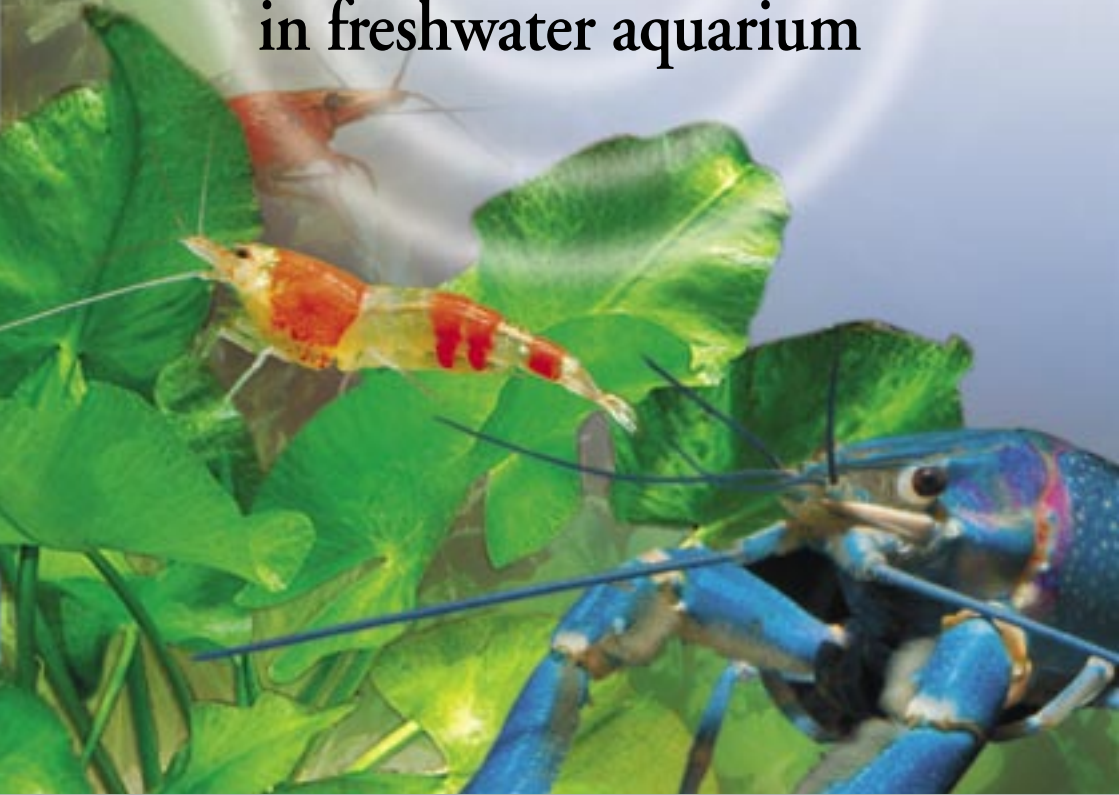


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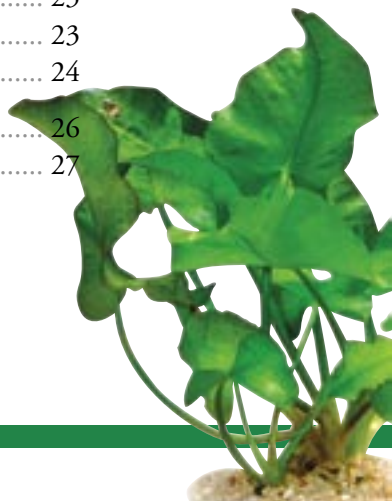
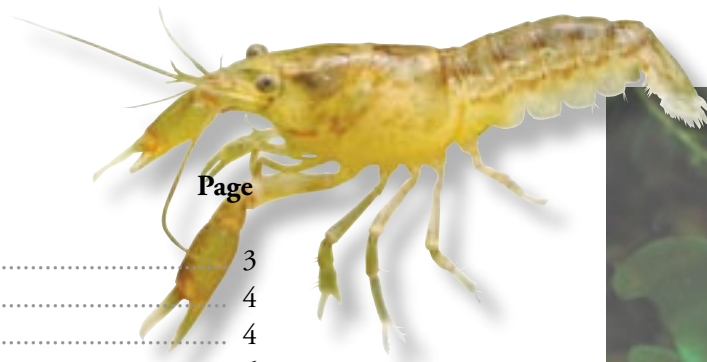
What - Why - How ?

Crustacea and shrimp in freshwater aquarium



Contents

	Page
Preliminary note	3
Preconditions	4
Equipping the aquarium	4
The right water	6
Food	8
Care	9
Communities	10
Overview of species - shrimp	
Dwarf shrimp	11
Fan shrimp	12
Large-clawed shrimp	13
Overview of species - crustaceans	
Dwarf crayfish	14
Large American crayfish	15
Cherax from Australia and Papua New Guinea	18
Photo overview:	
Dwarf shrimp	20
Large-clawed shrimp	23
Fan shrimp	23
Dwarf crayfish	24
American crayfish	26
Cherax	27



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 only have a small selection of species, importers and wholesalers are offering 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. There is one fact which new keepers usually don't like to hear: the best for all these creatures is to keep them in a single-species tank. But no need to groan! That doesn't mean that there aren't any other options.

Since floating shrimp are not important in aquariums, the main priority when choosing an aquarium is to select one with the largest possible floor ground area. Most shrimp and all crus-

taceans spend hardly any time in the open water, but live mainly on the bottom 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, quite the contrary.

EQUIPPING THE AQUARIUM

Crustacea and shrimp do not grow in the same way as fish, but have to molt to suddenly change their size. Each molt is an enormously decisive and dangerous experience in the life of these creatures, since for a period of time ranging from hours (dwarf shrimp, young crustacea) to days (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 sub-

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 emerged 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.



strate 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 ground 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 should be given additional fertilizer such as **JBL Ferropol** (plant-based fertilizer) and **JBL Ferropol 24** (daily fertilizer).



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 Air40**) 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.

The water temperature is a further important criteria 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**). 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 can be measured precisely in 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 colours in a slightly acid environment.

In nature, many species have adapted to suddenly changing conditions, so that practically nothing unsettles them. This means that even species from acidic water



Biotope of the Caridina japonica

(pH level below 7) (for example *Procambarus pygmaeus*) or alkaline water (pH level above 7) (*Cambarus 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

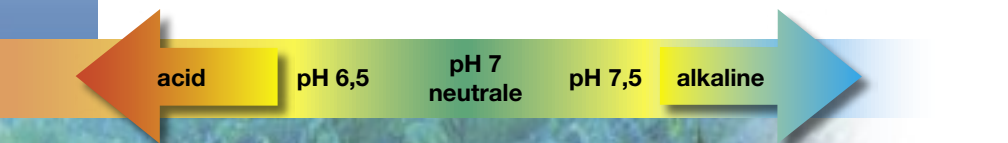
Remember to keep the water cool

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. Changing temperatures prolong life-span, a good reason for controlling the heater (JBL ProTemp) 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!

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 a reverse osmosis unit.
3. Remove problem substances from the water with **JBL Biotopol**.
4. Add cleansing bacteria an hour later (**JBL Denitrol**).
5. Stocking can start, step by step, over the next few days.
6. Check ammonium and nitrite levels each week.

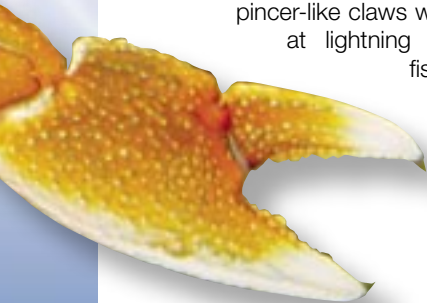


FOOD

Almost all freshwater shrimp and crustacea are omnivorous, that means they eat everything. They simply cannot be choosy in their natural habitat; it's a matter of survival. And so various techniques are used to obtain food, whereby the fan shrimp work as filterers, hunting lumps of food with specially adapted catcher arms and transferring the catch to the 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. Other shrimp have developed long, thin,



Fan shrimp filter their food from the water!



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 best diet for 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 NovoPrawn** 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 of two or three days fasting per week does no harm at all.

CARE

Every action produces a reaction – 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 temperate water should be used (as it should be in winter, too). A good water conditioner (**JBL Biotopol**), 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**. **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 ammo-



nium (NH₄ Test) and nitrite (NO₂ 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?

One point at a time: in North America up to seven species of crayfish have been identified in the same water, but each one occupies a different ecological niche. In large home aquariums, even creating a community of *Cambarus* species with a quiet temperament which grow to the same size is only successful for a limited period of time. In the long-term, one species will become dominant here too, and the others will gradually disappear. This applies to large as well as small crustaceans.

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 crustaceans 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 No-voPrawn** 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 through 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-



The most important types

Caridina sp. *Bee shrimp*

Caridina sp. *Crystal Red*

Caridina sp. *Red Bee*

Caridina breviata – *Bumble bee shrimp*

Caridina sp. *Tiger shrimp*

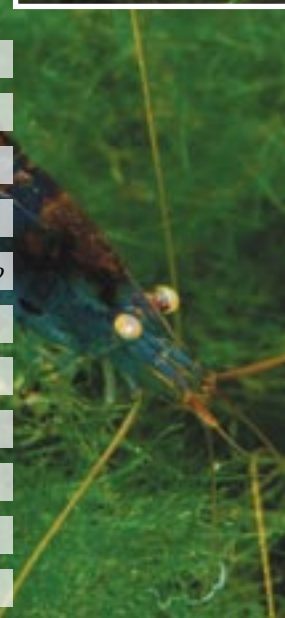
Neocaridina denticulata sinensis –

Red Fire shrimp

Caridina graciliostri

Caridina babaulti

Caridina japonica



known example of this type of reproduction is *Caridina japonica*, the Amano shrimp.

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.

FAN SHRIMP

Fan shrimp of the genera *Atya*, *Atyoides* and *Atyoida* can become relatively large, 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 particles out of the water and convey it to their

jaws. If that does not meet their nutritional needs they can look for food on the ground with their fan appendages. This includes flake food, for example, which has sunk to the bottom 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.

If fan shrimp are to be included in an aquarium with fish, please 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.



Check rocks for any possible lime content using a drop of JBL pH-Minus. 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.

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.

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 terrible predators 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 ram's horn snails

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

The snowflake shrimp, *Macrobrachium cf. Banjarensis*, is also one of the more sociable species regarding additional stocking with fish. For adult specimens, however, dwarf shrimp are apparently part of their diet.



- The most important types**
- Atya gabonensis* – Gabun giant fan shrimp
 - Atyopsis moluccensis* – flower shrimp, wodd shrimp
 - Atyoida pilipes* – Sulawesi fan shrimp

The most important types

- Macrobrachium assamense* - Red Rusty
- Macrobrachium cf. Banjarensis* - Snowflake shrimp
- Macrobrachium dayanum* - Kaira River Prawn

OVERVIEW OF SPECIES – CRUSTACEANS



DWARF GRAYFISH

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 eat or damage 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 crustacea

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 will 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. zempoalensis* 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 fuss. The females can produce three

to four clutches of eggs a year. With clutch sizes of between about 10 (*C. diminutus*) and over 100

eggs (*C. puer*), 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 the species.

LARGE AMERICAN CRAYFISH

Species of the *Procambarus* genus, which are widely spread throughout the USA, Mexico and many Caribbean Islands, 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 outside its



Procambarus tolteca



Procambarus pygmaeus



Procambarus clarkii



The most important types

Cambarellus patzcuarensis „orange“

Cambarellus montezumae

Cambarellus chapalanus

Cambarellus shufeldtii

Cambarellus puer

normal 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 colour variations nowadays. Single-colour 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 alleni*, a species which occurs in a bright blue variation, may contain over 200 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 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.

In contrast to the *Procambarus* species, which sometimes actively pursue other inhabitants of the aquarium such as fish and shrimp, the *Cambarus* and *Orconectes* are far more peaceful. Socialized dwarf shrimp will even reproduce in an aquarium, ignoring fish in the middle and upper levels of the water. Fish which live predominantly on the bottom of the aquarium should not be

included here, as this area is the habitat of these crustaceans.

The reproductive season of species such as *Orconectes durelli* or *Orconectes marchandi* are the months of March and April, whilst *Cambarus coosae* or *Cambarus speciosus* produce eggs somewhat later. The colourful *Cambarus manningi*, several generations of which have now been bred in the aquarium, have already adapted and sometimes spawn as early as Christmas.

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.

- The most important types**
- Procambarus clarkii*
 - Procambarus alleni*
 - Procambarus* sp.
 - Procambarus spiculifer*
 - Procambarus toltecaae*
 - Orconectes durelli*
 - Orconectes luteus*
 - Cambarus coosae*
 - Cambarus manningi*
 - Cambarus rusticiformis*
 - Cambarus speciosus*

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!



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



CHERAX FROM AUSTRALIA AND PAPUA NEW GUINEA

Originally only available as imports caught in the wild, but in the meantime just as often as bred specimens, numerous colourful 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 aquar-

iums, 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 colourful 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

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.

The most important types

- Cherax destructor*
- Cherax holthuisi*
- Cherax lorentzi*
- Cherax quadricarinatus*
- Cherax sp. „Tiger“ or „Zebra“*
- Cherax sp. „Blue Moon“*
- Cherax sp. „Red Brick“*



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

In their behavior 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".



Vorsprung durch Forschung
Ahead through research
L'avancée par la recherche



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



Bee shrimp



Caridina sp. Tiger shrimp



Caridina sp B&W



Caridina sp. Crystal Red



Caridina cf. babaulti "Zebra"



Caridina babaulti denticulata
sinensis



Caridina sp. Crystal Red



Caridina breviata
- Bumble bee shrimp



Caridina multidentata Pair



Caridina multidentata



Caridina breviata
- Bumble bee shrimp



Caridina breviata
- Bumble bee shrimp



Caridina cf. babaulti



Red Bee



Atyoida pilipes – Sulawesi fan shrimp



Atyoida pilipes – Sulawesi fan shrimp



Caridina heteropoda "Red Fire"



Caridina heteropoda "Red Fire"



Atyoida pilipes – Sulawesi fan shrimp



Macrobrachium sp.



Colour shrimp



Palaemonetes paludosus



Macrobrachium dayanum
- Kaira river prawn



Macrobrachium kulsense



Cambarellus young



Cambarellus montezumae



Cambarellus sp. "Arkansas"



Cambarellus chapalanus



Cambarellus patzcuarensis „orange“



Cambarellus puer



Cambarellus patzcuarensis „orange“



Cambarellus puer



Cambarellus puer



Cambarellus shufeldti



Cambarellus puer



Cambarus howardi



Cambarus manningi



Procambarus clarkii



Procambarus enoplostern



Cambarus speciosus



Cambarus rusticiformis



Procambarus pygmaeus



Procambarus tolteca



Orconectes luteus



Orconectes durelli



Cherax sp. „Blue Moon“



Cherax quadricarinatus

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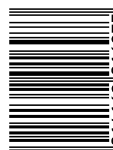
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