

NEWS

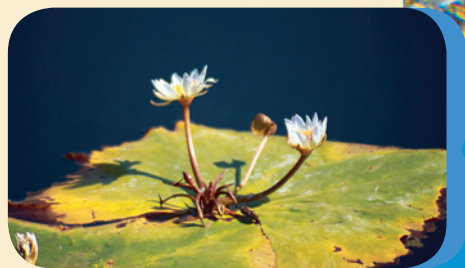
The magazine for aquarists and terrarists


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 A jewel from the Congo



 A live-bearing waterlily

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 Leopard Tortoise



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Preview:

News No 103
will appear in autumn 2012
Don't miss it!

Impressum

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 Übersetzungen: Aqualog Animalbook GmbH
 Gestaltung: Frederik Templin
 Titelgestaltung: Petra Appel, Steffen Kabisch
 Druck: Bechtle Druck&Service, Esslingen
 Gedruckt am: 15.2.2012
 Anzeigendisposition: Aqualog Animalbook GmbH
 und Verlag: Liebigstraße 1, D-63110 Rodgau
 Tel: 49 (0) 61 06 - 697977
 Fax: 49 (0) 61 06 - 697983
 e-mail: info@aqualog.de
 http://www.aqualog.de

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Readers' Letters

Re: "A gentle giant: *Manouria emys*" by Thorsten Holtmann, News 101:8-10

Dear Herr Schäfer,

In reading this very informative article I was taken aback by the statement, under the subheading "Peaceful giants", that "Practically without exception, all tortoises are solitary and have little idea of how to get on with conspecifics" and that the males are very aggressive towards members of their own sex and terrorize females.

My experience as a breeder of European tortoises has been quite otherwise: my two breeding groups (*Testudo hermanni boettgeri* and *Testudo graeca ibera*) have a balance of the sexes and nevertheless there is no conflict between the males. And I cannot say there has been any terrorization of females by the males. In the event of any individual case of excessive boisterousness then the male in question is removed to a spare pen for a few days.

In the case of my adult Indian Star Tortoises (*Geochelone elegans*) an almost ideal harmony prevails among the animals: I have never yet seen any fights or biting.

One final example: every year I have the opportunity to study a group of more than 100 sexually mature Aldabra Giant Tortoises (*Dipsoschelys dussumieri*) for a whole day on an island in the Indian Ocean. Here too I have remarked no conflict. Mating takes place without any previous courtship – there is no spitting and no biting at all.

So it really isn't correct to say that "practically all" tortoises are socially intolerant.

With best wishes,
Horst Köhler (www.schildi-online.eu)



Kaloula pulchra.

Photo: Frank Schäfer

Re "Focus on *Kaloula pulchra*" by John Dawes, News 101:12-15

Dear Herr Glaser,

I like your magazine TERRALOG News a lot, and I always particularly enjoy reading the items about new arrivals in the world of the terrarium hobby.

As long ago as 1978 I solved one of the problems experienced by your author John Dawes, see No 101 (final paragraph, bottom right). Perhaps you could give him my work as the information may help him with his research!

With best wishes,
Alfred A. Schmidt, Frankfurt am Maine

Editorial note:

Herr Schmidt enclosed a reprint of his work, Erst-Nachzucht des Indischen Ochsenfrosches *Kaloula pulchra* (Amphibia: Salientia: Microhylidae). Salamandra 14 (2): 49-57, which we will certainly pass on to John. Many thanks for this important information!

Here is a summary of the article:

A spawning by the Asian Painted Frog,

Kaloula pulchra, on 21. IV. 1978 was reported. The eggs were round, small (0.7 to 1.4 mm in diameter), and with little surrounding gelatinous matter. The spawning took place during the night hours, with much loud calling by the male. After spawning, the eggs covered the surface of the water. No sign of fungussing was detected.

At a water temperature of 26°C the development of the larvae proceeded very rapidly, as they swam free as soon as 22. IV. 1978. They received finely crushed fish food (Tetra Min, Tetra Omin, and Tetra Phyll) which was scattered on the surface of the water and also consumed there. Metamorphosis took place from 5. V. 1978 onward, that is 15 days after spawning. The young frogs had a head-rump length of 1 cm and ate freshly-hatched Crickets (*Gryllus bimaculatus*) as well as Enchytrae. There were no noticeable losses through the entire development period.

The very short time span of 15 days suggests that in the wild these frogs spawn in temporary pools and transitory accumulations of water, and hence rapid development is essential to species survival.



Turtles

Little giants from Zambia

by Christoph Fritz, www.reptilia24.com

The Leopard Tortoise, *Stigmochelys pardalis*, is the definitive tortoise of the Black Continent, with numerous different populations within its huge distribution region.

The Leopard Tortoise occurs from South Africa to southern Sudan. It has been recorded from the following countries (from north to south): southern Sudan, Ethiopia, Somalia, Kenya, Uganda, Tanzania, Ruanda, Burundi, D. R. Congo, Angola, Zambia, Namibia, Mozambique, Malawi, Zimbabwe, Botswana, Swaziland, and South Africa. However, some of the reports are dubious, and others probably relate to human introductions, but even when this is taken into account the species still has an enormously large distribution.

Subspecies?

Two subspecies are formally recognized by many scientists, the northern *Stigmochelys pardalis babcocki* and the southern *S. p. pardalis*. But the large variety of forms among Leopard Tortoises

means that this division is incorrect. There are marked local differences even within the subspecies' distributions. So far genetic studies have failed to produce any data that can be interpreted unequivocally. So at present there are two opposing camps: one that regards the species known as the "Leopard Tortoise" as being appreciably more differentiated and which would erect more than two subspecies; and the other, which regards such an undertaking as senseless given the wide spectrum of individual variation and doesn't accept any subspecies at all for *Stigmochelys pardalis*. These academic discussions are of little practical interest to terrarium enthusiasts. Far more important is an awareness that the Leopard Tortoise grows to different sizes depending on population concerned, and also has different climatic requirements!

Leopard Tortoises from Zambia from egg to adult. The carapace color is very variable, above left a "high yellow" specimen.
Photo: Christoph Fritz, www.reptilia24.com



Lexicon

Leopard Tortoise

Stigmochelys:
means "patterned tortoise"
pardalis:
means "panther-like"
babcocki:
named in honor of H. L. Babcock
(1886-1953).

Eaten small

Of course eventual size is of enormous practical importance. Leopard Tortoises are rather active and require a lot of space. The largest Leopard Tortoises known to date originate from Ethiopia, where they can attain a carapace length of almost 80 cm and a weight well in excess of 40 kilos! Such giants require a huge amount of maintenance. At the other end of the scale we have real dwarfs in the form of the specimens currently being imported regularly from Zambia. These grow to only 25-35 cm long; females grow larger than males, attaining 30 cm on average. The Zambian form of the Leopard Tortoise is thus no bigger than the largest European tortoise, the Marginated Tortoise, *Testudo marginata*. Even so, a Leopard Tortoise weight considerably more than a European tortoise of the same size, as *Stigmochelys* is significantly higher-backed. On the basis of the old subspecies model, the Zambian Leopard Tortoise belongs to *S. p. babcocki*. In the event that *S. p. pardalis* is offered for sale then it might be very interesting for the terrarium enthusiast with a large garden, as these tortoises originate from South Africa, and because of the subtropical climate of that country, where there is generally frost and snowfall in winter, can be kept outside in open-air terrariums from spring to autumn, almost like European tortoises. There are again huge size differences between the individual South African populations; they can grow to between 30 and 70 cm long, with the norm being 35 - 50 cm.



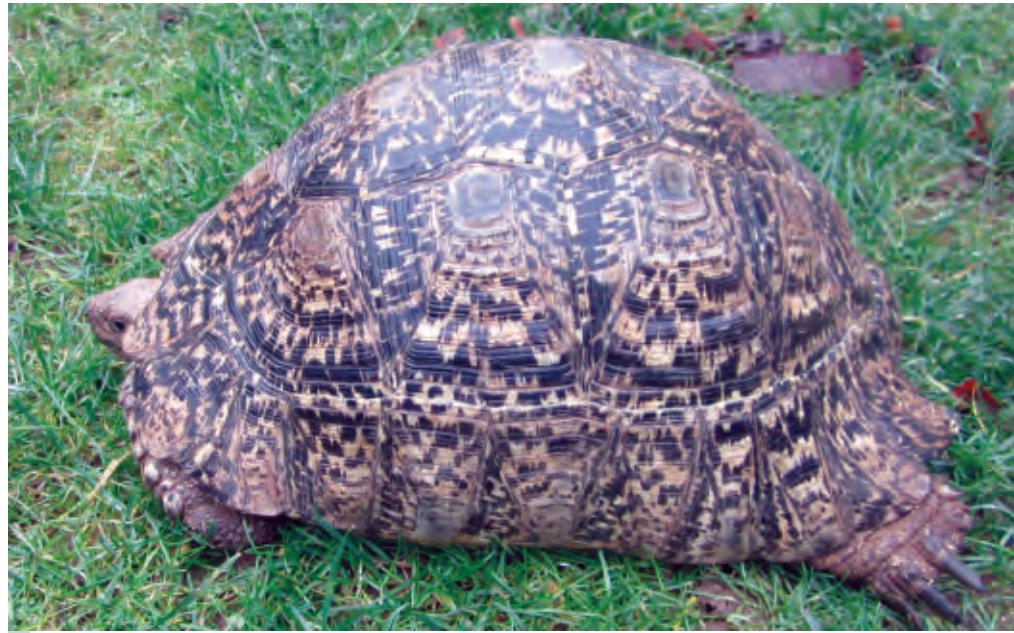
It is unknown why the Leopard Tortoises from Zambia remain so small, but there is an interesting theory on the subject. Leopard Tortoises, like many other tortoises, are eaten by humans. And the population in Zambia is supposedly under serious pressure from hunting. Obviously, larger specimens are much more desirable as food than small ones, and thus more likely to fall victim to the hunters than smaller conspecifics. The theory postulates that hunting pressure by Man has led to involuntary genetic selection among Leopard Tortoises in Zambia, as only the small-growing specimens survive to breed. As already mentioned, this is just a hypothesis and unproven, but it sounds quite plausible.

The natural habitat

The Leopard Tortoise is an inhabitant of open terrain. Although its biotopes may appear quite different in their details, as a rule they can nevertheless be described as savannah landscape characterized by stands of scrub and trees. Leopard Tortoises are very tolerant of drought. They can survive for months without drinking water, an ability made possible by the special structure of the gut, which permits almost complete utilization of any water contained in the food. But although some Leopard Tortoises live in bone-dry areas in the wild, there are also populations that have constant access to fresh water and can also make significant use of it.

The Leopard Tortoise is also flexible as regards altitude. Some populations live in mountainous regions and are also known as "Mountain Tortoises" among the local people, although some etymologists like to explain this popular name as "mountain" referring to the high-vaulted carapace of the species.

The importance of the latter is again to be found in the habitat of these tortoises, which they share with the famed herds of big game in Africa. On the one hand the form of the armor, along with the "hump formation" of the dorsal plates frequently



Leopard Tortoises from Cape Province, traditionally termed *Stigmochelys pardalis pardalis*.

Photo: Christoph Fritz, www.reptilia24.com

seen in this tortoise species, prevents injuries from the hooves of the big game, while on the other the shape of the carapace enables these tortoises to right themselves if they are overturned onto their backs by such animals.

Maintenance in the terrarium

Obviously maintenance requires space, even in the case of the Zambian "dwarf giants." The terrarium length for long-term maintenance should be no less than eight

times carapace length (that is, 2.8 m for a specimen 35 cm in length). Somewhat larger if several specimens are to be maintained. For this reason it is usual to devote a whole room to the tortoise pen when adult specimens are to be maintained indoors. This isn't the place to go into the arrangement of such a whole-room terrarium in detail; relevant information can be found in the specialist literature. The most important points are, however: it must be light, the more light

Stigmochelys pardalis are very active tortoises.

Photo: Frank Schäfer





Portrait of a Leopard Tortoise from Cape Province.

Photo: Christoph Fritz, www.reptilia24.com

the better, and these tortoises require UV light. The daytime temperature should be 24-30 °C, up to 40 °C beneath the heat lamp. At night the temperature should drop significantly, say to around 15-20 °C. There is no need to worry too much about decor, although the females require somewhere to lay eggs with 40-50 cm of substrate. The females produce several clutches of 8-20 eggs per year (12 eggs on average).

Outdoor maintenance is much better. In this case the pen for a small group should be 10-20 square meters in size and include an adjacent, heatable greenhouse or large hotbed where the tortoises can take a sort of "cat nap" during unfavorable weather. South African specimens can live here from spring to autumn, the "Babcocki" only in the warmest months of the year. These tortoises should be permitted a stay outdoors in the summer simply because they will graze the lawn with real passion – they are sometimes jokingly compared to lawnmowers.

Companions

Leopard Tortoises can be maintained singly without further ado, as they are solitary in the wild and both males and females react aggressively towards conspecifics of the same sex during the breeding season in the wild. But the

object of maintaining wild creatures in captivity is, of course, to study the entire life cycle of the species maintained, and both sexes are required for breeding. Astonishingly Leopard Tortoises are exceptionally tolerant in the terrarium and it is almost always possible to keep them successfully in small groups. For the reasons mentioned earlier, only individuals of the same population should be mated with one another. For this reason it is best to start off with either 3-5 juveniles or – if the sexes can be distinguished – one male and 2-3 females from the same importation. If you decide on the purchase of captive-bred specimens, then you should again make sure that the parents originated from the same population. Because the Leopard Tortoise, like all tortoise species, can be traded only with valid CITES paperwork (WA II, EU b), it is possible to ascertain at least the town of export and the date of import from this export/import permit.

For a wide variety of reasons Leopard Tortoises should not be kept with other tortoises, and keeping them in a species terrarium is preferable to all other forms of maintenance.

Food

Stigmochelys pardalis are exclusively vegetarian and specialized on food with a

high roughage content. Grass and hay (including water-softened hay pellets) should constitute the staple diet, to which can be added all sorts of wild plants, and lettuce leaves in winter. There is no need for supplementary vitamins, but calcium carbonate should be provided. These tortoises will often eat carrion, meat, or fruit, but this is a poisoned chalice for these animals. Leopard Tortoises grow rapidly and have a high reproductive rate. They are able to live their lives in the fast lane because their intestinal bacteria and the entire organism are tailored to the optimal exploitation of the poorest quality food. Hence feeding the above-mentioned "titbits" can very rapidly lead to serious organ damage and is essentially to be avoided.

When it comes to water, it is sufficient to provide drinking and bathing water twice per week. The bathing water must be removed by the next day at the latest, as the tortoises will often excrete their faeces in it.

If you are now filled with the desire to keep these wonderful tortoises then your pet dealer can undoubtedly order them for you from a wholesaler of his acquaintance, for example from reptilia24, Fax +49 6430 - 9250100. Zambian and South African specimens are currently available in Germany.

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Killifish

A jewel from the Congo

by Frank Schäfer

The lamp-eyes are killifishes from Africa and a number of species have long been part of the standard range of better aquarium stores. But the species that Aquarium Glaser has recently imported from the D. R. Congo is not only fabulously beautiful but also an aquarium-hobby rarity of the first rank.

A confused mass of names

The scientific genus name of this lampeye remains the subject of debate. Initially this little fish was placed in the genus *Aplocheilichthys*, and then the new genus *Congopanchax* was erected for it. Thereafter *Congopanchax* was regarded as a distinct genus by some scientists, while others saw it as no more than a subgenus of *Aplocheilichthys*. Nowadays, however, *Congopanchax* is usually regarded as a subgenus of the genus *Poropanchax*. This may all sound very confusing, but merely reflects the fact that the phylogenetic relationships of the lampeyes are being studied more intensively. Moreover, different research methods produce different results

and these are in turn subject to different interpretations by the researchers. There is no right or wrong here, as the discussion is by no means at an end, and everyone involved in the argument has the scientific freedom to decide for him- or herself, on a purely personal basis, which of the evidence put forward should be regarded as conclusive. And thus it is that this little fish can be found in the literature under the names *Congopanchax brichardi*, *Aplocheilichthys brichardi*, *Poropanchax brichardi* or – and this is the most commonly used designation at present – *Poropanchax (Congopanchax) brichardi*.

The fact that the name *Congopanchax* is placed in brackets signifies that it is being

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used as a subgenus name.

We aquarists need to be aware of all these names in order to be able to study the entire body of literature that currently exists on these little jewels.

History of discovery

In 1952 Max Poll described a small lampeye (males maximum length 2.5 cm, females maximum 2 cm) as *Aplocheilichthys myersi*. The type locality was is "Ile Atena, Stanley Pool, Leopoldville"; nowadays these places are known as Mbamu Island, Malebo Pool, and Kinshasa. You see, it isn't just scientific names that can change...

Courting male *Poropanchax brichardi*.

All photos: Frank Schäfer





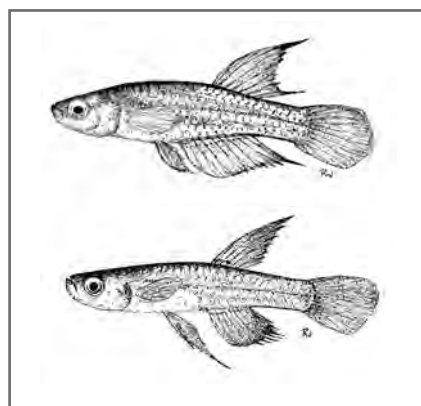
Almost 20 years later, in 1971, Poll described another very similar species, this time from the central Congo basin ("Liyke, bras mort de la riv. Tshuapa, route Boende-Watsi, 2 km de Boende") as *Congopanchax brichardi* and also placed *A. myersi* in the newly erected genus *Congopanchax*. In *Congopanchax brichardi* both sexes grow to just 2 cm long.

Unusually the original description of *C. brichardi* doesn't highlight the most striking difference between the two species: specifically, the anal fin of *C. myersi* begins very far forward, almost immediately behind the ventral fins, while the anal fin of *C. brichardi* begins at about the same point as the dorsal fin. Because of the only very slight differences between *C. myersi* and *C. brichardi* mentioned in the original description, aquarists came to the conclusion that the two species were identical to one another.

The natural habitat

The precise distribution region for *Congopanchax brichardi*, for which I suggest the popular name "Richard's Hummingbird Lampeye" (*C. myersi* is sometimes known as

the Hummingbird Lampeye), is at present unknown. This tiny fish isn't caught with normal fishing equipment. It is known that the species occurs in the central Congo drainage including the shallow parts of Lake Tumba. The lake is over-fished, and so heavily that it is sometimes no longer possible to earn a living by fishing, and some former fishermen have had to go over to agriculture. According to the literature the known habitats of *C. brichardi* are small tributaries, streams, swamps, and bank regions with an abundant growth of aquatic plants. The water there is very soft



Type specimens of *C. myersi* (above) and *C. brichardi* (below). Drawings: R. Wildekamp



Brichard's Hummingbird Lampeye, male

(conductivity 20-50 μ S, ie barely 1°dGH), and acid, with the pH lying between 4.5 and 5.5. Lampeyes are generally shoaling fishes, and the shoals like to remain close to the surface.

U. Schliewen (verb. comm.) has caught the species in the shallow water of Lake Mai Ndombe. The water there is extreme blackwater and the water temperature very high, around 30 °C. In his view the species doesn't occur in small cool streams, as is the case with the Butterfly Barb (*Barbus hulstaerti*), but more in backwaters and floating meadows of the major blackwater rivers and even in blackwater lakes.

Females of Brichard's Hummingbird Lampeye are rather inconspicuously colored.





The tiny *Congopanchax brichardi* grows to only around 2-2.5 cm long.

Because of the overfishing situation in Lake Tumba and its only imprecisely known distribution, Brichard's Hummingbird Lampeye appears as "Least Concern" on the International Red List of the IUCN. That is the lowest alert level for a species.

In the aquarium

Undoubtedly the main problem for aquarists as regards *Congopanchax brichardi* is obtaining the species at all. Only relatively few importations reach us from the central Congo region and Brichard's Hummingbird Lampeye is as good as never among them. This is undoubtedly because it is generally very difficult to accommodate such small, delicate fishes correctly over there. And in addition debilitated fishes are very sensitive to transportation. Nevertheless from the 1990s on there have been occasional importations of these breathtakingly beautiful fishes to Europe.

Great care is required during acclimatization, as otherwise losses are unavoidable. These fishes are very susceptible to bacterial (debilitating) diseases and the dreaded "Velvet Disease", *Piscinoodinium*.

The specimens in the photographs were imported by Aquarium Glaser in the second

week of January 2012. The fishes were initially maintained for a week in a 15-liter photographic aquarium with relatively soft water (8°dGH) at pH 7 and a temperature of 22-24 °C, where they settled in well. The photographic aquarium was fairly strongly filtered to keep the water free of suspended particles. A submersible pump with a turnover of 40 liters/hour powered the filter. The little fishes tolerated this strong current without problem, but were very nervous in the clear water. They are best not exposed to strong current in the long term.

When the photographic work was finished the fishes were moved to a small 30 x 20 x 20 cm) aquarium filled with the readily available rain water, matured in a small garden pond. A number of Alder (*Alnus glutinosa*) cones colored the water in this aquarium deep brown. The aquarium wasn't filtered, and the water temperature was around 28 °C. The fishes were fed exclusive with live *Artemia nauplii*. Stomach-contents investigations performed by Matthes in the field showed that *Congopanchax* feed on Cladocera, copepods, and the tiniest of insect larvae.

The deep brown water has the advantage that the fishes feel more secure; the humic

substances from the Alder cones have a slight bactericidal and fungicidal effect, and the development of the light-hungry *Piscinoodinium* is at least limited.

Dieter Bork succeeded in breeding these fishes in the 1990s. He placed them in a group (16 individuals) in a 30-liter aquarium at 27 °C, with soft water (conductivity 200µS/cm) and a pH of 6.8, with a piece of bogwood covered in Java Moss as a spawning substrate. The little fishes proved very productive (more than 100 fry after 14 days), but the young grew very slowly and took 7-12 months to reach adulthood.

Lexicon

Lampeyes

Aplocheilichthys:

means "Fish with simple lips"

Poropanchax:

means "Panchax with pores", referring to pores on the head region; Panchax is the name of another killifish genus.

Congopanchax:

means "Panchax from the Congo"

myersi:

name in honor of the ichthyologist George Sprague Myers (1905–1985)

brichardi:

name in honor of the collector and exporter Pierre Brichard (1921-1990)

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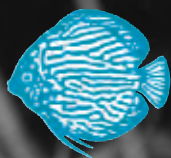
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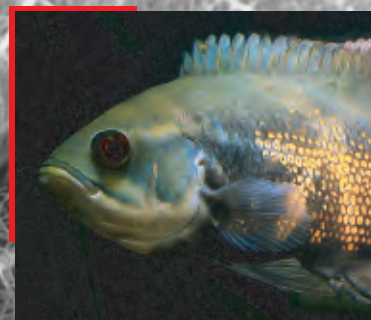
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Dwarf fish

Tytocharax cochui

by Klaus Diehl

In 1949 W. LADIGES introduced a new dwarf characin in the hobby magazine *Wochenschrift für Aquarien- und Terrarienkunde* under the heading "Drei unbestimmte Neuheiten" (Three unidentified new species). A year later he formally scientifically described the species as *Microbrycon cochui*.

Unusual discovery

The specimens on which the description was based were found in a consignment of ornamental fishes at the then world-famous import business Aquarium Hamburg, where Ladiges, who later worked as an ichthyologist at the Hamburg Zoological Museum, was working at the time. That is nothing particularly unusual in itself. Lots of small fishes from the tropics have the ornamental fish trade to thank for their discovery. But in this case matters were somewhat different, as Aquarium Hamburg was actually importing South American Leaf-fishes (*Monocirrhus polyacanthus*) from Peru. Because in those days ornamental fishes were still imported via steam ship, they had been in transit for several weeks. So that the delicate predators wouldn't come to grief during transportation, the exporter had packed small food fishes with them in the cans. And those were the new dwarf characins! It would appear that the leaf-fishes were a bit sea-sick and didn't have much of an appetite; otherwise who knows when *Tytocharax*

cochui would have been discovered!

On investigation it was found that the few specimens imported originated from the vicinity of Ramon Castilla (Loreto Province, 4°14'S, 69° 58' W). Ladiges initially handed them over to the well-known expert E. Roloff



to try and breed; he was promptly successful, as he reported in the December 1949 issue of the same magazine as first announced the importation.

Caudal-fin glands

Nowadays it is easy to underestimate how many fish species were already being maintained and bred in the aquarium in Europe prior to the Second World War. The



Adult (= full-grown) male *Tytocharax cochui*.

All photos: Frank Schäfer

Female *Tytocharax cochui*.



same applied back then as today: practically everything that humanity knew about the biology of small fishes was derived from the observations of aquarists. Naturally the onset of war placed massive limitations on the aquarium hobby just as it did on all other human cultural activities, but people did the best they could.

A number of species of tetras are known from southern South America that exhibit quite atypical, aberrant reproductive biology in the aquarium. These fishes have modified scales at the base of the caudal fin that perform the function of glands; in other words, they are able to release substances.



The precise biological significance remains unknown to the present day, but it is known that the substances released play some role or other in breeding, as only the males possess these caudal glands.

We know a certain amount more: these tetras practice internal fertilization. The females are able to lay fertilized eggs even in the absence of a male. And that is precisely what Roloff observed: the females of the then still nameless dwarf characin, which grows to only around 2 cm long, laid their eggs on the undersides of leaves, something with which he was already familiar from the subfamily Glandulocaudinae, as this group of tetras were all classified in Roloff's and Ladiges' day; nowadays two subfamilies are recognized, the Glandulocaudinae and the Stevardiinae. Both belong to the family Characidae.

Tyttocharax

The genus *Microbrycon*, to which Ladiges originally assigned the new dwarf tetra, is now regarded as a synonym of *Pterobrycon*, another genus of tetras with tail glands, in

which males have two enlarged, spoon-like body scales with which they maneuver their sperm into the female via an acrobatic performance.

The genus *Tyttocharax* was erected in 1913 by Fowler for his new species *T. madeirae*. In 1958 Boehlke described two further species in the genus, *T. atopodus* and *T. rhinodus*, both from Peru, which are today assigned to the genus *Scopaeocharax*. And finally, Weitzman & Ortega described what is currently the last *Tyttocharax* species, *Tyttocharax tambopataensis*, in 1995.

The three currently still valid species remaining in *Tyttocharax* can be distinguished relatively easily using the following key:

1a. Adipose fin present...2

1b. Adipose fin absent.....*T. tambopataensis*

2a. Unpaired fins transparent or with a white edge.....*T. cochui*

2b. Unpaired fins with dark markings.....*T. madeirae*

All three species are imported occasionally,



Tyttocharax tambopataensis, female

and those pictured here were all imported to Germany by Aquarium Glaser in 2011. Because they look rather similar – they are, after all, tiny and constantly moving around, so that you need either a very well lit aquarium or a photo in order to be able to see the differences – they are sometimes imported mixed together, at least in the case of *T. cochui* and *T. tambopataensis*, although the species don't occur together in the wild. The mixing takes place at the exporter's. It is a real chore for the importer to sort the two species out again.

Tyttocharax in the aquarium

Despite their small size – as already

Two competing males of *Tyttocharax tambopataensis*.





The first *Tyttocharax cochui* arrived as food fishes for leaf-fishes in 1949.

mentioned several times, they grow to only 2-3 cm long – all *Tyttocharax* species are easy to maintain in the aquarium. They are robust little fishes that can generally also be maintained in the company of other peaceful species. If you decide to keep them in a species aquarium, then it shouldn't be too small, as these tetras are extremely lively fishes that require space in order to display their natural behavior.

Tyttocharax are very peaceful and leave aquatic vegetation completely alone. These fishes will accept all the usual fish foods of suitable size, generally including dried foods as well. The water in the natural habitat is soft and slightly acid, while in the aquarium *Tyttocharax* have proved undemanding in this respect, as long as the water parameters

avoid extremes. Water with a hardness of 5-20 °dGH and a pH of 6.5 – 7.5 is very suitable, although neither hardness nor pH should fluctuate on a regular basis.

These tetras are shoaling fishes or – more accurately – social fishes. They are only rarely seen swimming in regular shoals. But there is always something going on in an aquarium with *Tyttocharax*, as these little fishes chase one another and display constantly. If you decide to keep *Tyttocharax* then you should obtain no fewer than 10, better 20 individuals. These tetras are uninteresting if kept singly or in too small a group.

Breeding

As already mentioned, Roloff spawned the

Tyttocharax madeirae can be recognized by the dark tips to the unpaired fins.



Lexicon

Tyttocharax cochui

Microbrycon:

means "tiny Brycon"; Brycon is another tetra genus.

Pterobrycon:

means "winged Brycon"

Tyttocharax:

means "small Charax"; Charax is another tetra genus

cochui: name in honor of the exporter Fred Cochui of Paramount Aquarium

madeirae:

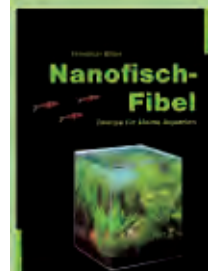
means "of the (Rio) Madeira", the type locality

tambopatensis: means "of the Tambopata (River)"

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first *Tyttocharax cochui* imported. However detailed breeding reports are lacking to the present day. These little fishes practice internal fertilization, but the details of how they go about it is something only the aquarists of the world can find out. When attempting to breed them it is important that plants are available, so that the females can lay their eggs on the undersides of the leaves. *Ludwigia* and similar plants that grow up to the water's surface are particularly suitable for the purpose, as *Tyttocharax* are reluctant to leave the upper third of the water column. It is also wise to use soft water with a pH of around 6 for breeding.

Nicht suchen, finden!

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Evergreens

A Goldfish is a Goldfish...or is it?

by John Dawes

To many fish lovers, the goldfish is a brightly coloured fish which is active, but peaceful, is about 5cm long and has a simple, streamlined body shape with large friendly-looking eyes.

Yet, the common goldfish that everyone knows is, despite its basic finnage and body shape, at least one step removed from the 'real' goldfish.

The natural coloration of the wild goldfish is olive-brown. Other colours may be found in some lowland river locations, small lakes, and backwaters, but these are thought to be the result of introductions of domesticated varieties (although colour variations do exist in true wild stocks).

The two best known goldfish relatives are the gibel or Prussian carp (*C. gibelio*) and the crucian or bronze carp (*C. carassius*).

The goldfish and the gibel carp were once believed to be so closely related as to be subspecies, i.e. *C. auratus auratus* and *C. auratus gibelio*.

The goldfish is native to China, central Asia, Japan and certain parts of Siberia, while the gibel carp, although also found in western Siberia, is usually reported as being a mainly eastern European fish. The two may be told apart by slight anatomical differences such as the size of



the head relative to the body (smaller in the gibel carp), numbers of gill rakers (35-46 in the goldfish and 39-50 in the gibel carp), fin rays and lateral line scale counts. However, the virtually worldwide introduction of the goldfish into natural bodies of water often clouds the true distribution and nature of many of the populations found in the wild.

The other widely distributed European carp which shares certain similarities with both the goldfish and the gibel carp i.e. the bronze or crucian carp, is also olive-brown, but has a considerably deeper body, a convex outline to its dorsal fin, grows to a larger size – up to 64cm (max), compared to 48cm and 45cm (max) for the other two, respectively – and has

Wild colored Goldfish, *Carassius auratus*

All photos: Frank Schäfer





Prussian Carp, *Carassius gibelio*, from Germany

different fin ray and gill raker counts.

When the gibel carp became recognised as a species in its own right, i.e. *C. gibelio*, most people then assumed that the goldfish, too, was a full species, i.e. *C. auratus*. However, the situation is not quite as straightforward as this.

The wide distribution of the goldfish, along with its in-built 'plasticity', which results in slightly different forms depending on location and conditions, has resulted in numerous 'species' and 'subspecies' being described over the years. In fact, by 1945, there were 42 different official descriptions of the goldfish and goldfish-type fishes! Since then, these have been systematically reduced to just four species, one of which, *C. auratus*, is subdivided into five subspecies.

If this latest trend is correct...and if we feel able to accept it and want to be really up to date...we should therefore be

recognising the common goldfish as a subspecies: *C. auratus auratus*.

The full current FishBase listing for *Carassius* is:

C. auratus argenteaphthalmus (No common name)

C. auratus auratus (Goldfish, Kin-buna*)

C. auratus buergeri

Crucian Carp, *Carassius carassius* (population from Görlitz, Germany)





(Naga-buna*)

C. auratus grandoculis

(Nigoro-buna*)

C. auratus langsdorfii

(Gin-buna*)

C. carassius (Crucian or

Bronze Carp)

C. cuvieri (Japanese or

White Crucian Carp)

C. gibelio (Gibel or

Prussian Carp)

The names indicated by an asterisk (*) are the Japanese names for these fish. With the exception of the goldfish, these asterisked subspecies have almost exclusively Japanese distributions and are little-known, even within Japan itself. One, *C. auratus grandoculis*, has a particularly restricted distribution, occurring only in Lake Biwa. *C. auratus argenteophthalmus*, the most recently described subspecies (Nguyen, 2001), comes from Viet Nam and is even more poorly known.

The only subspecies of *C. auratus* that most of us are ever likely to encounter is the common goldfish, which we'll

Plain Goldfish of the modern "Super Red" strain.

Lexicon

Goldfish

Carassius:
name used for this fish in ancient Rome.

auratus:
means "golden".

buergeri: name in honor of Heinrich Bürger (1804-1858)

grandoculis: means "with large eyes"

langsdorfii: name in honor of Georg Heinrich von Langsdorff (1774-1852)

cuvieri: name in honor of Georges Chrétien Léopold Dagobert Cuvier (1769-1832)

gibelio: from the German popular name

argenteophthalmus: means "with silver eyes"

undoubtedly continue to refer to as we've always done i.e. as *Carassius auratus*.

One thing we are most unlikely to do, at least, in Europe, is to use any common name other than 'the goldfish'...not like the Malaysians who also refer to *C. auratus* as the edible goldfish...or the

Kazakhstanis who, confusingly, call it the gibel carp(!)...or the Taiwanese who label it (even more confusingly) as the golden crucian carp!

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Plants

A livebearing waterlily

by Sarah Nieten

Waterlilies are fabulous plants that have long stimulated the imagination of humans. This is also reflected in the scientific genus name *Nymphaea*. Nymphs were minor deities in the mythology of ancient Greece and Rome, spirits of Nature that were often helpful to humans. Unlike the Gods they were regarded as mortal.

According to mythology, the first waterlily sprang from the dead body of a nymph who died of jealousy towards Hercules.

Waterlilies in the pond and the aquarium

Although waterlilies are very common in the wild and their gorgeous flowers have long fascinated humans, they entered cultivation comparatively late on. It was probably the winter-hardy European White Waterlily, *Nymphaea alba*, widespread in Europe, Asia, and northern Africa, that was first cultivated in garden ponds. Not until

around 1800 were other species also recognized as being suitable as garden plants, and around the middle of the 19th century greenhouses for the cultivation of waterlilies sprang up all over Europe so that people could grow and exhibit the sensational *Victoria regia*, the Giant Waterlily. At the same time people began to experiment with crossing species, and every year colorful new hybrids appeared on the market. Probably nobody knows precisely how many cultivars there are in existence nowadays, but it must be well over 600. There are 40 species in the wild.

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It wasn't until much later that waterlilies were discovered as aquarium plants. Even Albert Wendt wrote in his classic work *Die Aquarienpflanzen in Wort und Bild* (Aquarium plants in words and pictures) (1952-1955) that little pleasure was to be had from waterlilies in the aquarium, as they grew far too large, needed a lot of light, and the rich substrate required for their optimal development

The adventitious plantlets of *Nymphaea x daubenyana* flower readily even though they have hardly any leaves of their own.

all photos: Frank Schäfer





couldn't be used in the aquarium because of concerns for the fishes (in those days the growing medium used for waterlilies was a mixture of sand, old loam, and compost, with some well-rotted cow dung added, and the whole well matured - lovely!).

It wasn't until the late 1960s that the Tiger Lotus (*Nymphaea lotus*) became a regular aquarium plant in the tanks of enthusiasts, to become a standard thereafter. This plant owes its success in the aquarium hobby to a rethink by aquarists. Previously people had tried to grow waterlilies in a natural manner, that is with floating leaves, in order to enjoy their splendid flowers. But we learned from the Tiger Lotus that it is possible to exploit the ecological flexibility of some species and cultivate them entirely under water (= submerge). Grown in this way, some waterlilies are truly splendid underwater plants, although it is necessary to promptly prune away the floating leaves that appear from time to time, as otherwise the underwater leaves will die off.

The origins of *Nymphaea x daubenyana*

The precise history of the origins of this



Very small plantlet that is nevertheless already producing flower buds.

attractive waterlily is unknown, but the aforementioned Albert Wendt states that it was a Professor Caspary in Königsberg (now Kaliningrad, Russia) who first crossed the species *N. micracantha* and *N. coerulea* and thus produced the plants discussed here. Professor Daubeny in Oxford is said to have subsequently repeated the cross.

While this waterlily was initially marketed in Germany as *Nymphaea stellata prolifera hortorum*, before very long the horticultural name *Nymphaea Daubenyana* prevailed. In the past species that were named after people were spelled with a capital letter. Nowadays the plant is generally known as *Nymphaea x*

Splendid large specimens of *Nymphaea x daubenyana* in the heated waterlily pond at the Wilhelma in Stuttgart, Germany.





Lexicon

Waterlilies

Nymphaea:

nymph, see introduction.

alba:

means "white"

daubenyana:

after Professor Daubeny

micracantha:

means "small thorns"

coerulea:

means "blue"

stellata:

means "star-like"

prolifera:

means "producing young"

hortorum:

derived from "hortus", meaning

garden; the genitive plural

hortorum (= "of gardens") is used as

a suffix for plants that do not occur

in the wild but only in horticulture.

Victoria: name in honor of Queen

Victoria (1840-1901)

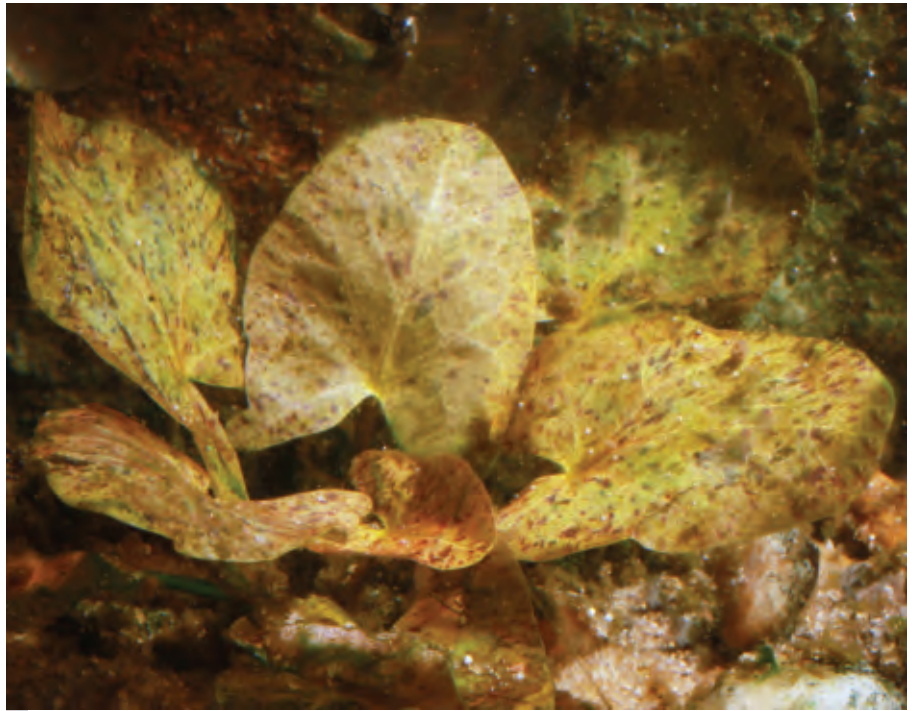
regia: means "royal" or "magnificent"

lotus: a legendary plant in ancient

Greek mythology, whose fruit

induced forgetfulness.

daubenyana, with the "x" signifying that it is a cross (= hybrid), and not a natural species.



N. x daubenyana is also a gorgeous underwater plant in the aquarium.

Culture

The most fascinating thing about this waterlily is undoubtedly that, like its parent *N. micracantha*, it forms adventitious plantlets at the base of the leaves. When the plant is grown outdoors these also flower abundantly, albeit in a Bonsai format. But this waterlily is also a splendid plant in the

aquarium, and its delicate underwater leaves produce a very decorative effect. Even when grown submerge it forms young plants on the leaves. This waterlily requires soft to medium-hard water, a pH in the acid to neutral range, lots of light, and iron fertilizer, and appreciates the addition of CO₂. This plant isn't winter-hardy outdoors in Germany.

Free-flowering young plant. The blue tips of the petals are inherited from one of the parent species, *N. coerulea*.





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Marines

Very different sexes – wrasses

by Matthias Reising

The wrasses (Labridae) are a very successful family of fishes, with more than 500 species. They are exclusively marine; a number of species occur in brackish water but none lives there permanently. And wrasses have a third sex...

Almost all wrasses have several color phases that look extremely different and have frequently led to males, females, and juveniles being scientifically described as different species. The entire family is thus very difficult to classify and we are still a long way from really understanding the wrasses.

Three sexes?

Obviously there are fundamentally only two sexes: male and female. One can choose to speak of functional hermaphrodites, that is animals that produce both eggs and sperm simultaneously, as a third sex; but that isn't what is meant here and it is also

fairly rare in fishes (there are some, however, for example among the grouper family, the Serranidae). No, matters are quite different with wrasses; in their case sex is genetically determined right from the start, so that there are individuals that are males from the time of hatching, and others that are females. This isn't apparent though, as males and females look the same as juveniles. But, juveniles also often look very different to adults! So we can straightaway check off the first color phase, the juvenile phase.

With the onset of sexual maturity juveniles develop into primary males and



Paracheilinus carpenteri, male



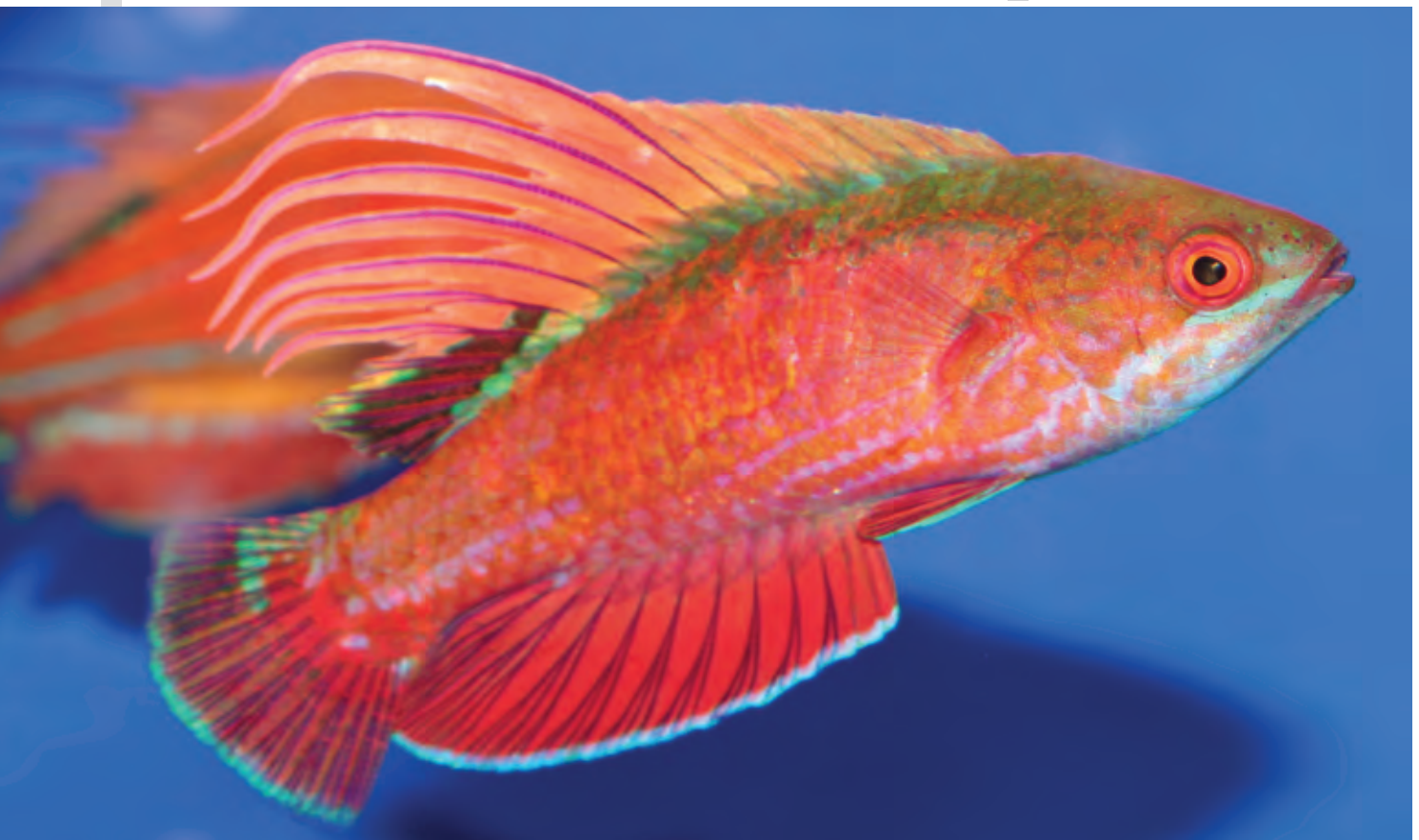
Paracheilinus carpenteri, female

primary females. Again both very often look very different and the color change from juvenile to sexually active fish also



Paracheilinus filamentosus, female

Paracheilinus filamentosus, male. The majority of species of this genus grow to around 8 cm long.





Lexicon

Wrasses

Paracheilinus: means "close to Cheilinus"; Cheilinus is another wrasse genus

filamentosus: means "with filaments"

carpenteri: name in honor of Dr. Kent E. Carpenter of the Old Dominion University

Macropharyngodon: means "with large pharyngeal teeth"

bipartitus: means "divided into two parts"

Pseudojuloides: means "false Juloides"; Juloides is another genus

severnsi: name in honor of Mike Severns

Wetmorella: name in honor of Dr. Alexander Wetmore, at the time Assistant Secretary, United States National Museum

nigropinnata: means "black-finned"

Novaculichthys: means "Novacula (-like) fish"; Novacula is another genus

macrolepidotus: means "with large scales"

Amphiprion: means "with serrations on both sides"; referring to the serrated opercula.



takes a certain amount of time, so that it really takes a lot of experience to identify the species correctly at some stages of the transformation. But the story of the wrasses doesn't end with this first change of coloration. They are also capable of changing sex! More precisely: females have this capability. Fishes that start life as females and end up as males are termed "protogynous hermaphrodites". The reverse situation also exists, namely fishes that begin as males and change into females. These are known as "protandrous hermaphrodites"; a well-known example of protandrous hermaphroditism is the clown- or anemonefishes of the genus *Amphiprion*.

But back to the wrasses! Males that develop from females are termed "secondary males", and once again they look different to the juveniles, primary males, and females – so we really can justify speaking of a third sex.



Macropharyngodon bipartitus, male

But not all wrasses are subject to this complex change of coloration. In some species no sexual dichromatism is known at all, and in others it is only slight. The observation of wrasses in the aquarium may help answer many open questions on this subject.



Macropharyngodon bipartitus, female

Males of the only rarely imported *Pseudojuloides severnsi*.

all photos: Frank Schäfer





Wetmorella nigropinnata is a dwarf species (around 5 cm) with no sexual dichromatism

Wrasses in the aquarium

The majority of wrasses are not particularly demanding aquarium fishes. Many are very popular with reef aquarists, as they are active and colorful, not very susceptible to parasitic diseases, leave the majority of sessile invertebrates (corals, etc) in peace, and devour the bristleworms (Polychaeta) that often become a real nuisance in the reef aquarium. However, it is very important that the aquarium in which wrasses are to live should contain an area with an adequate depth of substrate (at least 5 cm) consisting of relatively fine gravel or sand, as wrasses bury themselves at night

and when upset. Newly-introduced wrasses may well disappear for a few days; this is perfectly normal and no cause for concern.

When it comes to feeding, wrasses present few problems. They are relatively unspecialized feeders that eat small organisms, and will happily take the usual varieties of frozen foods. Once they have settled in they will usually also take flake food and granules. The gorgeous open-water *Paracheilinus* species should be fed several times daily, and an automated feeder can be useful here.

Wrasses are usually peaceful towards other fish species, but will establish an order of rank among themselves. It is always wise to obtain several individuals of a species right from the start and introduce them all at the same time. Conspecifics added later often have a hard time of it.

If you are now filled with the desire to keep wrasses then your pet dealer can undoubtedly order them for you from a

Buchtipp !

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Unfortunately the Emerald Wrasse (*Novaculichthys macrolepidotus*) is only rarely imported. Females have more red color on the belly region.



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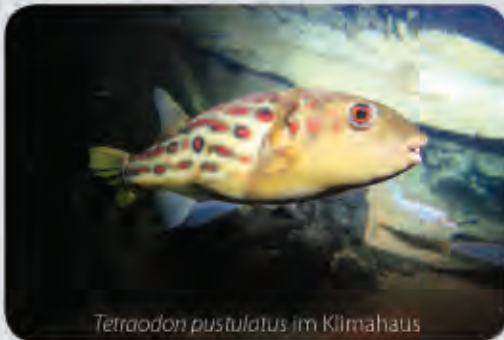
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Mit einem Kongress zur Süßwasser-Aquaristik richtet sich die Bremerhavener Besucherattraktion erstmalig an ein aquaristisches Publikum. Am 21. und 22. April 2012 beleuchten Experten das Thema „Gefährdung aquatischer Lebensräume – Nachhaltigkeit und Aquaristik“ im Klimahaus®.

Der Kongress bietet Hobby-Aquarianern und Experten die Gelegenheit, sich auszutauschen und Fachwissen zu vertiefen. In Vorträgen informieren insgesamt 13 Referenten, darunter bekannte Autoren wie Friedrich Bitter, Gerhard Ott, Frank Schäfer und Rainer Stawikowski, über die Zierfisch- und Crustaceen-Zucht im In- und Ausland. Eindrucksvolles Bildmaterial der Biotope vieler Fisch- und Krebsarten sowie Erfahrungen aus Reisen in die Ursprungsländer der Aquarientiere untermalen die Vorträge der Referenten.

Im Klimahaus® werden einige dieser Biotope nachgestellt, wie die Flusslandschaft in der Reisesation Kamerun. Alle Aquarien und Terrarien weisen eine naturnahe Einrichtung und einen authentischen Besatz auf. Die Wissens- und Erlebniswelt bietet auch Führungen hinter die Kulissen der Aquaristik und Terraristik an.

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— Knowledge makes all the difference



Garden pond

The Chinese Highfin Banded Shark - mysterious and beautiful

by Wolfgang Löll

The alert visitor to aquarium stores will regularly encounter a uniquely beautiful fish labeled *Myxocyprinus asiaticus* or the Chinese Highfin Banded Shark. But there is hardly any information at all on these unique creatures in the aquarium hobby literature.....

First and foremost: *Myxocyprinus* isn't a member of the carp family (Cyprinidae), but is instead a member of the family Catostomidae (popular name suckers). This in turn is misleading, as the Catostomidae are a sister group to the loaches (there are several families among

the loaches and to list them all here would be going too far) and thus only very distantly related to the carps.

Lots of friends, a Russian and a Chinese

The Catostomidae currently contains around 13 genera with a total of 68-80

Info

A gigantic Chinese Highfin Banded Shark

On the Internet at http://english.peopledaily.com.cn/200705/10/eng20070510_373479.html# there are photos of a full-grown male *Myxocyprinus asiaticus*. This fish originated from the Jialing River, and was caught at Langzhong in the south-west of the province of Sichuan (Szechuan). Unfortunately we were unable to obtain permission to reproduce the photos and hence cannot display them here. The largest Chinese Highfin Banded Shark measured to date was 125.9 cm long and weighed 45.86 pounds.

species (the sources contradict one another). Apart from one species they are all found in North America (seen from an

Chinese Highfin Banded Sharks, *Myxocyprinus asiaticus*, are already very attractive as juveniles.

All photos: Frank Schäfer





A specimen of *Myxocyprinus asiaticus* about 8 cm long.

apolitical viewpoint, that is including Canada) with outliers in Mexico and northern Siberia. And that one species is our *Myxocyprinus asiaticus*. The second species with a foothold on Asian soil (in north-eastern Siberia) is *Catostomus catostomus*, which has several subspecies and is found partly in North America, partly in Asia, and thus must have come into being at a time when the Bering Straits were still land with freshwater rivers and not, as today, an icy strip of water around 85 km wide.

The natural distribution of *Myxocyprinus asiaticus* lies in western China, where it is found in the Yangtze river system.

Only one species?

Myxocyprinus asiaticus was described in 1864 by Bleeker, under the name *Carpiodes*

asiaticus. In 1872 Dabry de Thiersant described a second species, *C. chinensis*. The genus name *Carpiodes* is now used only for American species. The genus *Myxocyprinus* was erected in 1878. In 1889 Günther described the species *Sclerognathus chinensis*, which Nichols (1925) regarded as conspecific with *Carpiodes chinensis*, but distinct from *C. asiaticus* at subspecies level. Nichols described a third subspecies, *Myxocyprinus asiaticus fukiensis*, and in 1929 Tchang added a fourth subspecies, *M. a. nankinensis*. Thus there are at least four formally described subspecies, but there has been no recent revision of the genus *Myxocyprinus*. The specimens available in the trade are all captive-bred.

An endangered species

Unfortunately the situation regarding the natural occurrence of *Myxocyprinus*



Adult specimen, around, 40 cm long.

asiaticus isn't very good. The population in the Minjiang, the most water-rich tributary of the Yangtze, is even regarded as already extinct. This fluviatile fish is exploited by Man because of its size and apparently tasty flesh, but that, like the occasional removal of juveniles for aquarium maintenance, probably doesn't have any significant influence on natural stocks. The most important reasons for the disappearance of



Lexicon

Myxocyprinus asiaticus

Myxocyprinus:

means "slimy carp"

asiaticus:

means "Asian"

chinensis:

means "Chinese"

Carpiodes:

means "carp-like"

Catostomus:

means "with an underslung mouth"

fukiensis, nankinensis: after the type

localities (Fukien and Nankin, respectively).

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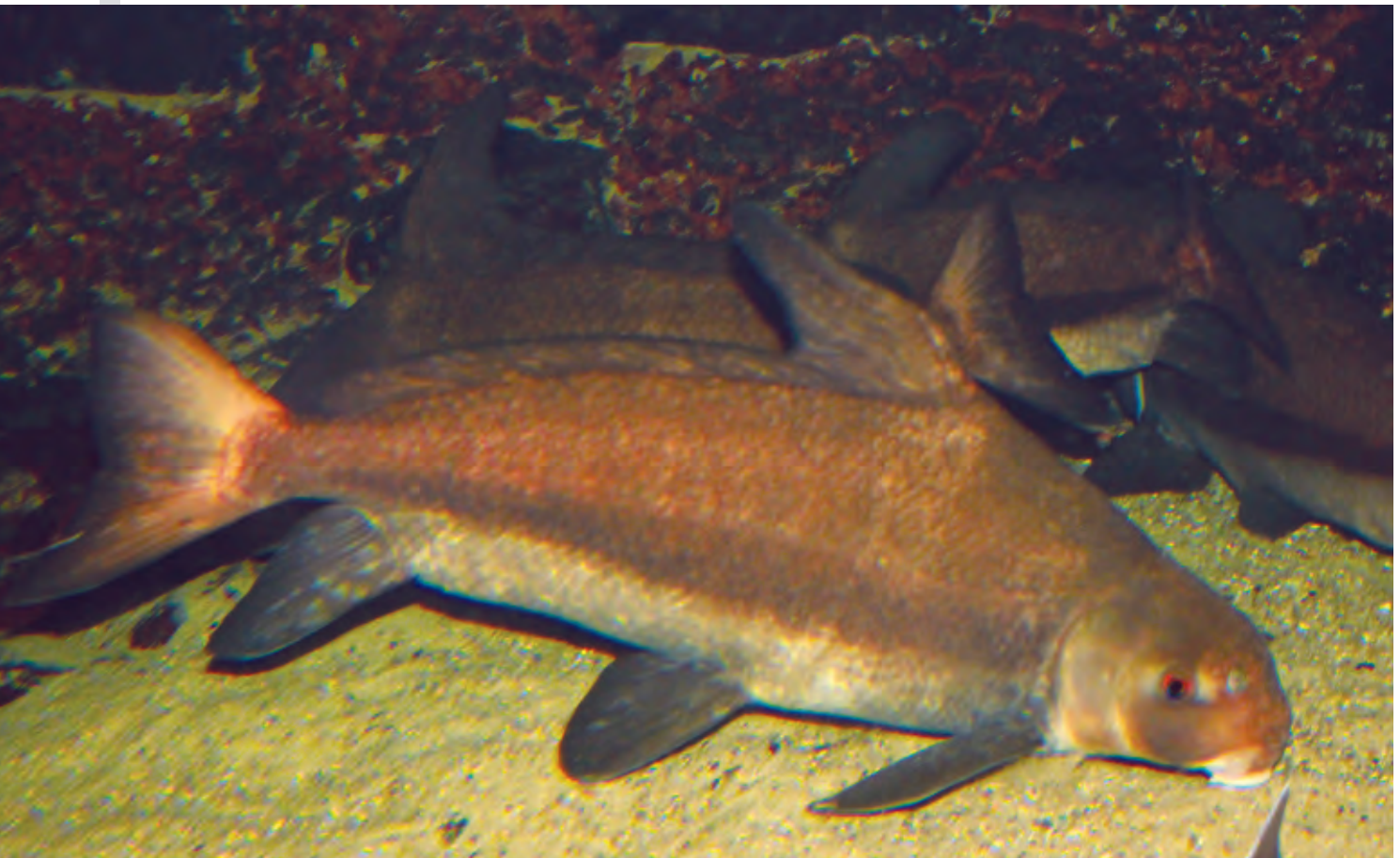
this fish may be the construction of hydro-electric dams, pollution of the water, and other uses of water by humans, as *M. asiaticus* is a migratory fish. In February the

adults migrate to their spawning grounds, shallow places with fast-flowing water, where they spawn from March to April. The adults remain in the spawning areas until autumn and only then migrate back to deeper parts of the rivers to overwinter. The species is protected in China and there are breeding programs designed to support natural populations via the introduction of young fishes.

In the aquarium and pond

Myxocyprinus asiaticus is suitable for aquarium maintenance only when young, as the species usually grows to around 40 cm long. The record is some 125 cm and a weight of 23 kg. The species is a coldwater fish that is completely winter-hardy in central Europe. The water temperature in the aquarium should not exceed 24 °C in the long term, and 16-22 °C is ideal. *Myxocyprinus asiaticus* are sociable fishes that should always be kept in groups of at least three individuals. Larger groups are better if space allows. These fishes are completely peaceful towards both conspecifics and other species.

Myxocyprinus asiaticus are very sociable fishes. This group of adults lives in the Artis Aquarium in Amsterdam.



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Myxocyprinus are very useful in the garden pond, as they will enthusiastically graze algae from the bottom and other surfaces. If you want to keep *Myxocyprinus asiaticus* in the garden pond then they shouldn't be put outside before June, as the fishes available in the trade are captive-bred in tropical Asia, and initially need to adapt slowly to our prevailing cooler water temperatures.



Signierstunde mit Enie auf der AQUA-FISCH

Die bekannte und beliebte Moderatorin Enie van de Meiklokes findet nach einem anstrengenden Arbeitstag im Fernsehstudio Ruhe und Entspannung vor ihren heimischen Aquarien, von denen es vier in ihrer Berliner Wohnung gibt. Seit vielen Jahren ist Enie passionierte Aquarianerin und hatte im Laufe dieser Zeit kuriose Erlebnisse mit ihren Pfléglingen. Die lustigsten



Photo: Dr. Hans-Joachim Berrmann

ten und skurrilsten Geschichten hat Enie van de Meiklokes nun für ihr Erstlingswerk „Enies Aquariengeschichten“ launig, plaudernd und unterhaltsam aufgeschrieben.

Auf der diesjährigen AQUA-FISCH in Friedrichshafen wird Enie am Sonntag, den 11.03.2012 auf dem animalbook und Tetra-Verlag Gemeinschaftsstand (A5-704) eine Signierstunde ihres Buches geben.

Auch die Verlage Ulmer und Kosmos werden hier offiziell durch animalbook vertreten sein.



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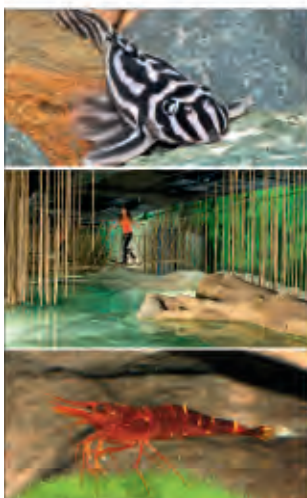
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Freshwater

Rarities from the Congo

by Roman Neunkirchen

The consignment of Congolese fishes that Aquarium Glaser received in January was accompanied by a number of sample specimens. The exporter requested identification and asked whether these fishes were of any interest for the aquarium trade.

The first species was relatively easy to identify:

Neolebias ansorgii

This dainty little characin was a fairly popular aquarium fish in the 1950s and 1960s - according to the literature, at least. Nowadays it is only very rarely seen in the trade. It isn't a very productive breeder, so the small numbers of offspring are normally bought directly from the breeder.

The species is comparatively widespread in Central Africa. It has been reported from Angola, Benin, Nigeria, Cameroon, Gabon, and the D. R. Congo. However, it would appear that this little fish (around 2.5 - 3 cm long) is commonly overlooked or prefers

habitats where it can't be collected effectively. Otherwise it is difficult to explain why the species so rarely turns up in the trade.

There is also a question mark over whether all fishes determined as *Neolebias ansorgii* actually belong to this species. Depending on the locality, these fishes look very different and it has yet to be clarified what the fish described by Boulenger in 1912, from the Lucula River in Angola, actually looks like in life. The variant or species recently sent as a sample of five specimens exhibits a very attractive, brilliant green lateral stripe. The five specimens have gone to a trusted breeder, but at present it looks as if all of them are males.

The variant of *Neolebias ansorgii* recently imported from the D.R. Congo has very attractive brilliant green flanks.

All photos: Frank Schäfer



These dwarfs, which aren't particularly delicate, are best maintained in a small species tank. In the company of larger and livelier fishes they become timid and pale, as also happens in brightly lit aquaria. So, muted light, dark substrate (peat fiber), soft water, pH 6.0-6.5, and a temperature around 24 °C. You should then get a lot of pleasure from these charming little fishes, which will eat all the usual fish foods of appropriate size.

The second species is one of the few freshwater gobies found in Africa:

Awaous lateristriga

This goby grows to around 25 cm long, and is thus one of the larger species. It is very widely distributed in West Africa and also found on numerous islands. When adult these fishes live almost exclusively in fresh





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water, and are only occasionally reported from brackish regions as well. The wide distribution and the occurrence on islands can be explained by the fact that the tiny larvae of the species develop in the sea and drift long distances with the marine currents. This specialized reproductive biology makes breeding in the aquarium very difficult, as we lack suitable food organisms with which to feed the larvae during their marine phase.

Even so, reports of successful breeding are published occasionally. The following data relate to the related species *A. flavus* from South America, which is so attractive that aquarists have already attempted to breed it. These gobies are cave-spawners, and the very underdeveloped larvae hatch after only around 12-13 hours. At this time their eyes are hardly developed at all and they float through the water in a typical head-down position. After four to five days they assume a horizontal swimming position, the eyes are now fully developed, and the little fishes can begin to take food. At this point they must without fail be transferred to full-strength sea water, as otherwise they will inevitably die. Maintenance of the larvae is possible at a salinity of 1.018 upwards. The larvae can be transferred straight from fresh to sea water without fear of them being harmed.

The maintenance of the larvae in sea water should continue for up to 20 days. During this period the larvae grew and apparently took food, though it wasn't entirely clear exactly what they are eating. They were given rotifers (*Brachionus*); cultures for breeding such rotifers can be obtained from

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specialist aquarium dealers. The rotifers were fed on micro-algae in the rearing aquarium. Hence it is conceivable that the goby larvae also consumed the algae or unidentified ciliates that developed. For further details see the very interesting report by Naomi Delventhal at http://gobiidae.com/breeding_awaous.htm.

But even if you don't breed them, these fishes are very interesting to maintain in the aquarium as, like all gobies, they exhibit a wide spectrum of behavior. When maintaining them it is important to provide a substrate of fine sand, which the fishes will sift with great enthusiasm for food particles. Water parameters are of subordinate importance, though the temperature should be in the 22-26 °C range. These fishes have large appetites and will take all the usual foods. *A. lateristriga* are peaceful among themselves and towards other fish species.

Awaous lateristriga is a beautiful African freshwater goby.





Lexicon

Rare Congo fishes

Neolebias:

means "new Lebias"; Lebias is another fish genus.

ansorgii:

name in honor of William John Ansorge (1850-1913)

Awaous:

after the local name on Tahiti for the species *A. ocellaris*

lateristriga:

means "laterally striped"

Nanochromis: means "small cichlid";

Chromis is a marine genus that formerly included some cichlid species, and the name is still used as a suffix meaning "cichlid"

teugelsi: name in honor of Guy G.

Teugels (1954-2003), former Curator of Fishes at the Africa Museum in Tervuren (Belgium).

The final sample species was a splendid dwarf cichlid:

Nanochromis teugelsi

This gorgeous species has been known in the hobby for some time. It was initially named *Nanochromis* sp. "Kasai" after the

Only a few days after importation the male began to court. The dark spot in the dorsal fin is very typical of the species *Nanochromis teugelsi*.

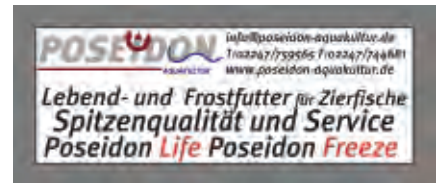


Both sexes of *N. teugelsi* have green-blue on the anterior dorsum (female in front).

locality where it was found, until it was eventually described in 2006 by Lamboj and Schelly and given the scientifically valid name *N. teugelsi*.

This dwarf cichlid was first discovered in the year 2000 and exported as an ornamental fish. The one to three black dots in the soft-rayed part of the dorsal fin, visible in the majority of individuals, are very characteristic of the species. Males grow up to 8 cm long, females remain significantly smaller.

Like all *Nanochromis* species this is a biparental cave brooder, with the females mainly guarding the eggs and fry and the males chiefly defending the territory. Soft, acid water with a low germ count is required for both maintenance and breeding.



Messe

Das 4. Internationale Garnelenchampionat

165 Wettbewerbsaquarien, 90 Aquarien mit Wirbellosen in der Rahmenshow, eine internationale Jury mit Juroren aus sechs Nationen und viele freiwillige Helfer, die für einen reibungslosen Ablauf sorgten – das waren die Garanten für eine rundherum gelungene Veranstaltung.

Unter der Federführung des Dähne Verlags mit der Zeitschrift *caridina* und dem Arbeitskreis Wirbellose in Binnengewässern (AKWB) waren auch die äußeren Umstände wieder nahezu perfekt: Keine Wassertrübung erschwerte die Sicht, kein Tier hatte Probleme mit dem Wasser oder der Umgebung.



Photo: Friedrich Bitter



Photo: Friedrich Bitter

Und so konnte auch unter anderem das Fernsehteam vom MDR in Ruhe die kleinen Stars des Championats filmen und Interviews mit zufriedenen Teilnehmern und Veranstaltern machen.

Gegenüber dem Vorjahr gab es eine deutliche Steigerung der Teilnehmerzahl und auch die Internationalität hat sich durch die Einbindung von Botschaftern für die ausländische Wirbellosen-Szene und verstärkte Social-Media-Aktivitäten verbessert.

Ein Garnelenfreund aus Japan, der seine Ausstellungstiere persönlich begleitete, dürfte die weiteste Anreise gehabt haben und konnte sich über einen 1. Preis freuen. Das dürfte ihm Ansporn geben und auch den Ehrgeiz anderer Züchter aus Fernost wecken. Neben attraktiven Siegetrophäen konnten den glücklichen Siegern dank zahlreicher Sponsoren auch wertvolle Sachpreise überreicht werden.

Abgerundet wurde das 4. Internationale Garnelenchampionat von einem interessanten Vortragsprogramm, vielen Gesprächen und der täglichen Verlosung ganzer Aquarienkombinationen.

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Lizards

The Malagasy Giant Chameleon

by Thorsten Holtmann

The huge island of Madagascar off the East African coast is an Eldorado for zoologists. The island, which is the fourth largest in the world, separated off from the ancient continent of Gondwana some 135 million years ago. Since then evolution there has followed a unique course and more than 90% of the Malagasy species are endemic – in other words they occur nowhere else on Earth. There are numerous chameleon species on Madagascar, including the largest chameleon species of them all, the Malagasy Giant Chameleon, *Furcifer oustaleti*.

How large can it grow?

In fact nobody knows precisely. There are rumors of individuals up to a meter long, but the largest specimen measured to date was "only" 68.5 cm in length. But that is total length, ie including the tail.

Distribution

The Malagasy Giant Chameleon is found in the coastal lowlands of Madagascar. It is found all over the island, but its occurrence in the eastern part of Madagascar is linked to the relatively high temperatures there. The species is well-

adapted to the hot savannah climate and hence has benefited from alterations to the landscape resulting from human activity (deforestation).

There is supposedly an introduced population in Kenya (Ngong Forest near Nairobi) and a breeding population also exists in southern Florida.

Malagasy Giant Chameleons and humans

Chameleons are generally regarded as easily upset. They are noted/notorious for some particularly territorial species suffering stress-

induced kidney problems as the result of a conspecific simply being constantly in view (for example if two individuals can see one another in adjacent terrariums), and this can lead to death!

The Malagasy Giant Chameleon is, however, a comparatively calm and peaceful member of the chameleon tribe. Males don't tolerate one another, and gravid females are likewise strictly solitary. But they can generally be kept in pairs in an adequately large terrarium (a winter garden is a lot better in view of the size of these animals).

Malagasy Giant Chameleons also exhibit this laid-back attitude towards humans. They don't get excessively upset even when they are picked up carefully; and the threatening mouth-opening known from many other chameleons is seen in Malagasy Giant Chameleons only if they are seriously provoked. Researchers in the field say that you can usually simply perch a Malagasy Giant Chameleon on your shoulder and it will stay there quietly for hours on end.

The females of *Furcifer oustaleti*, the Malagasy Giant Chameleon, are very attractively colored.

All photos: Frank Schäfer





Lexicon

Malagasy Giant Chameleon

Furcifer:
means "forked"
oustaleti:
name in honor of the zoologist
Émile Oustalet (1844-1905)

Because the Malagasy Giant Chameleon is comparatively common and is also associated with human settlements, the native people like to make use of the greedy appetites of these animals, and place these chameleons in their gardens, where they devour unwanted pests up to the size of a mouse and thereby keep them in check.

However, these positive (from a maintenance viewpoint) characteristics of the Malagasy Giant Chameleon don't alter the fact that these animals can develop a quite remarkable turn of speed when necessary.



The Malagasy Giant Chameleon is a relatively peaceful and sociable species.

Males of the Malagasy Giant Chameleon have a brown or gray base color.



Malagasy Giant Chameleons in the terrarium

All the usual basic rules of chameleon maintenance apply to the Malagasy Giant Chameleon. These include a relatively high food requirement, which is, however, easy to satisfy in the case of the Malagasy Giant Chameleon, as they will take not only all the usual food insects (crickets, grasshoppers, and *Zophabas* beetles, but also baby mice - in the wild they also eat small birds and reptiles. All food insects should always be dusted with one of the usual calcium-vitamin powders available in the trade.

The high requirement for drinking water always makes chameleon maintenance rather time-consuming, as the majority of individuals don't automatically learn to drink from a dish. For this reason they need to be given water via a pipette at least every other day. There are, however, a number of tricks to get round this. Many chameleon-keepers use drop dispensers, which drip water at intervals of 1-2 seconds into a collecting container placed below. This simulates rain water, which the chameleons recognize as such and drink. The most natural way of providing chameleons with water to drink is by spraying, with the reptiles taking the water from plant leaves, etc. But that too is labor-intensive and can also result in the terrarium becoming too wet. A more



elegant method is the installation of an artificial waterfall using a small aquarium pump. However, such systems are somewhat prone to disturbance and the pump may fail – and, following Murphy's Law, invariably at the least convenient time, for example when you are on holiday. A very neat way of setting the water in the drinking dish in motion, and thus making it recognizable as water to the chameleons, is to aerate the dish with one of the standard aquarium air-pumps available in the trade. You simply suspend the airline in the dish and set the air supply to produce around two bubbles per second from the airline. A nice side-effect of this method is that it simultaneously raises the humidity in the terrarium; in the case of the Malagasy Giant Chameleon this should be a relative humidity of around 70% during the day, rising to up to 100% at night.

Because of its natural habits, the Malagasy Giant Chameleon can be classified as one of the easier chameleon species to maintain, as it doesn't immediately react adversely, followed by the onset of illness, if things get

a bit too warm in the terrarium. The daytime temperature should be between 22 and 28 °C, rising to up to 45 °C under the spotlamp. It is, however, essential always to provide these reptiles with a relatively cool, well-ventilated area in the terrarium, to visit when they so choose.

Breeding

Furcifer oustaleti is an egg-laying species. After a gravid period of around six weeks the females lay up to 61 eggs. At an incubation temperature of around 28 °C it takes between 210 and 280 days until the young hatch.

Many breeders use vermiculite as a brood substrate. The young grow very rapidly and attain sexual maturity in as little as a year. All in all, maintenance and breeding are similar to those of the well-known Panther Chameleon, *Furcifer pardalis*.

If you are now filled with the desire to keep these large chameleons then your pet dealer can undoubtedly order them for you from a

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When resting, the Malagasy Giant Chameleon usually curls up its "fifth leg", the prehensile tail.





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Food

Live food in bags

by Henrik Weitkamp

Live food is without any doubt one of the best foods of all. The successful maintenance of some species isn't possible at all without live food, and others require it while settling in - but all fishes love it!

But in no way is this simply to do with the ingredients of the live food. A balanced flake food, carefully produced frozen food, freeze-dried food, and all sorts of other ornamental fish foods generally contain what they say they do and guarantee healthy fishes. But things are somewhat different when it comes to breeding. Thus some fishes won't spawn unless they are given live food. And finally, live food represents genuine variety in the sometimes rather boring everyday lives of our aquarium fishes. Live food awakens the hunting instinct and thus enriches the lives of fishes in captivity. People who keep wild animals refer to this as "environmental enrichment" and the term is very appropriate.

The different live food varieties from Amtra-Groci are sealed in breathable plastic bags and can be kept for around 8-9 days at 6-8 °C.

Obtaining live food

In the old days there were two ways of obtaining live food: the pond and the local aquarium store. The weekly pond excursion was a permanent fixture in the life of the conscientious aquarist, and whenever possible that should still be an option today. But unfortunately it is rarely feasible. As well as legal restrictions there is the problem of lack of time. And many aquarists have no way of storing the food collected for use over the week. In the old days, not surprisingly the local aquarium-store owner went "ponding" just like other aquarists. However, he didn't feed all his catch to his stock, but offered some for sale to those who, for whatever reason, couldn't or wouldn't collect their own. But

those days are long gone.

Nowadays the live food offered in the aquarium trade originates from carefully monitored stocks. The live food sources used by Amtra-Groci are all European and – with the exception of water fleas, where there are sometimes seasonal shortages – can supply top quality live food year-round. And nowadays storage isn't a problem any more either, as the food organisms are hygienically stored in little plastic bags that can be stored in the refrigerator for 8-9 days without problem.

The varieties



Glassworm

1. Glassworms

Zoologically speaking, glassworms are the larvae of phantom midges (family Chaoboridae). Important note: any larvae that are missed by the fishes and develop won't cause any grief to the aquarist and his family, as the midges don't bite and don't suck blood!



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Glassworms are an outstanding live food. It is important to note that these larvae are little predators and hence, for safety's sake, they should not be fed to any fishes with a total length of less than 2 cm. Larger fishes are never attacked or harmed in any other way by glassworms.

Glassworms are a perfect food for bringing barbs, characins, labyrinthfishes, and cichlids into spawning condition.

2. "Jumbo" bloodworms

The midges that develop from bloodworms – chironomid midges (family Chironomidae) – are likewise no threat of



Bloodworm

any kind to humans, as again these midges don't bite and don't suck blood.

The chironomid midges are very species-rich, with more than 5,000 species worldwide and more than 570 species known in Germany. In the wild these midge larvae constitute one of the most important sources of food for wild fishes. Because chironomid larvae are ecologically very adaptable, there is virtually no aquatic environment in which they do not occur. They are absent only from the open sea, but there are species that make their living in tidal pools.

The large "Jumbo" bloodworms represent an excellent treat for larger fishes (upwards of around 5 cm total length). They feed on dead plant particles (mulm) and bacteria, so they represent no danger of any kind to aquarium livestock.

Bloodworms aren't free-swimming like glassworms, but live on and in the substrate, where they construct a type of tube to live in. For this reason bloodworms are also a particularly good food for

bottom-dwelling fishes.

The deep red body color and the jerky mode of swimming of bloodworms are extremely attractive to fishes. Hence these midge larvae are also particularly good for pampering fishes that are poor feeders.

Their filter-feeding behavior also makes it possible to enrich them with water-soluble medications that need to be got into the fishes in order to be effective (in the event of intestinal parasites, for example). In short, bloodworms are an ideal fish food.



Water flea

3. Water fleas

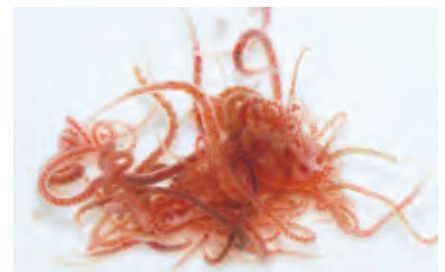
Water fleas (family Daphniidae) are not actually fleas at all. Fleas are insects and live by feeding on blood when adult. Water fleas are crustaceans and feed throughout their lives by filtering micro-organisms from the water. Hence even the fussiest person in the household need have no concerns about these food organisms.

Water fleas are part of the freshwater plankton and live in standing or slow-flowing waters. They are filter-feeders that feed on micro-algae, bacteria, etc. They are very interesting creatures biologically. For the majority of the year they produce live young via parthenogenesis (ie virgin birth). These young are genetically completely identical with their mother, ie so-called clones. Only when the days become shorter, or the water in which the water fleas live threatens to dry up, do males appear. These originate from fertilized eggs and now in their turn inseminate the females, who immediately produce rather large winter eggs. These eggs are very resistant and can even tolerate completely drying-up of the water or freezing. Because these eggs are very light, they can also be blown by the wind, and

in this way water fleas sometimes colonize even tiny bodies of water such as puddles in country lanes and paths, etc.

Water fleas are particularly suitable as food organisms as their jerky, hopping mode of swimming is very good at getting the attention of fishes. The nutritional value of water fleas is rather small, but they are nevertheless an important food, as on the one hand they are very rich in roughage, and on the other they provide predominantly carnivorous fish species with their greens. Because, as already mentioned, water fleas filter micro-algae from the water, their guts are always full of this vitamin-rich supplementary food.

Water fleas are very sensitive to toxins in the water. In the past the "water flea test" was a recognized method in toxicology (the study of poisons). So water fleas are also very suitable for testing whether an aquarium that has, for example, been treated with an "aggressive" medication, can be repopulated with delicate fishes or whether residues of the medication are still present.



Tubifex

4. Tubifex

For a long time *Tubifex* was the only live food that was always available in the pet trade. *Tubifex* or tubificid worms (family Naididae) are annelid worms, and thus distant relatives of the earthworms. *Tubifex* live in the substrate of bodies of water, where they construct tubes from mud and skin secretions (the name *Tubifex* is derived from the Latin words for "tube" and "make"). Here they feed on dead, decaying organic matter.

The red color of *Tubifex* worms comes from haemoglobin, that is, the same blood pigment that we humans also use to bind oxygen. Because haemoglobin binds oxygen very effectively, but the oxygen requirement



of *Tubifex* is very low, these little worms are often found in large numbers in oxygen-depleted waters that are heavily polluted with organic material. Hence it is important to obtain *Tubifex* from carefully monitored populations, as otherwise there is a danger of introducing toxins into the aquarium with them. The danger of *Tubifex*-transmitted parasites (*Myxobolus*), which in Germany affect mainly North American salmonid species (Rainbow Trout, char, etc), is in practice totally insignificant in the aquarium hobby.

Fishes love *Tubifex*! There can be hardly any fish species that can't be persuaded to feed using *Tubifex*. But *Tubifex* are as healthy for many fishes as chocolate is for children. Specifically, these worms are very fatty. Hence *Tubifex* should always be fed only in small quantities as a treat. Too much *Tubifex* can lead to fatty degeneration in the fishes, which become susceptible to disease as a result and eventually die. But this is the fault of the aquarist, not the *Tubifex*.

Tubifex should never be fed to specialized Aufwuchs-feeding cichlids (eg *Tropheus*, the majority of the mbuna from Lake Malawi, etc.), as inevitably these will become seriously ill within a very short time. By

contrast *Tubifex* are indispensable for catfish enthusiasts. It is quite simply impossible to breed mailed catfishes effectively without *Tubifex*.

In the case of *Tubifex*, the pack size is ideal for the aquarist with just one or a small number of tanks, as it makes overfeeding with *Tubifex* well nigh impossible. But note that uneaten *Tubifex* will colonize the substrate and live there, as in the wild. Too many *Tubifex* in the substrate are harmful, as they constitute a not inconsiderable biomass that can significantly reduce the oxygen content in the aquarium water. If you find that a colony of *Tubifex* has become established in the aquarium substrate, then it will suffice to stop feeding until the fishes have dealt with the problem.



Artemia salina

5. *Artemia*

The brine shrimp *Artemia salina* occurs in inland salt waters worldwide. In the wild it

is above all the millions of flamingos that feed on *Artemia*, as fishes cannot survive in the very salty water. But these "prehistoric" crustaceans constitute one of the most important foods in the aquaculture of food fishes and are also indispensable in the aquarium hobby, as their larvae (termed nauplii) are easily hatched from cysts and essential in the rearing of many fry.

Artemia are not dissimilar to water fleas in their biology. They too sometimes reproduce parthenogenetically, sometimes sexually, and produce "eggs" that can be stored for an unlimited time. Again *Artemia* are filter-feeders, just like water fleas. But unlike water fleas, *Artemia* are very nutritious and particularly rich in the much-famed unsaturated fatty acids.

Artemia are a delicacy much appreciated by fishes and the only permanently available live food for marine fishes. Even very fussy feeders, for example some butterflyfishes, weaken and abandon their hunger strike when fed with live *Artemia*.

Artemia live for only a few hours in fresh water. Here they are particularly suitable for feeding very disease-prone fishes, as because of the fact that *Artemia* are bred in salt water, they are free of pathogens of any kind.

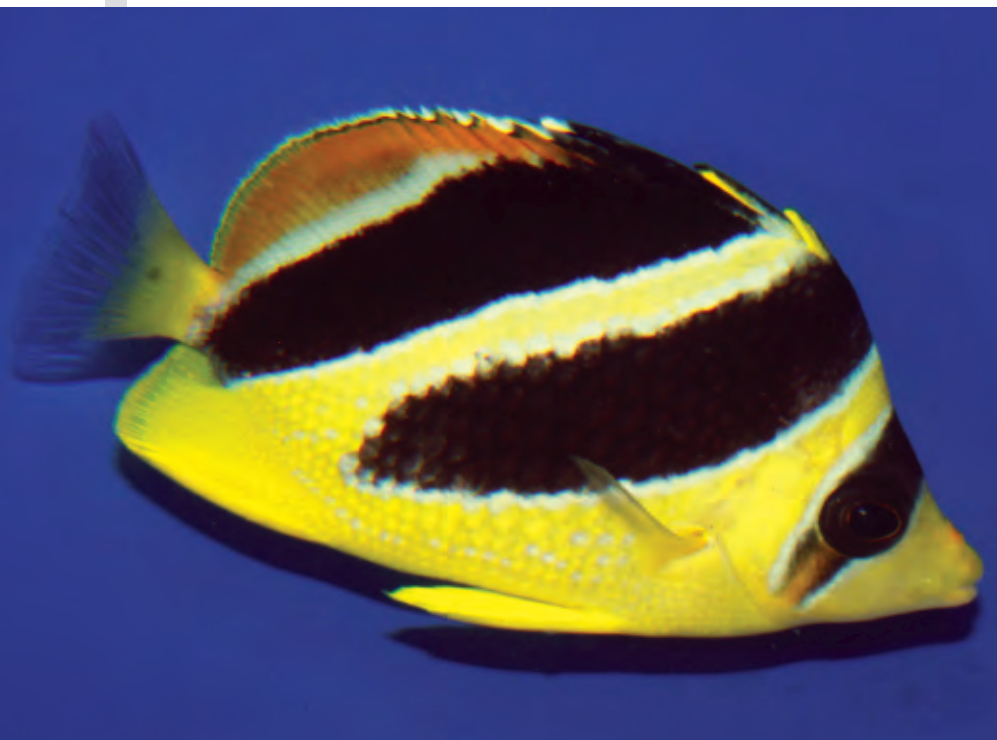
Amtra-Groci offers *Artemia* in two sizes: as nauplii for small fishes and as adult brine shrimps.

The varieties glassworms, bloodworms, water fleas, and *Tubifex* can, obviously, also be fed in salt water, but water fleas die very rapidly in salt water (within a few minutes).

Additional live food varieties will be available shortly, and we will tell you about them here when the time comes.

The live foods in bags described above are available only via the pet trade. Your regular dealer can order them for you from Amtra-Groci GmbH.

Some coral fishes obstinately refuse to accept unfamiliar types of food. Live food is still the best way to break the hunger strike. The photo shows *Chaetodon mitratus*.





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Critters

Colorful creepers for the terrarium

by Sebastian Zimmer

The world of invertebrates is full of fascinating creatures. In this News we present one of the most beautiful praying mantises and a new, as yet unidentified amphibious crab.

The Orchid Mantis

Praying mantises or mantids belong to the insects, the most successful group of animals on our planet. The number of

described insect species is estimated at almost a million and new species are constantly being discovered and described. The mantids constitute only a comparatively

Female Orchid Mantis (L5). Imagines have fully developed wings.

All photos: Frank Schäfer



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small percentage of these species, as there are only around 2,300 of them. But that is nevertheless quite an impressive figure when we consider that there are only around 5,500 species of mammals in total.

All mantids are predatory. They are lurking hunters with perfect camouflage, that lie in wait for passing insects which they seize with specially shaped raptorial legs and then devour. The lurking posture typical of all mantids is vaguely reminiscent of that of a person praying with folded hands, hence their popular name of praying mantises. These insects do not possess any poison.

There are mantids that look like little sticks, others that imitate ridges of bark, while yet others are almost impossible to spot among grass. But the most attractive mantids are undoubtedly those that imitate flowers and lie in wait for nectar-feeding insects in flowering plants. They include the Orchid Mantis, *Hymenopus coronatus*.

Natural distribution

The Orchid Mantis is relatively widespread in South and South-East Asia. It is found from India across the Malayan Peninsula to the Sunda Islands. Within this range it is an inhabitant of tropical rainforests, just like the orchids whose colorful flowers the adult insect imitates so perfectly.

Life cycle

Mantids go through a so-called incomplete metamorphosis. This means that the larvae that hatch from the eggs are already very similar anatomically to the parent insects. A well-known example of complete metamorphosis is the butterflies, in which the larvae (caterpillars) aren't remotely similar to the subsequent adults and don't develop into the winged insect until the pupa stage.





As stated, things are different in mantids. The larvae have to molt regularly as the chitinous armor that encases them cannot grow. The new armor is soft and expandable only immediately after molting and the larvae can grow only during the few hours after molting.

The Orchid Mantis produces a so-called ootheca, a mass of froth in which the eggs are embedded. The froth hardens a short time after it is produced and the ootheca then looks like a piece of foam insulation. The larvae hatch from the ootheca after 6-8 weeks. In the terrarium it is very important to incubate the ootheca at 25-30 °C and a relative humidity of 70-90%, as otherwise the larvae won't hatch.

The freshly-hatched larvae (= L1, ie "larva 1"; the larvae of mantids are also termed nymphs) are very different in coloration to the parents, specifically they are red and black in color. They thus imitate ants and this mimicry (the technical term) allows

them to evade predators. But by the L2 the coloration is pink and white, and the larva now seeks out orchid flowers, where it is incredibly well camouflaged.

Hymenopus coronatus goes through a total of eight molts before becoming the adult, sexually mature insect (= the imago, plural imagines). At least, the females do. Orchid Mantis males remain considerably smaller and are full grown after just five molts. They are sexually mature correspondingly earlier, making a brother-sister mating virtually impossible in the wild. In the terrarium, however, the situation can be manipulated by keeping the males (for sex differences see photos) cooler - at 22-24 °C - from the L4 stage and continuing to maintain the females at 25-30 °C. Because the males live 2-3 months as imagines it is then possible to mate them with their sisters. The majority of breeders advise against this, however, and prefer males from a subsequent clutch. Female imagines live for 6-9 months and,



The female's camouflage in this *Dendrobium* orchid is perfect.

once successfully inseminated, produce 4-5 oothecae at intervals of 2-4 weeks.

Cannibals?!

Because adult females are considerably larger than males, they generally regard male conspecifics as prey. But overall *Hymenopus coronatus* prefers significantly smaller winged insects, and for this reason specimens of the same size (eg siblings up to L4) can be kept together as long as they are well fed. But exceptions are nevertheless always possible. During mating the male escapes the voracity of

Male imago of *Hymenopus coronatus*. Males are brownish in color and considerably smaller than females.





The new *Geosesarma*

the female via a species-specific drumming with the forelegs on her back, which triggers a block on her urge to feed.

And now, a new *Geosesarma* species!

A pleasant surprise arrived from Indonesia in mid January 2012: a new, as yet still undetermined, very attractive crab; all the indications are that it belongs to the genus *Geosesarma*, popular in the terrarium. Unlike the *Geosesarma* species known hitherto (eg the Vampire Crab (*Geosesarma* sp.), Orange Crab (*G. krathing*), Mandarin Crab (*G. notophorum*), the new crabs have dark eyes. Otherwise these crabs are much the same size (2-3 cm carapace diameter), and, on the basis

The new *Geosesarma* species is variable in coloration.



Lexicon

Colorful creepers

Hymenopus:

a combination of the Greek words for membrane and foot, probably referring to the lobe-like appendages on the legs.

coronatus:

means "crowned"

Geosesarma: means "Earth Sesarma"; *Sesarma* is another crab genus.

of terrarium observations to date, correspond well with their familiar relatives.

The new species has violet claws, black legs, and dark eyes; the anterior part of the carapace is fox red to red-brown, the posterior bright yellow with a black spot of variable size in the center.

Amphibious crabs

Geosesarma species live in and by streams, constantly switching between land and water. For this reason they

require an aqua-terrarium with a well matured water area, which should, if possible, contain soft water with a slightly acid to neutral pH. These crabs are omnivores and dead leaves (oak (*Quercus*), beech (*Fagus*), birch (*Betula*), maple (*Acer*), etc.) must always be available for them to eat when desired.

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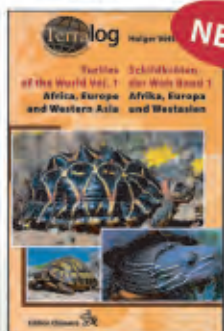
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