

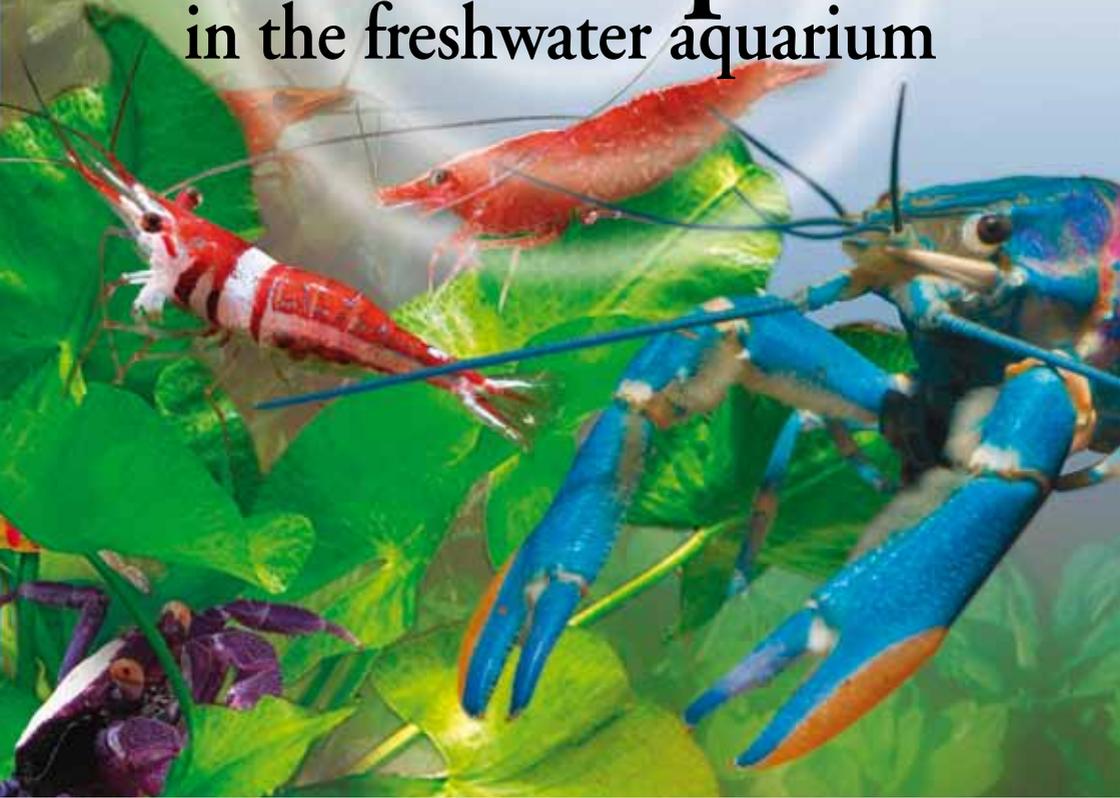
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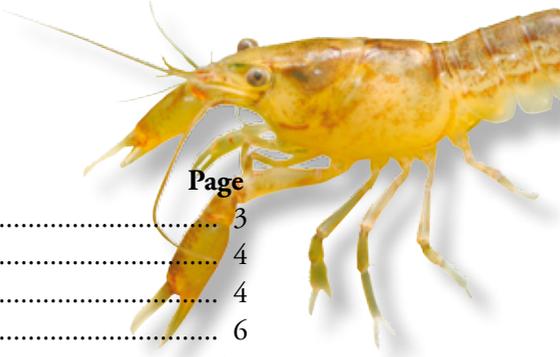
BROCHURE

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What - Why - How ?

Crustacea and shrimp in the freshwater aquarium



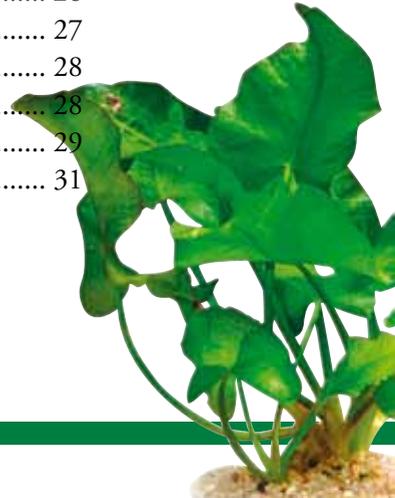


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PRELIMINARY NOTE

If you are just becoming interested in fresh-water shrimp and crustacea or are thinking about acquiring some, this information has come at just the right time. We want to make you more familiar with these ten-limbed creatures (decapods) and at the same time describe some of the basic principles of successful care.

What began as a fashion about ten years ago, namely keeping shrimp, crustacea

and crabs, has become a firmly established sector of aquarium-keeping. More and more people are fascinated by these creatures and are interested in keeping them. Although some aquarium stores have just a small selection of species, importers and wholesalers are bringing us new species or forms almost every week, so there is absolutely no lack of variety.

PRECONDITIONS

There are as many different sorts of decapods as there are differences in their temperament and requirements, a fact which many newcomers do not like to acknowledge. The best for all these creatures, of course, is to keep them in a single-species tank, however, with the right selection and combination of species, they can be combined with other aquarium dwellers in a community aquarium.

When choosing an aquarium, the main priority is to select one with the largest possible floor area, since floating shrimp do not play a significant role in aquariums. Most other types of shrimp and all crustaceans spend hardly any time in the open wa-

ter, but live mainly on the floor or on or under decorative objects such as rocks, roots, caves and aquatic plants.



Avoid high water temperatures

Higher temperatures definitely stimulate the metabolism of crustaceans, shortening the intervals between molting. Unfortunately the possible life expectancy is also affected. Freshwater crustaceans, with very few exceptions, originate from cool, oxygen-rich waters. Being kept at room temperature with cooler temperatures at night is not bad for them at all, in fact positive effects on their vitality are to be expected...

EQUIPING THE AQUARIUM

Crustacea and shrimp do not grow continuously in the same way as fish do, but have to molt, enabling them to increase in size considerably. Each molt is a decisive and dangerous experience in the life of these creatures, since for a period of time ranging from hours (for dwarf shrimp, young crustacea) to days (for adult crustacea), their otherwise



protective shell is soft, leaving them practically helpless against hungry predators, which, in the case of crustacea, even include their own species! Caves and crevices are therefore vital as they provide hiding places.

The aquarium should also be well-structured in other aspects, so that the aquarium inhabitants can avoid each other if they wish. It is important particularly when keeping freshwater shrimp that the decorative material provides hiding places, as many of these creatures react aggressively if they constantly meet other inhabitants of the aquarium.

Aquatic plants are also important in shrimp aquariums or for dwarf crayfish. If you only want to keep floating plants, mosses and epiphytes like Java fern, the ground substrate is of secondary importance. If root-growing plants are to be included, a fine, washed

quartz gravel from a specialist aquarium retailer is recommended. In order to provide the optimum living conditions, we recommend using a long-term nutrient floor covering material (**JBL AquaBasis plus**), placed in the empty aquarium as the first layer and then covered with the washed, fine quartz gravel. This provides the aquatic plants with all the nutrients they need for vigorous, healthy growth. Strong plant growth in turn ensures healthy water, as vigorously growing plants extract harmful nutrients from the water. The plants can be given additional fertilizer with **JBL Ferropol** (plant-based fertilizer) and **JBL Ferropol 24** (daily fertilizer).

Soaking newly acquired aquatic plants

It has become apparent that newly purchased groups of plants may cause symptoms of poisoning in shrimp and crustaceans.

It is not so much the plant fertilizer which causes this, but rather the insecticides used in the culture of emersed plants.

Soaking the plants in water for several days before placing them in the aquarium will help. The short-term use (12-24 hours) of a very good active carbon such as JBL Carbonec activ will remove insecticides and pesticides.



THE RIGHT WATER

Shrimp, like other crustacea, breathe through their gills, covering their oxygen requirements primarily out of the water. What currents and waves create in nature, namely oxygen enrichment of the water, is produced in an aquarium by a motor-driven filter (**JBL CristalProfi**), an air-driven internal filter (**JBL CristalProfi i40**) or aeration. The animals react to a lack of oxygen by trying to seek refuge in higher layers of water, where they sit almost motionless. In such situations the more agile crustaceans will even attempt to escape from the hostile environment by leaping out of the aquarium.

JBL CristalProfi i 40 is perfect for shrimp aquariums as it has no dangerous inlet slit

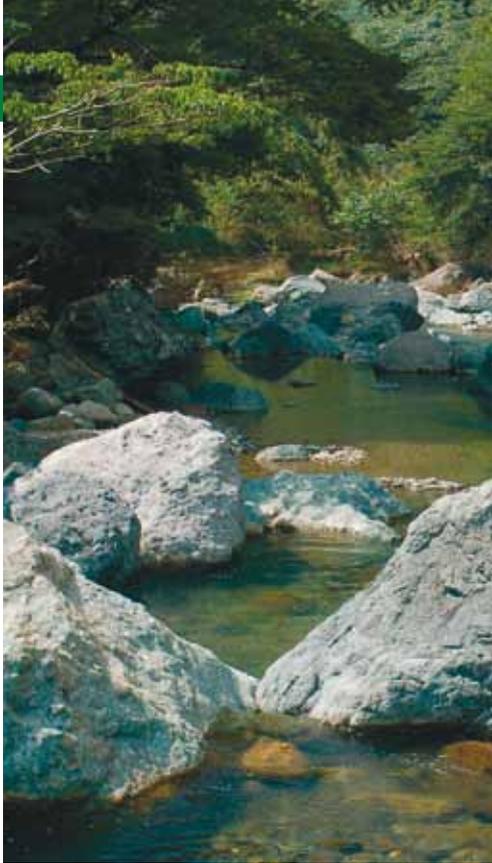
which sucks in shrimp and their offspring. CP i 40 is driven purely by air. The bubbles rising in the inner pipe push the water out of the filter, causing suction to develop in the filter. The surrounding water flows in through the bio filter foam, where it is cleaned by pollutant-absorbing bacteria. Shrimp also love searching for food on the surface of the foam.

The water temperature is a further important criterion in the successful care of these creatures. Even species from apparently tropical or subtropical regions prefer lower temperatures: they often originate from waters at higher altitudes or are accustomed to seasonal variations. Most species can be kept at a temperature ranging between 19 and 25 °C. The required temperature can be easily and safely set using a heater-stat (**JBL ProTemp S**). North American crayfish of the species *Cambarus* and *Orconectes* need a temporary drop in temperature to below 15 °C if they are to breed successfully the following spring.

For the majority of species, the recommended pH level of the water should be in the slightly acid range (pH 6.5) to slightly alkaline (pH 7.5). Using a **JBL pH Test Set**, the pH level



Air-driven internal filter JBL CristalProfi i 40



Biotope of the Caridina multidentata

can be measured precisely in only a few minutes - and you don't have to be a scientist! The attractive bred forms of the bee shrimp and bumble bee shrimp display much brighter colors in a slightly acid environment.

Remember to keep the water cool

In long hot summers the water temperature of an aquarium may increase alarmingly, especially in apartments under the roof. For small shrimp aquariums, special ventilators directed at the surface of the water use the principle of cooling through evaporation to reduce the temperature of the water by 2 to 4° C compared to the ambient temperature. Larger aquarium for crustacea can be connected to commercially available cooling units. Daily changes of water and an improved supply of oxygen make the life of the invertebrates more tolerable at this time.

Constant water temperatures not desired

In nature, the water temperatures change in a day/night rhythm and over the course of the year. The metabolism of the crustacea has adapted to this. Slight variations in temperature prolong life-span, a good reason for controlling the heater (JBL Pro Temp) with a time switch. The water temperature can be precisely monitored using the JBL Premium Aquarium Thermometer, which shows exact readings to 0.5°C!

Caution environmental protection:

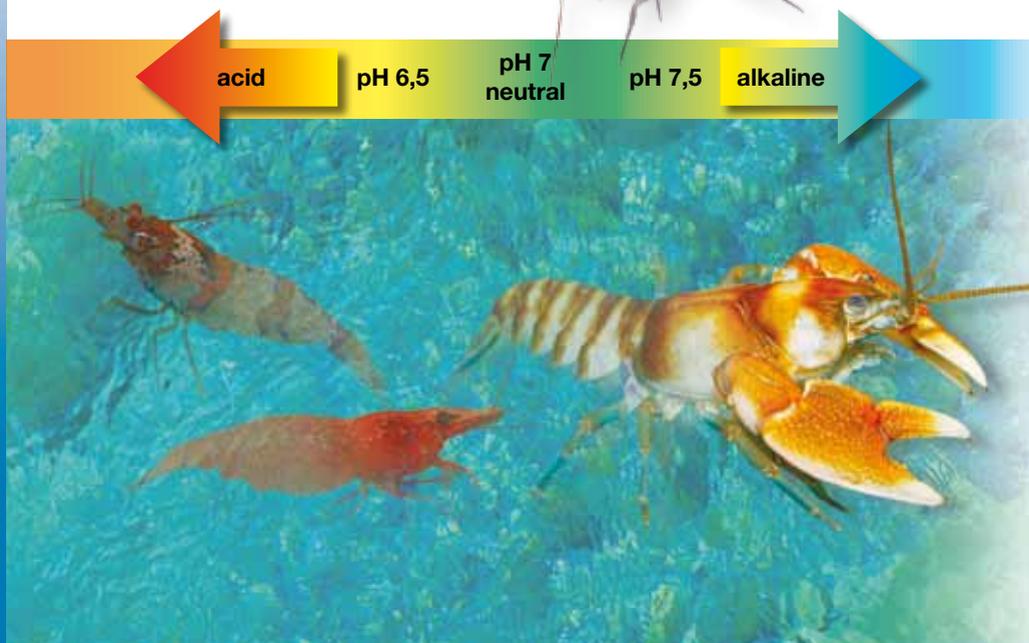
Crayfish and shrimp should never be released from an aquarium into the wild or into a garden pond. Many species can breed in the wild and endanger native species of crustacea.



In nature, many species have adapted to suddenly changing conditions, so that practically nothing unsettles them. This means that even species from acidic water (pH level below 7) (for example *Procambarus pygmaeus*) or alkaline water (pH level above 7) (*Cambarellus patzcuarensis*) feel comfortable at levels around neutral (pH around 7).

The situation regarding water hardness is similar. It goes without saying that invertebrates have to absorb hardening constituents from the water in order to build up their shell. In principle, this is possible even in soft water, although water with a medium hardness is better (carbonate hardness between 5 and 10 °GCH). If you have particularly hard water, you should either keep more tolerant crustacea or reduce the hardness of the water with a reverse osmosis system (**JBL Osmose**

120). In some circumstances dwarf shrimp may cease breeding completely if the hardness level is wrong.



Water conditioning in brief

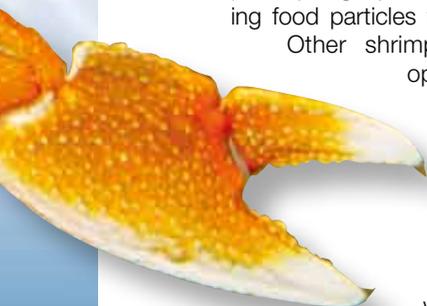
1. Test mains water: pH should be around 7, CH between 5 and 10 °GCH.
2. If the water is too hard, use an osmosis unit.
3. Remove problem substances, in particular copper, from the water with **JBL Biotopol C**. JBL Biotopol C has been specially developed for invertebrates and has other important properties for invertebrates in addition to its powerful capacity to absorb copper: it contains minerals which support molting; it neutralizes hazardous chlorine compound; it contains important hardeners and does not damage the shell of crustaceans.
4. Add cleansing bacteria (**JBL Denitrol**) an hour later.
5. Stocking can start, step by step, over the next few days.
6. Check ammonium and nitrite levels each week.



Almost all freshwater shrimp and crustacea are omnivorous, that means they eat everything. They often cannot be choosy in their natural habitat if they are going to be successful in the fight to survive. And so various techniques are used to obtain food, whereby the fan shrimp work as filterers, for example, waiting with specially adapted catcher arms for particles of food which drift by on the current and then transferring the catch to their jaws. Food tablets such as **JBL NovoFect** und **JBL NovoTab** are the ideal nutrition for fan shrimp. They eagerly sift out the dissolving food particles from the water.



Fan shrimp filter their food from the water!



Other shrimp have developed long, thin, pincer-like claws which they move at lightning speed to catch fish swimming by, whilst some crustaceans have powerful claws to attack snails, in particular.

However, as already mentioned, decapods mainly graze on the substrate, eating detritus which can be described as a mixture of decaying organic material and the bacteria, fungus and micro-organisms involved in this process. Fallen leaves, particularly oak, beech and hazelnut, are a good natural substitute.

The preferred diet of crustaceans and shrimp is special food containing all the nutrients and additives required in a concentrated form. But not all food for crabs or shrimp is the



same. Some more sensitive animals react to food with a high proportion of animal protein by trying to shed their shell prematurely, which often fails. To avoid this risk, feed special food such as **JBL NovoCrabs** and **JBL Novo-Prawn** with a high plant content, preferably giving small doses. It is important



to bear in mind that decapods have a very different metabolism to four-legged pets. A diet or two or three days fasting per week does no harm at all.

CARE

Every action produces a reaction. In this saying, adapted slightly, applies well to crayfish and shrimp too. If you watch how *Cherax* species shred and devour even Moorkien wood and the speed with which **JBL NovoCrabs** food chips disappear in their jaws, you are not surprised that these creatures produce significant amounts of sediment. Shrimp lag a little behind their cousins, but with time the proportion of suspended and sinking particles grows at a similar rate.

Some sediment is good for any freshwater aquarium. It contains concentrated bacteria which are actively involved in the biological breakdown of nitrates. Nevertheless, for invertebrates the water should be changed at regular intervals using a special sediment bell (**JBL AquaEX Set**), which reduces the sediment layer at the same time. One third of the content of the aquarium every two weeks is recommended. The fresh water can be a few degrees Celsius colder without harming the animals. A little more care is only needed if fish and/or plants are kept which are sensitive to cold, and tem-

perate water should be used (as it should be in winter, too). A good water conditioner (**JBL Biotopol C**), which removes chlorine and heavy metals from the water should be used. For new aquariums it is important to add beneficial cleansing bacteria to the water or the filter material one hour after using the water conditioner, **JBL Biotopol C**. **JBL Denitrol**, containing different strains of bacteria, was developed to rapidly break down any pollutants. If used correctly, the aquarium can be gradually stocked over the following days. **JBL Test Sets** should be used every two days to check the ammonium (NH_4 Test) and nitrite (NO_2 Test) levels. New bacteria cultures



should also be added to the filter material after the filter has been cleaned. **JBL FilterStart** is designed for this and can be added directly to the clean or new filter material.



COMMUNITIES

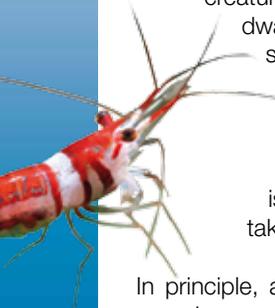
If you do not wish to keep your crustacean or shrimp in a single-species tank in the long-term, you should define your objectives from the outset. Are you only keeping the animals, or should they also be able to successfully breed? Is the aim to breed pure specimens, or are the crustaceans only an enrichment to a community aquarium?

The situation is similar for long-clawed shrimp of the genus *Macrobrachium*, however this is also due to the fact that some of these creatures are complete predators. For dwarf shrimp of about the same size, the maximum population density in the aquarium first has to be reached, but well before this stage the aquarium keeper will notice which form is more productive and slowly taking the upper hand.

In principle, attempts at mixed community aquariums usually work: large crustacea with hefty claws can be put together with dwarf shrimp, without harm to either. Medium-sized *Caridina* and all fan shrimp seem to get on with dwarf shrimp. On the other hand, the cute dwarf crayfish are completely unsuitable

companions for shrimp (see species section).

And fish? The overall picture is similar here.



OVERVIEW OF SPECIES – SHRIMP

DWARF SHRIMP

All types of the genus *Caridina* and *Neocaridina* are usually included in the dwarf shrimp group, although there are significant differences in size within this group, so that the description does not suit all forms. Whilst some species remain quite small, hardly 3 cm long, others grow to over 7 cm.

All of the commercially available representatives of this group are suitable for plant aquariums. In their natural habitats they graze on aufwuchs (beds of algae and the micro-organisms it contains) and/or eat detritus (organic material which is decomposing or will decompose). Some are reputed to be good consumers of algae, but it must be pointed out that they are not able to keep a normally stocked aquarium really free of algae in the long-term. As a species-specific food, **JBL NovoPrawn** is highly suitable as it is precisely balanced to meet the natural nutritional needs of these shrimp. Caution should be taken with food containing too much animal protein. This leads to too rapid growth and thus to death from molting problems!

In this group there are two different methods of reproduction. Animals of the simpler sort produce large quantities of small eggs. The larvae which hatch are released into the water, where they are carried into the

sea by the currents. Spending time in seawater is vital to their further development. The small organisms form part of plankton, initially feeding on microscopically small food whilst they pass through several different larva stages. Once they have finally transformed into small shrimp they return to freshwater where they spend the remainder of their lives. The best-known example of this type of reproduction is *Caridina multidentata*, the Amano shrimp.



The most important types

Caridina cf. cantonensis – Bee shrimp

Caridina cf. cantonensis – Crystal Red

Caridina sp. Red Bee

Caridina meridionalis – Bumble bee shrimp

Caridina cf. cantonensis sp – Tiger shrimp

Neocaridina heteropoda –

Red Fire shrimp

Caridina graciliostriis

Caridina cf. babaulti

Caridina multidentata



The species of the advanced reproductive type produce far fewer eggs, although the diameter of the eggs is relatively large. The development of the larva takes place in the egg, so that on hatching a viable mini-shrimp appears. These shrimp live in freshwater throughout their entire lives.



Check rocks for any possible lime content using a drop of JBL pH-Minus t. If foam appears when a drop of JBL pH-Minus is added to the rock, the rock contains lime! Calciferous rock should not be used as it may increase the hardness of the water.

FAN SHRIMP

Fan shrimp of the genera *Atya*, *Atyoides* and *Atyoida* can become relatively large, up to 16 cm , but are non-aggressive on the whole. They are known to be not particularly mobile, which is due to their specific form of feeding: their front pair of legs have developed into fans with which they can fish the finest food from the water and convey it to their jaws. If that does not meet their nutritional needs they can look for food in the floor with their



If fan shrimp are to be included in an aquarium with fish, only select types with a non-aggressive temperament. Shrimps do not like to be constantly disturbed when they are feeding



The dwarf gourami has a quiet character.

fan appendages. This includes flake food, for example, which has sunk to the floor and is eagerly eaten. Food tablets such as JBL NovoFect and JBL NovoTab dissolve slowly in the water, releasing fine food particles into the water. These food particles are then filtered like plankton from the water by the fan shrimp.

As in nature, the fan shrimp look for places in the aquarium which are subject to currents,

wherever possible. They cling tightly to the substrate, preferably to rough surfaces such as stones or roots. Plants with a firm structure are also used as a perch.

The most important types

Atya gabonensis – Gabun giant fan shrimp

Atyopsis moluccensis – flower shrimp,
wood shrimp

Atyoida pilipes – Sulawesi- fan shrimp

LARGE-CLAWED SHRIMP

Imports of large-clawed shrimp of the genus *Macrobrachium* have increased in recent times, mainly from Asia and South America. Unfortunately some become too large for the normal aquarium, others are agile and successful hunters who have no fear of large, powerful fish. **JBL NovoCrabs** is an ideal species-specific food for this genus. As this species often consumes animal proteins (snails), the diet can be happily supplemented with **JBL NovoTab** or **JBL Tabis**.

The best-known of this group, the Red Rusty, *Macrobrachium assamense*, can be safely kept together with peace-loving fish from the open waters. They like catching Great ramis horn snails

and tower-shelled snails, which they skillfully extract from their shells and devour.

A shrimp which is very commonly found on sale is the Riceland prawn, *Macrobrachium lancestri*. These shrimp are among the more harmless representatives of their species and can therefore be kept in a group. These creatures are fully grown at 3-8 cm.



The most important types

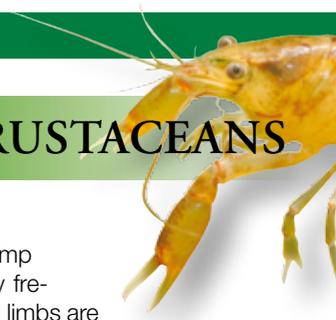
Macrobrachium assamense - Red Rusty

Macrobrachium lancestri - Riceland Prawn

Macrobrachium dayanum - Kaina River Prawn



OVERVIEW OF SPECIES - CRUSTACEANS



DWARF CRAYFISH

Types of the genus *Cambarellus* are generally referred to as dwarf crayfish. They are mainly to be found in the USA along the Mississippi and the states around the Gulf coast, as well as in Mexico. The smallest representative is scarcely three centimeters long as a fully grown adult, whilst the largest reach about four and a half centimeters.

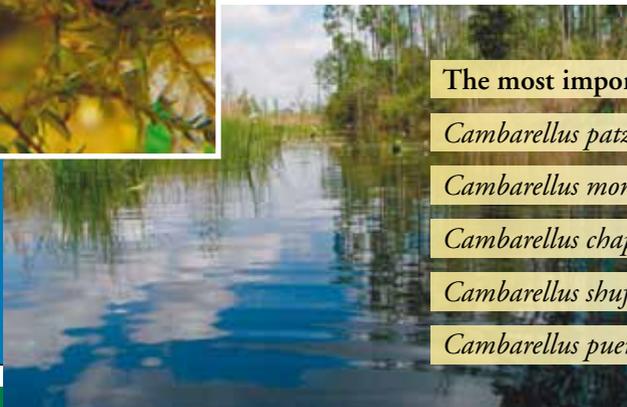
Dwarf crayfish can be safely kept in aquariums with plants, as they do not attack the foliage. They can be combined with small, peace-loving fish of the middle and higher water levels, although fewer young will then be able to grow up in the aquarium.

Keeping them together with dwarf shrimp should be avoided. Although there are occasional reports of the successful care of such mixed communities, observations of attacks by the crusta-

cea on the shrimp are increasingly frequent. Severed limbs are the lesser evil. If a *Cambarellus* gets hold of a shrimp, the animal is usually done for and it becomes a further item on the menu of the crustacea. **JBL NovoCrabs** provides the right food for the *Cambarellus* genus. For this genus, too, the proportion of animal protein should not be too high, as fatal molting problems might otherwise ensue.

All *Cambarellus* species have different temperaments. Whilst the small-growing *Cambarellus diminutus*, *C. shufeldtii* and *C. puer* will raise their own young in a well-designed aquarium with many hiding places and without additional species, the males in particular of the species *C. montezumae*, *C. patzcuarensis* und *C. zemopolensis* are really evil-tempered, with attacks on their fellow creatures and even their own young a part of their daily life.

All *Cambarellus* species can be bred without much trouble. The females can produce three to four clutches of eggs a year. With



The most important types

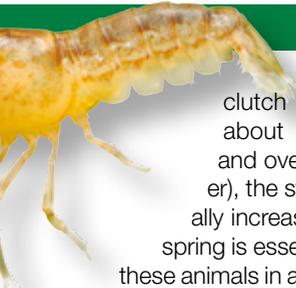
Cambarellus patzcuarensis „orange“

Cambarellus montezumae

Cambarellus chapalanus

Cambarellus shufeldtii

Cambarellus puer



clutch sizes of between about 10 (*C. diminutus*) and over 100 eggs (*C. pu-er*), the stock can be gradually increased. Producing offspring is essential when keeping these animals in an aquarium, as life-

expectancy varies between 14 and a maximum of 30 months depending on species.

LARGE AMERICAN CRAYFISH

Species of the *Procambarus* genus, which are to be found widely throughout the USA, Mexico and on Cuba, have been popular for a long time. The best-known example, *Procambarus clarkii*, the Louisiana swamp crawfish, is not only a popular aquarium crustacean. It is the most common edible crayfish in aquaculture and has gradually become established as an invasive species in regions far



Procambarus toltecae



Procambarus pygmaeus



Procambarus clarkii



outside its natural distribution area. For example, reproductive populations are known to be thriving in Asia, Africa, America and Europe. It survives cold winters, even in Germany, and is gradually spreading.

Procambarus clarkii is bred in many color variations nowadays. Single-color forms are particularly popular, such as red, orange, white and blue.

Unfortunately the larger *Procambarus* species have one bad habit in common: they love eating plants. Although there are individual differences, for example individual crayfish which leave tough-leaved plants untouched for a longer period of time, sooner or later even these will at least be trimmed back. For this reason, the ingredients of **JBL NovoCrabs** are predominantly vegetable. As already mentioned, too much animal protein in the food leads to molting problems.

Many crustacea from the *Procambarus*



group are highly productive. The clutches of eggs of *Procambarus allenii*, a species which occurs in a bright blue variation, may contain over 350 eggs. The females of this species can easily produce three to four broods per year. A special case regarding reproduction is *Procambarus* sp..

So far only female animals have been found, which reproduce by parthenogenesis (reproduction by means of unfertilized eggs). This means that just one single specimen kept in an aquarium will produce offspring.

In recent years North American crayfish of



The most important types

Procambarus clarkii

Procambarus allenii

Procambarus fallax f. virginalis

Procambarus spiculifer

Procambarus toltecae

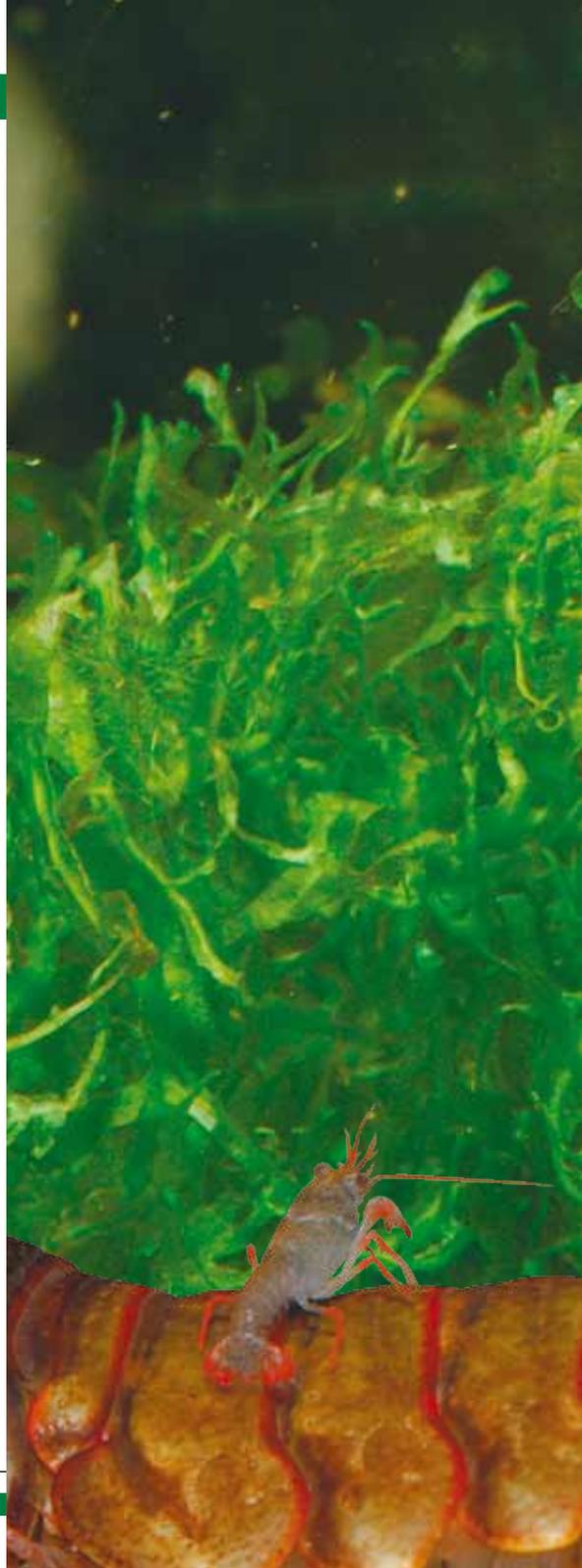
Plastic-wrapped gravel can be a problem.

Now and again crustaceans and shrimp suddenly die in newly established aquariums with colored gravel. Softening agents or other additives may be the cause. Washed river sand or natural gravel is a better alternative. Caution: even "Play sand" from do-it-yourself stores often contains fungicidal additives, which may be fatal for decapods. Even the best water conditioner cannot remove these problem substances!

the genera *Orconectes* and *Cambarus* have been imported to Germany, mainly on private initiative. Some of these are really brightly colored species which are quite hardy. If you wish to breed crustacea such as *Orconectes luteus* or *Cambarus rusticiformis*, you have to keep the breeding stock cold throughout the winter, which may in some cases entail water temperatures below 15 °C for about three months.

The brood-care behavior of these species is interesting: after developing for four to six weeks, the fully-formed small crayfish remain with their mother for up to five more weeks. Although they search for food in the immediate vicinity, they always return to find protection under the abdomen of their parent.

Even up to the age of 5 weeks, Orconectes offspring always return to their mother.



■ **CHERAX FROM AUSTRALIA AND PAPUA NEU GUINEA**

Originally only available as imports caught in the wild, but in the meantime just as often as bred specimens, numerous colorful types of crustaceans originating in Australia or Papua New Guinea can be found in specialist retailers.

All of the Cherax which are popular here are medium or large-sized crayfish. This does

not always mean that they need huge aquariums, although generous space and a lot of hiding places are very acceptable.

Whilst species such as *Cherax destructor*, *Cherax quadricarinatus* or *Cherax lorentzi* also roam the aquarium during the day and can be easily observed, their colorful relatives from Papua New Guinea, in particular, mostly hide in caves or crevices in the daytime, becoming active when the aquarium lighting is switched off. They are usually so peace-loving and so clumsy with their long pincers that they can be safely kept with fish in a community tank, providing the fish themselves do not become aggressive to their armor-clad companions.

Since a large part of the life of the Cherax takes place in hiding, the aquarium should be well-designed. Clay pipes, coconut shells and stone slabs are suitable decorations as well as branched Moorkien wood. **JBL No-**

Die wichtigsten Arten

Cherax destructor

Cherax holthuisi

Cherax lorentzi

Cherax quadricarinatus

Cherax peknyi

Cherax „Hoa Creek“

Cherax sp. „Blue Moon“

Cherax boesemani



JBL

voCrabs and **JBL NovoFect** and **JBL Tabis** are highly suitable foods, providing exactly the right nutrients.

In their behaviour towards each other, most Cherax are far more restrained than their American cousins. When two animals have found each other, they do not mate immediately, instead the male and female sometimes spend days together in a cave, before finally taking up the mating position.

In the case of the Cherax, too, the female carries the eggs under the rear abdomen. It can take one or two months until the young hatch. During this time the female remains even more hidden than normal.

As a rule, the young crayfish grow more slowly than the Procambarus species, however, Cherax have a much longer life-expectancy. Whereas a Procambarus clarkii seldom lives for more than three years, some Cherax live to be four or even six years old.

Simple shedding!

Problem-free shedding of the shell is only possible with the right food!

Too many animal proteins in food trigger rapid growth which can lead to massive problems with shedding shell.

That's why JBL NovoCrabs and JBL NovoPrawn have a low level of animal proteins, specially designed to avoid this problem.

Guaranteeing growth, easy shell-shedding and brilliant colouring.

Test results
(from crustacean specialists
from www.aquariummagazin.de)
"The best food you can
imagine for crustacean".

Cover escape hatches

All crustaceans have a tendency to leave the aquarium. It should therefore be covered and the holes for hoses and cables be so narrow that no animal can squeeze through. Irregularly shaped holes can be very effectively closed with foam.



Vorweg
durch Forschung
Ahead through research
L'avance par la recherche



More information
can be found on the Internet at www.JBL.de

OVERVIEW OF SPECIES - CRABS

CRABS



Crabs are rewarding pets which bring a lot of life to an aquarium. However, they are quite vulnerable to variations in conditions and stress.

They need plenty of space, a few companions of their own species, and clean, oxygen-rich water. Also a lot of hiding places both in and out of the water. Due to their amphibian lifestyle, an area of land must be available.

Since the individuals have quite distinctive temperaments, they need to be observed with sensitivity.

Pseudosquilla moeschi is one of the most commonly imported species and is sold in Europe under the name "Red-clawed mangrove crab". Like many other species of crustacea, these crabs need a semi-terrestrial aquarium rather than a pure aquarium.

These crabs need sufficient space, love interaction with their own species (however, do not keep more than one male in a small tank!). A small group of one or two males and a few females is recommended. In a single-species tank or a semi-terrestrial aquarium, freshwater or brackish water may be used. Sufficient hiding places should be provided both in and out of the water. Particularly after molting, crabs need a cave to retreat to. Feeding is unproblematic, most food is accepted, whereby a balanced diet

should be offered.

Breeding in an aquarium is only possible with a great deal of effort, as the larvae need water with a particular salt content and the right size of food to survive. Since they originate from warm climates, temperatures should be between 22-29 °C. Crabs do not do well in cooler temperatures. A well-structured aqua terrarium about 60 cm long is sufficient for 3-4 animals.

Two varieties of crab from the *Geosesarma* species are now available, sold as the "Vampire" crab and the orange mandarin crab. These crabs are 2-3 cm long in the body when fully grown and are therefore ideal for smaller aqua terrariums. Both of these crabs originate from south Asia and have settled successfully in terrestrial and limnetic environments, completely independent of the sea. An aqua terrarium 60x30x30in size is sufficient for a small group. In the case of these crab, too, there should be more females than males to avoid fights and squabbles over rank. Temperatures can vary between 25°C-28°C, whereby cooler nighttime temperatures are certainly beneficial for the well-being of the crabs. "Vampire" crabs are active hunters, feeding mainly on small insects and worms or invertebrates. A high proportion of meat in their diet is also an advantage. In an aqua terrarium, however, they will also eat flake food (**JBL Novo-Bel**), food tablets (**JBL NovoTab**) or sticks.

For all varieties of crab it should be mentioned that the aquarium or aqua terrarium should be closed or covered securely as these animals are skillful escape-artists. Whilst land

crabs can mostly survive short exits onto land without harm, for mangrove inhabitants or freshwater species any lengthy period of time on land can end in death.

Crabs in communities

In their natural habitat, healthy, live fish are not amongst the natural prey of crabs. However, that may change in a small aquarium. If conditions are cramped and the crabs have an inadequate diet, they may snatch the odd fish or two. This happens mainly at night. Of course, any diseased or dead fish will be eaten by crabs.

Dwarf shrimp of the species *Neocaridina* and *Caridina* are mainly ignored by crabs, although fan shrimp are defenseless against crabs and the combination is therefore not recommended. Large-clawed shrimp and crabs may live side-by-side in the natural habitat, but under restricted conditions, things can be quite different. Crabs molt very often in water and large-clawed shrimp can

therefore pose a danger to them.

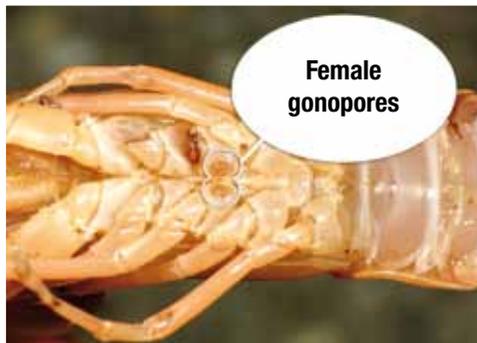
A combination with crayfish is not recommended. In the natural habitat, there are only very few occasions where the two species occur together. Experience has shown that crayfish can be threatened, injured or even killed by much smaller crabs.

Many types of crab live only some of the time in water and an area of land is therefore needed for the animals to thrive.

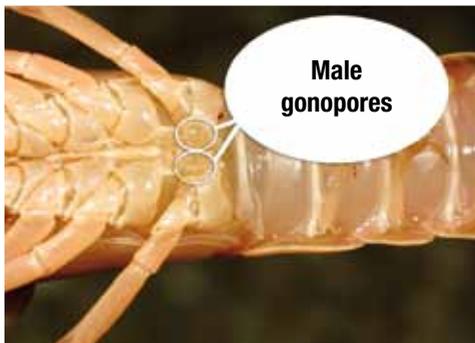
Geosesarma krathing



Differentiating the sexes as follows:



Female gonopores



Male gonopores



1



2



3



4



5

Caridina cf. cantonensis – Bee shrimp; Picture 1-2 Crystal Red; Picture 3-5 Tiger Shrimp

Origin: common throughout South China

Size: 2-3 cm • Water hardness: to 10°KH • pH: 6.25-7.5 • Temperature: 10-28 °C • Tank size : over 20 liter



Caridina babaulti – Green dwarf shrimp (*Caridina cf. babaulti*)

Origin: tropical to subtropical regions of East India and Myanmar to Iraq • Size: 1.5-3 cm

Water hardness: to 25°KH • pH: 6.8-8.3 • Temperature: 20-30 °C



Neocaridina heteropoda var. red – Red Fire shrimp
Origin: Southeast Asia region, China and Hawaii
Size: 2-3 cm • Water hardness: to 15°KH • pH: 6.25-8
Temperature: 4-30°C



**Caridina gracilirostris – Nashorngarnele
Red nose shrimp**
Origin: Japan, Indo-Pacific region, West Africa
pH: 6.8-8.0 • Temperature: 26-30 °C



Neocaridina palmata – White Pearl shrimp
Size : 2.5 cm • pH: 6.8-8.0
Temperature: 10 °C to 30 °C
Relatively unfussy about KH and CH



Caridina thambipillai – Bengal caridina
Origin: Indo-Pacific region • Size: 2-3 cm
pH: 6.0-7.5 • Temperature 20-30 °C



Caridina multidentata – Amano shrimp
Origin: Southern part of Central Japan • Size: 3-4.5 cm • Water hardness: to 20°KH • pH: 7.0- 8.3
Temperature: 18-30 °C





Caridina meridionalis – Bumble bee shrimp

Origin: South China • Size: 1.5-3 cm • Water hardness: to 15°KH
pH: 6.25-8.0 • Temperature: 14-26 °C



Caridina woltereckae “Harlekin shrimp”

Origin: Malili Lake Sulawesi
Size 1.5-2 cm • pH: 7,5-8,5
Temperature: 27-30 °C



Caridina dennerli” Kardinal shrimp”

Origin: Malili Lake Sulawesi
Size 1.5-2 cm • pH: 7,5-8,5
Temperature: 27-30 °C



Atya gabonensis – Gabon giant fan shrimp

Origin: West Africa and east coast of South America
Size: 10-16 cm • Water hardness: to 10°KH
pH: 6.25-7.5 • Temperature: 20-30 °C



Atya scabra

Origin: West Africa throughout the Lesser and Greater Antilles, to the east and west coast of Middle America as far as Brazil • pH: 7.5 • Temperature: 22 -30 °C



Atyoida pillipes

Origin: Eastern Indonesia, the Philippines throughout New Guinea, the Caroline Islands to Samoa, Marquesa and Gambier Islands • Size: 40-50 mm



Atyopsis moluccensis – Flower shrimp

Origin: Indonesia • Size: 7-9 cm • Water hardness: to 15°CH • pH: 6.25-7.5 • Temperature: 20-30 °C



Macrobrachium assamenis – Red rusty shrimp

Origin: India, Pakistan and Myanmar
Size: 5-8 cm • Water hardness: to 20°KH
pH: 7.0-8.3 • Temperature 14-28 °C



Macrobrachium lanchestri – Rice land prawn

Origin: Myanmar and Thailand • Size: 3-8 cm
Water hardness: to 30° KH • pH: 6.4-8.3
Temperature: 23-30 °C



Macrobrachium dayanum – Kaira river prawn, Red Rusty

Origin: India, Bangladesh • Size 9-10 cm
pH: 6.5-8.0 • Temperature: 20-27 °C



Macrobrachium rosenbergii – Giant river prawn

Origin: Southeast Asia, Indonesia and as far as Australia
Size: up to 32 cm
pH: 6.5-8.0 • Temperature: 20-27 °C



Cambarellus patzcuarensis "orange"
Mexican orange dwarf crayfish or CPO
Origin: Lake Patzcuaro / Mexico • Size: 3-4 cm
pH: 7.5-9 • Temperature: 10-30 °C



Cambarellus shufeldtii – Cajun dwarf crayfish
Origin: Mid-west USA / Gulf Coast USA
Size: 2-3 cm • Temperature: 4-30 °C



Procambarus fallax f. virginialis
Origin: Southern US states • Size: 8-12 cm
Temperature: 10-30 °C



Procambarus alleni – Blue Florida crayfish
Origin: Southern Florida • Size: 7-9 cm
Temperature: 20-27 °C



Procambarus clarkii – Louisiana swamp crayfish
Origin: found worldwide • Size: 5,5-12 cm
Temperature: 4-30°C





Cherax peknyi
(Cherax sp. „Tiger“/Cherax sp.“ Zebra)
Origin: Papua New Guinea • Size: 8-12 cm
Temperature: 20-26 °C



Cherax „blue moon“
Origin: Vogelkop Peninsula West Papua/ Indonesia
Size: 7-12 cm • Temperature: 20-26 °C



Cherax holthuisi
Origin: Lakes Aitinjo and Ajamaru West Papua / Indonesia • Size: 9-12 cm
Temperature: 20-26 °C



Cherax lorentzi
Origin: Southwest Papua New Guinea
Size: 15 cm • Temperature: 20-28 °C



Cherax destructo – “Yabby”
Origin: Australia • Size: 20 cm
Temperature: 4-28 °C



Cherax boesemani
Origin: West Papua • Size: 20-25 cm
Temperature: 19-26 °C



Cherax boesemani
Origin: West Papua • Size: 20-25 cm
Temperature: 19-26 °C



Cherax sp.
(Cherax sp. Irian Jaya & Cherax "Hoa Creek")
Origin: Lake Aijamaru West Papua/ Indonesia
Size: 10 and 13 cm • Temperature: 20-25 °C



Geosesarma krathing- Orankeköpfchen-Krabbe
Origin: Sulawesi
Temperature: 24-28°C
Haltung in feuchtem Terrarium, da es sich eher um eine Landkrabbe handelt.



Pseudesarma moeschi – Red-clawed mangrove crab
Origin: common in warm climates
Temperature: 22-29°C • Tank size: over 80 litre



Geosesarma sp. Vampire crab, Orange mandarin crab
Origin: South Asia
Size: 2-3 cm • Temperature: 25-28°C
Tank size: over 30 cm

