humans. But not among the pioneers of the aquarium hobby. Anyone who keeps snakes, toads, and slippery fishes at home won't be too worried about the Alder's reputation and will put aside ancient prejudices against the environment it inhabits. And thus it was that our forefathers in the hobby very quickly discovered that the fruits of the Alder, the so-called Alder cones, were a first-class natural healing medium.

The Alder from a botanic viewpoint

The genus *Alnus* - alders - is represented by three species in central Europe. Worldwide there are between 17 and 50 species, depending on the opinion of the scientist in question. The truth probably lies somewhere in between. All alders are trees or shrubs. But only the Common Alder is perfectly adapted to wet locations, so there is no risk at all of any confusion.

* Father, don't you see the Alder King?

The Common Alder is a member of the birch family (Betulaceae), and hence is related to the birches (*Betula*) and the hazelnuts (*Corylus*). Like them it has male and female flowers, both on the same tree. The male flowers, which produce the pollen, are called catkins. The female flowers are very inconspicuous and sit in clumps at the ends of small twigs. Pollination is effected by the wind.

Survival specialists

Like all animals and plants on this planet, the Common Alder requires oxygen for respiration. Trees that stand in water for any length of time suffocate and die. But not Common Alders. Why? The Common Alder is the only species of European tree with the ability to take up oxygen from the air via its trunk and transport it to the roots, where it can be breathed. In addition, as an adaptation to nutrient-poor marshy soils, the Alder lives in symbiosis with bacteria that can bind nitrogen direct from the air. Nitrogen is one of the most important of all plant nutrients. And finally, the Common Alder has evolved a host of decay-limiting substances that prevent the plant from rotting in the waterlogged environment in which it lives. It is mainly these fungicidal and bactericidal substances that make the Alder so valuable to aquarists.

The effective ingredients

Unfortunately there has been no scientific research into the precise substances contained in Alder cones, or at least none is



Male Common Alder flower (catkin).

known to us. But because the bark and leaves of the Common Alder are used in human medicine, their contents are well known. As with all natural products the concentration of the individual substances varies depending on the location and the time of collection, but as a rough rule of thumb it can be stated that some 10-20% of the contents are tannic acids, while additional main active ingredients are phenylpropane (flavonoglycoside (hyperoside)), cinnamic acids, stilbene derivatives, steroids, and triterpenic acids (taraxerol (alnulin) and taroxeron (protaenulin)), and ancillary substances are anthraquinone (emodin), sugars, uric acids, and waxes (all data after LAGONI, 2003).

Usage

In human medicine Alder-bark teas are used as a gargle to treat inflammation of the mouth and throat, tooth and throat pain, and bleeding gums; Alder bark is used to make a lotion or poultice, and the leaves to treat all sorts of skin conditions, eczema, infected wounds, burns, and hemorrhoids. Strange to say Alder cones aren't used in classic medicine, though they are used in folk medicine, to produce an aphrodisiac.

Their use in the aquarium is simplicity itself and has been tested thousands of times: they are added to the aquarium at the rate of one Alder cone per 10-20 liters of water. And that's it. You can also use a lower dosage - with natural medications the rule "more helps more" generally DOESN'T apply. On the



Female Common Alder flowers.



Alder cones

All photos: F. Schäfer

contrary, traces of medication are often a lot more effective. It is virtually impossible to overdose, although the water will become increasingly less transparent until it eventually takes on the color of strong coffee. Even this water is generally harmless to the livestock, though the plants will suffer considerably due to the lack of light caused by the brown coloration.

Do Alder cones make the water acid?

Essentially the answer is yes! The pH will generally be affected by the tannic acids, as can very easily be checked. Distilled water has a pH of 7 and no buffering capacity, and so can't "capture" and neutralize any acids. If eight Alder cones are placed in a glass containing 100 ml of distilled water (which is a lot more than the dose that would be used in the aquarium), this lowers the pH from 7 to slightly over pH 4.

Statements to the contrary may perhaps relate to the collection time. Alder cones are best collected in winter, when they have shed their seeds. Alder seeds are undesirable in the aquarium as they will merely pollute the water unnecessarily. Because the scales of the cones open only in dry weather to release the



Common alders are short-lived and live for only 100-120 years. Even young trees fruit abundantly.

seeds, it may happen that a certain amount of rain may already have washed over the cones before the time comes to harvest them. It may be that cones harvested before they are ripe and then dried have a different effect on the water chemistry and in particular on the pH, and the same may apply to those harvested in the spring or summer, but we haven't experimented to check. The Alder cones sold in the trade, e.g. at Aquariana-Online.de, originate from winter harvesting and will lower the pH in soft water.

When to use Alder cones, and what for?

It can be said of Alder cones that they never do any harm and are almost always beneficial. Hence it is essentially advisable to have Alder cones in the aquarium (at a low dose because of the plants). Dose at the rate of one Alder cone per 10-20 liters of new

water after every partial water change. Older, expended cones look unattractive and hence should be removed, though that is a matter of individual taste. They won't do any harm.

The same applies here as with all natural medications: in the case of acute illness they will support the healing process, but WON'T replace conventional medicine! Their most important effect is that the animals and plants in the aquarium will be healthier through the use of natural products such as Alder cones, and hence hardly ever get sick!

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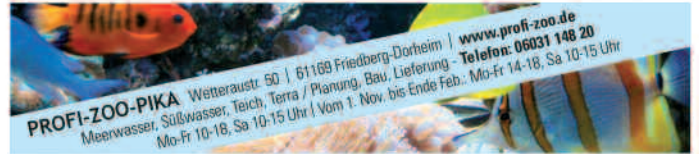
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Gobies are becoming ever more popular. The Dragon Goby from China is a real classic. It was formerly known under the name *Rhinogobius wui*, but that name is now regarded as a synonym of *R. duospilus*. This little goby grows to only around 4 cm long. It is an inhabitant of freshwater streams and requires no addition of salt. The males dig holes beneath rocks, and spawning takes place there. Rearing the relatively large fry is comparatively easy. Because of their provenance (southern China) these fishes can readily be kept without heating, and the temperature can lie between 16 and 26 °C.

Text & photo: F. Schäfer



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Cultivated forms

A new cultivated form of the Harlequin Rasbora

by Roman Neunkirchen

The Harlequin Rasbora is one of the most important ornamental fishes on Earth. It was first discovered in 1904 by the German researcher Georg Duncker of the Zoological Museum in Hamburg during an expedition to Malaysia, and scientifically described as *Rasbora heteromorpha*.

The name *heteromorpha* means "having a different form". DUNCKER used it to express the fact that the new discovery was appreciably higher-backed than all the other *Rasbora* species known at that time. For this reason the Harlequin Rasbora, along with a number of subsequently-discovered, related species, is placed in the genus *Trigonostigma*, which means "triangle spot".

Impossible to breed?!

The first importation for the aquarium hobby took place shortly after the discovery of the species. In 1906 Julius REICHELT of Berlin managed to bring a few specimens to Europe under arduous conditions. But despite all the experience of breeding aquarium fishes already available at that time, this gorgeous little fish couldn't be bred!



Wild-caught male Harlequin Rasbora.

Evil rumors

Anyone who thinks that disputes and backbiting are an invention of the Internet era is going to be severely disappointed to learn that even in the early 20th century aquarists were past masters of this art! The difference is that people didn't defame their fellow humans on Internet forums back then, but in

the specialist magazines of those days, where it is still available to read today. It was suggested, for example, that the females looked totally different to the males and the



A male of the new albino cultivated form of the Harlequin Rasbora.

All photos: Frank Schäfer

wicked Chinese in Singapore were sending only males, in order to maintain their monopoly on the Harlequin Rasbora. It wasn't until 1920 that the plot unraveled, when a Herr Gundelach in Thuringia became the first person to breed the species successfully in small numbers.

Breeding secrets

Two factors are particularly important for the breeding of the Harlequin Rasbora: the water chemistry and the spawning plants. The latter is almost more important. Until that time people had been accustomed to all barbids and rasboras scattering their eggs among fine-leaved aquatic plants. And so they put what

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spawn impossible.

The discovery of water chemistry

It can justifiably be assumed that it was the Harlequin Rasbora, along with the ambition of aquarists to breed the species, that eventually led to the discovery of the secrets of water chemistry that first made possible the breeding of blackwater fishes. In Thuringia, where the first successful breeding took place, the water from the mains supply is unusually soft and slightly acid. Gradually people came to realize that it was these chemical conditions that were required for the spawn of so-called problem fishes to develop.

Numerous local variants - or species?

Because we were reliant for so long on wild-caught stocks, people quite soon realized that Harlequin Rasboras from Malaysia had a far higher percentage of red than those from Indonesia, which looked more bluish. Nowadays we know from DNA study that they may even be different species.

Wild-caught Harlequins are hardly ever seen in the trade nowadays. However, the various breeding strains consist of several genetically-distinct lineages. Obviously the crossing of these strains is likely to encourage the creation of cultivated forms, such as can be seen among the live-bearing toothcarps, many cichlids (e.g. discus and angels), and other ornamental fishes.

Blue and gold

For many years now there have been two mutant forms of the Harlequin Rasbora in the trade. The first is a melanic form, in which the black pigment on the body isn't restricted to the triangular spot but covers a large part of the body. This form is particularly attractive by virtue of there being a blue sheen all over the fish.

The second mutant is completely the opposite of the melanic form. It largely lacks black pigment on the body. Such individuals are termed leucistic, or - because it sounds a lot nicer - golden. The golden Harlequin has been bred and offered for sale by breeders for several years now.



A ripe female of the new albino cultivated form. These fishes are completely lacking any black pigment, and hence the eyes are red.

Brand new: the albino

The albino harlequins that have recently appeared on the market are apparently totally independent of the blue (melanic) and golden (leucistic) forms. They are being offered for sale by the ornamental-fish wholesaler Höner in Hiddenhausen, Germany, from whom we obtained the individuals illustrating this article. Thanks again for that! The albino strain is particularly beautiful by virtue of the fact that the original black triangle now appears white. This makes the fishes look extraordinarily extravagant.

Easy to keep

Breeding them may require a certain amount of knowledge, but anyone can keep Harlequins. These fishes are extremely peaceful, easily fed with dry foods, and gorgeous to look at. Water chemistry is unimportant for maintenance. Almost 110 years after the first importation, anyone can enjoy the satisfaction of keeping Harlequin Rasboras in the aquarium. Which is a good thing!



Female of the golden cultivated form.



The blue cultivated form of the Harlequin Rasbora.



Pair of the blue Harlequin Rasbora.



Golden cultivated form, male.



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Puffers: deadly poisonous and super cool

If you are looking for a fish with personality, then a puffer will be just the ticket for you. Puffers are intelligent, inquisitive, and bold. Unfortunately they are also rather mean. For this reason the majority of species are very difficult or impossible to keep with other fishes.

But on the other hand you can even train a larger puffer to perform tricks! It will learn to come to the front at the sound of a whistle and take food from forceps.



The Gold-Ringed Puffer (*Tetraodon mbu*) from the Congo grows very large, almost 60 cm!

Gnashers

Puffers have sharp teeth. Four of them, two upper and two lower. Together they look rather like the beak of a parrot. And just as a parrot can crack nuts with its tough beak, a puffer can crack snails. Snails and mussels are its favorite foods! But a puffer will also eat other foods, for example earthworms, mosquito larvae, shrimps, and cuttlefishes.

If a puffer doesn't get enough snails then it may happen that its teeth become too long. Then the teeth have to be trimmed and ground down. If this becomes necessary it is best done by a vet.

Deadly poisonous!

Any creature that eats a puffer will die, as the flesh of puffers contains a deadly poison. This is also the reason why puffers are so bold: they have hardly any enemies! As long as you don't eat it, however, the poison is harmless.

The teeth of puffers are a lot less pleasant. Some are so greedy that they will bite at anything! If this happens to be your hand or finger then it will bleed quite a lot and hurt as well. So you must always make sure you know where your puffer is when you are working in the aquarium. If your puffer is very bold then you must trap it in a net until you have finished in the aquarium.

Puffers can inflate themselves



If a puffer becomes scared then it can inflate itself. It does this by swallowing lots of water. In this way it can become twice or three times as large as it really is. If you catch a puffer and take it out of the water then it will inflate itself with air. This is very dangerous for the puffer as sometimes it isn't able to get rid of the air again later. And then it will die! For this reason you must never catch a puffer just for the fun of seeing it inflate itself, right? That would be rather cruel.

There are lots of different species of puffers. Some grow to only 2 cm long, others to more than a meter. Some require salt in the water, others not. So you need to buy a good book so that you know what you are doing before you buy a puffer.



Infobox for Parents

Dear parents,

Please start by reading a good handbook on maintaining an aquarium with your child, before actually acquiring any fishes. The pet trade, book shops, and public libraries all have a wide range of books for beginners. It isn't possible to keep fishes successfully without first finding out the basic requirements of these finned creatures and the correct way to maintain an aquarium (setting up, water changes, etc).

General hints

The majority of puffers are fundamentally very easy to keep, but they do need to be kept in a fresh-, brackish-, or salt-water, depending on the species. Puffers often can't be kept with other fishes as they will harm them and bite off their fins. This behavior depends on the individual, there are also completely peaceful specimens, but you should also assume the worst so that you are prepared for anything.

Puffers can't be fed on dry foods. They require frozen or live foods. Your aquarium dealer will be happy to advise you. Because some puffers grow very large, make sure you know all about the different species before purchasing.

Holidays

Fishes are poikilothermic ("cold-blooded") and require much less energy than us humans. A fast of two to three weeks won't affect them much at all and won't do them any harm. If you are going to be away for two or three weeks then it is always best to let the fishes go hungry, as a neighbor or friend will usually be too generous towards them. Under normal circumstances no fish has ever died of starvation in the aquarium, but millions of them have died because they were given too much food and the water went bad.

Hazards

Puffers can bite! Their bite isn't venomous but it hurts and there is always some risk of infection. Because the skin, flesh, and innards of puffers contain a deadly poison, then when they die you should never feed them to other pets or eat them yourself!



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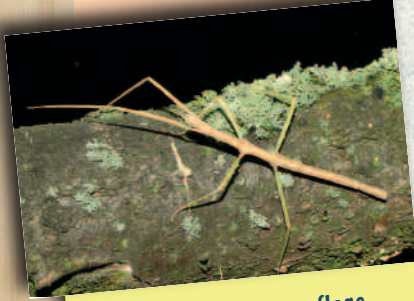
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Mobile sticks and leaves



Stick insects camouflage themselves as bits of dead twig.

The stick and leaf insects are among the neatest creatures that you can keep in the home terrarium. Another name for stick and leaf insects is phasmids, and they are tremendously interesting and fascinating creatures, as they are masters of camouflage. What at first glance appears to be a dry leaf or a piece of dead stick is in reality an active, living creature. Even though some species look prickly they are fairly harmless. Stick and leaf insects eat leaves and like to be left in peace. All species lay eggs.

No need for males?

In some species there are just females. Or to put it better: almost just females. Sometimes there are males as well. But the females of these species usually breed without males, by cloning themselves. The Indian Stick Insect (*Carausius morosus*) is an example of this unusual form of reproduction. By day the Indian Stick Insect imitates a piece of stick and doesn't move unless necessary. It doesn't even feed until the night-time, when nobody can see it any more!



A mobile leaf. Also available in yellow and green.

Leaf-eaters



Some species are very prickly.

Although the vast majority of stick and leaf insects live in the Tropics, they can very readily be fed on native European plants. Blackberry leaves have proved to be a universally acceptable food plant. The blackberry bramble (various *Rubus* spp.) has the advantage that it also bears leaves in winter. So it can be collected outdoors all year round, and there is no need to breed extra plants for the phasmids. But blackberry brambles are prickly as they have lots of thorns! So it is sometimes quite nice to be able to give your pets something different. Depending on the species they will also eat the leaves of roses, oak (*Quercus* spp.), Hawthorn (*Crataegus monogyna*), Hazel (*Corylus avellana*), Ivy (*Hedera helix*), Privet (*Ligustrum vulgare*), and a number of others. So you can also learn how to recognize native European trees and shrubs!

Saved from extinction

The Black Beauty Stick Insect (*Peruphasma schultei*) shown in the cover picture was first discovered in 2004. Unfortunately it is endangered in its natural habitat, but because it is being bred and there are lots of people who enjoy breeding stick insects, it has been possible to preserve it from extinction. Note that this species sprays acid if you upset it too much. This burns but isn't dangerous otherwise. The Black Beauty Stick Insect is a good example of why it is so important to keep and breed animals in the terrarium.





Infobox for Parents

Dear Parents,

The maintenance of a terrarium is not for small children. Your child should be at least 12 years old so that he or she can look after the livestock properly. It is essential to read a good handbook on terrarium care with your child before acquiring a terrarium. Terrarium animals cannot be kept correctly by guesswork alone, you must learn how to treat them correctly as anything else would be cruelty to animals.

Setting up the terrarium

There are a lot of different species of stick and leaf insects. Some are rather small, others rather large. A terrarium with a bottom area of 30 x 30 cm and 50 cm in height will be suitable for the maintenance of most species, though the container should be bigger for the very large species. These creatures really aren't miracles of movement.

The terrarium should have large, but closable, air vents so that the humidity can be adjusted to optimal for both desert and rainforest species, as required. Room temperature (around 20-22 °C) will usually suffice if the terrarium is illuminated during the day. The heat loss from the lighting should provide a temperature of 26-28° C inside the terrarium. At night the temperature can drop to room temperature.

The most important piece of equipment is a vase containing fresh food plants. The food plants will serve both as food and as something to climb. It is wise to have a cover for the vase with holes for the plant stems, so that the insects can't fall in and drown.

The bottom can be covered with sand, a sand-soil mixture, or just kitchen roll.

Regular maintenance

The plants should always be replaced when eaten or withered, with the vase simultaneously being washed thoroughly and the bottom cleaned.

Special notes

Many phasmids are poisonous and release an irritant poison when they feel threatened. Hence they shouldn't be handled unnecessarily. The poison irritates the mucus membranes. Some species can also bite or prick painfully with their spines. But overall these are harmless creatures if they are treated gently.



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Tortoises and turtles

Small and dainty: the Crevice Tortoise

by Christoph Fritz, www.reptilia24.com

Tortoises hold a great attraction for all reptile enthusiasts. The European species are best kept outdoors, but not everybody has a garden to make this possible. Tropical species are often very large and need a lot of space. But not the Crevice Tortoise!



The name "Crevice Tortoise" is very appropriate. It was invented by Heinrich Dathe.

The Crevice Tortoise (or Pancake Tortoise) - its scientific name is *Malacochersus tornieri* - grows to only 15-18 cm long and is thus one of the smallest of all the tortoises! And it is its resulting comparatively small space requirement that makes it so particularly desirable.

Soft shell

Unlike in all the other tortoises, the shell of the Crevice Tortoise is relatively soft, very flat, and not suitable for the animal to be able to withdraw its head and other extremities underneath. No wonder that the original describer of the species initially thought he was dealing with a deformed, unhealthy specimen! In all other tortoises a soft shell is indeed an extremely good warning sign, indicating a serious metabolic

disturbance that can lead to deformity and in very severe cases even result in the death of the animal. But this isn't the case with the Crevice Tortoise!

Head for the hills!

That is perhaps the best way to describe the survival strategy of the Crevice Tortoise. It is specialized in living in rocky upland habitats. While other tortoises are proverbially slow-moving and withdraw into their shells when danger threatens, the Crevice Tortoise deserves the title of "fastest tortoise in the world". If it is threatened then it runs away at a speed of up to 18 meters per minute. Its goal is to find a rocky crevice, and thanks to its highly-developed sense of direction it is regularly successful. It then creeps inside and props itself up on its legs, thereby wedging itself into the crevice. It also breathes in deeply, which increases its size even further - thanks to its soft shell! There is no animal known that can extract a Crevice Tortoise from its hiding-place once it is wedged in this way.

Homeland: East Africa

Originally it was thought that the Crevice Tortoise was distributed from central Kenya to southern Tanzania, but recently it has also been recorded further north in Kenya and south as far as Zambia. A particular bird - the

The armor of the Crevice Tortoise isn't suitable for protecting the head and limbs.





Egyptian Vulture (*Neophron percnopterus*) – may have encouraged the Crevice Tortoise to evolve. This vulture is in fact one of the few animal species that can crack open tortoises. To do so it grabs the tortoise carries it high into the air, and then drops it onto a rock to crack it open. According to legend the Greek poet Aeschylus (525 B.C. - 456 B.C.) met his death when this bird mistook his bald head for a rock and smashed a tortoise on it.

Unfortunately seriously endangered

Its specialized habitat doesn't make for very large populations of the Crevice Tortoise. For this reason it multiplies only slowly. That makes it remarkable.

It is thought that excessive collecting of the species for the terrarium trade may have come to constitute a threat to its survival. For this reason since 1992 the trade in wild specimens has been banned in Tanzania, while the export of so-called farmed specimens continues to be allowed. It appears that this measure may have been effective, as investigation of the biotope has revealed few signs of illegal collection. But at the same time the main threats to the species, namely habitat destruction through overgrazing of its food plants by human farmstock, quarrying for building houses, and climate change, continue to exist. Because the Crevice Tortoise can readily be maintained and bred in captivity, we can only hope that as many terrarium enthusiasts as possible will get involved with this interesting species. In the terrarium at least it mustn't ever become extinct.

Maintenance and breeding

The maintenance of the Crevice Tortoise is relatively easy. It isn't possible to give extensive advice on the subject here, and the reader is instead referred to the abundant specialist literature that exists (see book tip). But basically it can be said that these tortoises should be kept at an air temperature between 20 and 30 °C during the "dry season" (June-October, December-March) and 25-35 °C during the "rainy season". A sunning place with a temperature of 40-50 °C, created by a lamp, should be



Crevice Tortoises can move energetically when they have reason to.

provided.

Up to five clutches of eggs per female per year are possible, but as a rule consist of just a single egg. As far as possible the diet should consist of wild plants with a high percentage of soft grasses (Gramineae), while hay can be given during the dry season as well.

The necessary rocky crevices can most safely be built using light-weight plastic "rocks" such as are manufactured for the aquarium hobby. If you use natural rock then make

Lexicon

Crevice Tortoises

Malacochersus: from the Ancient Greek μαλακός (malakós, "soft"), plus chersus meaning "tortoise", i.e. "soft tortoise".

tornieri: in honor of Gustav Tornier (1858-1938), A German zoologist.

absolutely sure that it is safe from collapse! Males are often intolerant of one another, but that is the same as already known for tortoises in general.

If you are now filled with the desire to keep and breed Crevice Tortoises, your pet dealer can undoubtedly order them for you from a trustworthy wholesaler, for example <http://www.reptilia24.com>

Literatur:

Lindholm W.A. (1929): Revidiertes Verzeichnis der Gattungen der rezenten Schildkröten nebst Notizen zur Nomenklatur einiger Arten. Zoologischer Anzeiger 81(2): 275-295
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New freshwater imports

Recent new freshwater imports from all over the world

by Roman Neunkirchen

Given the huge number of fish species in existence - some 32,700 species are currently known to science, half of them from fresh water - the number kept in the aquarium at least now and then is very small. In fact only around 400 species of freshwater fishes are permanently available in the trade. So it isn't surprising that new species are constantly being discovered. Some recent new imports by Aquarium Glaser are briefly portrayed on the following pages.



Half-grown specimens of *Myleus* have a hook-shaped anal fin.

Myleus cf. lobatus

Many aquarists have an ambivalent relationship with the genus *Myleus*. The form and color of these plant-eating relatives of the piranhas are fascinating and awaken the

desire to own these fishes. On the other hand the majority of species grow rather large, and their feeding habits make it almost impossible to keep them together with aquatic plants.

This photo was taken immediately on the day of their arrival.

All photos: Frank Schäfer



Approximately 3 cm long specimen of the new import.

But these fishes are one of the standard attractions of large display aquaria and hence continue to be imported regularly. Aquarium Glaser has recently imported some lurid green specimens from Peru for the first time. Nothing of the sort has ever been seen there before, and that is saying something as they are one of the largest ornamental-fish



This individual is some 6 cm long.

importers in the world!

Be that as it may, they are a member of the genus *Myleus*. Of the total of 15 species included in this genus, only three are currently known from Peru: *Myleus lobatus*, *M. rubripinnis*, and *M. schomburgkii*. The last two of these are well known in the aquarium hobby and look quite different, so it may be that the new imports are *M. lobatus*.

The largest, 6 cm long, and the smallest, 3 cm long, specimens from the importation are shown here. Two specimens have been placed in the display facility at Aquarium Glaser for long-term observation and to see how they turn out. We are really excited! It is to be expected that these fishes will attain an eventual size of 20-30 cm. In the *Myleus* species known to date the anal fin in males alters after they attain sexual maturity and becomes three-lobed, which was the reason given for the choice of name (*lobatus* = lobed) in the original description in 1850. Females retain the same fin form as juveniles.



► Aquarienpflanzen richtig düngen

Pflanzen sind die Basis für ein stabiles und gut funktionierendes Aquarium. Sie sehen gut aus, versorgen das Aquarium mit lebenswichtigem Sauerstoff, binden überschüssige Nährstoffe, reduzieren Algen und mindern Stress bei den Aquarienbewohnern.

Jede Pflanze braucht zum Wachsen eine Vielzahl verschiedenster Nährstoffe. Ist auch nur ein Element in zu geringer Menge vorhanden, so ist das Pflanzenwachstum dadurch begrenzt. Im Aquarium sind Phosphat und Nitrat durch Futterzugaben und Fischausscheidungen meist im Überschuss vorhanden. Andere Nährstoffe werden schnell verbraucht oder fehlen ganz. Das Geheimnis eines guten Aquariendüngers ist es, die vorhandenen Nährstofflücken gezielt auszugleichen.

Im Fachhandel sind sogenannte Volldünger erhältlich, die entsprechende Versorgung bieten. Hochwertige Dünger enthalten sogenanntes „weißes“ - also wasserlösliches - Eisen enthalten, das von den Pflanzen auch aufgenommen werden kann. Zusätzliche bewahren Chelate wie Schutzhüllen die Nährstoffe davor, sich zu schnell im Wasser zu lösen. Die Nährstoffe sind so lange für die Pflanzen verfügbar.

Bei neu eingerichteten Aquarien sollte man sich erst nach der mehrwöchigen „Einfahrphase“ langsam an die vorgegebene Dosiermenge herantasten. Grundsätzlich hängt die benötigte Düngermenge von der Bepflanzungsdichte, der Art der Pflanzen und der Beleuchtungsstärke ab.

Hochkonzentrierte Dünger bieten im Allgemeinen den größten Komfort, da man sie nur alle 2-4 Wochen zugeben muss. Für diese Düngerkonzentrate gibt es inzwischen auch sehr günstige Dosiereinrichtungen. Diese ermöglichen eine gleichmäßige Düngung, und zusätzlich zeigen sie auch an, wann wieder nachgedüngt werden muss.

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Corydoras cf. breviostris CW 27 from Venezuela.



Corydoras cf. breviostris CW 27 Highfin

The little mailed catfishes of the genus *Corydoras* are enjoying increased popularity among aquarists. A round dozen species are among the standard range of the aquarium trade. They are "little scavengers for everyone", nice little bottom-dwellers that can be relied on to make sure no food is left lying uneaten. In addition they are absolutely peaceful and can be kept with any other peaceful fishes without concern.

Many aquarists have fallen in love with mailed catfishes to such a degree that they have specialized exclusively in these fishes. At present 159 species are known to science. In addition there are another 159 C-Numbers (C stands for *Corydoras*) and 107 CW-Numbers (CW stands for *Corydoras* World), which haven't yet been scientifically

determined but are known to the aquarium hobby.

The unusually attractive mailed catfish shown here was imported from Venezuela by Aquarium Glaser. It has been given the C-Number 154 and the CW-Number 27. The species belongs to the spotted species assemblage with a dark dorsal fin, saddle spot, eye stripe, and striped caudal fin, whose identification is a major headache for scientists and aquarists alike. It appears most similar to *Corydoras breviostris*, which was described in 1947 as a subspecies of *C. melanistius* from Guyana on the basis of a specimen imported from Venezuela (Orinoco), which was maintained in the aquarium prior to its death. Because unfortunately the precise collecting locality for the species is unknown, it isn't possible to go there and catch more mailed catfishes from the original site. That is required, however, in order to be able to study the sometimes fine differences on the basis of which the various mailed-catfish species can be distinguished from one another. The closest relatives of *C. breviostris* include *C. wotroi* from Surinam, a species that is regarded by many scientists as a synonym of *C. breviostris*.

When adult, CW 27 / C154 - which grows to around 5 cm long - develops a very high

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The extremely high dorsal fin can easily be seen in this photo.

dorsal fin. This phenomenon is also known from other species from the Orinoco, for example *Corydoras concolor*. It appears that CW27 / C154 occurs together with *Corydoras delphax* in the wild, and looks rather similar to it. However, *Corydoras delphax* is considerably more elongate and doesn't have the bright spot on the neck.

CW27/C154 is easy to keep in the aquarium. Like the majority of species from the Orinoco, it should be kept somewhat warmer than normal, i.e. at around 26-28 °C.

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Trichodactylus kensleyi, male

Trichodactylus kensleyi Freshwater crabs from Paraguay

Crabs are very entertaining aquarium-dwellers. They appear intelligent to the observer and display a wide variety of behavioral patterns. However, you should be aware that crabs are also rather destructive and may regard all their tankmates - plants as well as livestock - as potential sources of food, and can be very quarrelsome among themselves.

Aquarium Glaser has recently imported some splendid large (carapace width 5-8 cm; these creatures are larger than hand-size if you include the legs!) freshwater crabs from Paraguay. They are thought to be *Trichodactylus kensleyi*. The hair responsible for the genus name (*Trichodactylus* = hair finger) on the terminal joint of the pereopods can readily be seen in the photos.

Male and female crabs can always be told apart very easily by the form of the tail folded beneath the body, the pleon. But even without turning the crabs on their backs the males can be readily recognized by their comparatively larger claws.

In the case of marine crabs the young usually undergo several free-swimming larval stages before they adopt a bottom-oriented way of life. By contrast, in the freshwater crabs of the family Trichodactylidae, to which *Trichodactylus*

kensleyi belongs, the entire life cycle takes place in fresh water.

The Trichodactylidae are a family of freshwater crabs found exclusively in South America. There are 51 species divided among 15 genera. Although these crabs are generally commonplace where they occur and used as food by the local people, as far as we know there have not been any previous commercial importations of any of the species.

There is also practically no literature on the behavior of these animals, just a fairly recent study investigating the behavior of the species *Trichodactylus panoplus*. This indicates that these crabs prefer gravel bottoms, are both diurnal and nocturnal (but exhibit more activity at night), and are usually relatively peaceful among themselves. In the wild these omnivores usually occur in a balanced 1:1 sex ratio. Unfortunately the populations of numerous species are declining noticeably as a result of human alterations to the environment. Hence it would be nice if aquarists were to devote themselves to the maintenance and breeding of these crabs and thus provide the basic data required for conservation projects.

Literatur:

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Males have larger claws.



These crabs are comparatively peaceful among themselves.



Trichodactylus kensleyi, female

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In der wissenschaftlichen Textdatenbank könnt ihr euch zu den verschiedensten Themen aus Aquaristik und Terraristik informieren. Außerdem findet ihr einige unserer schönsten Bilder, angepasst um sie als Bildschirmhintergrund verwenden zu können.

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Wir verlosen 10 Exemplare Süßwasseraquarien von Claus Schaefer

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