Issue 1/2013

sera VIVO

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Aquarium passion in Southern France

We visit the aquarium expert Hans Dulière at the Côte d'Azur

Josef Ravnak
Founder and managing director
of the sera GmbH

Dear animal lovers,

a symbiosis, in other words the cooperation of entirely different organisms ensuring mutual benefit, is a fascinating way for improving the life situation. Reef forming coral species that accommodate zooxanthellae are very popular also among marine aquarists, and they are successfully kept and propagated.

The new pond season is eagerly anticipated after the long winter. Animals and plants wake up in spring and become active. Splendid blooms and lively fish are a pleasure to watch. We will give you valuable advice for a successful start into the season in this issue of your **sera VIVO**.

Every serious aquarist is surely aware that fish are living creatures with complex behavioral patterns and an ability to learn that should not be underestimated. They are much more than only beautiful looking "living decoration". As an entry into this interesting and important topic, your **sera VIVO** deals with some important aspects from current research.

You'll find all this, and more, in this issue.

We hope that you enjoy reading **sera VIVO**!

Josef Ravnak

Title feature

Pond environments

Behavior research

Nutrition

Corals

Aquarium environments

sera world

Special

Credits

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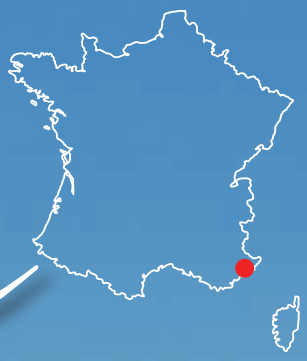
Impressive Aquariums at the Côte d'Azur



Situated directly at the coast, not far from Monaco, Nice provides ideal preconditions for creating interest for the aquatic inhabitants. Hans Dulière owns a specialized aquatics store here that, besides a highly interesting selection of plants and animals, also ensures competent advice.

By the cities of Monaco, Saint Tropez, Nice and Cannes, the Côte d'Azur is well known beyond the borders of France, and it provided the setting for numerous successful movies. However, the Côte d'Azur has even more to offer. Hans Dulière allows us interesting insights into the exciting and active local aquarium scene.

How did you discover aquarium care for yourself, and when did you open your store?
I come from a family of fishermen and always lived in Beaulieu sur Mer close to the Mediterranean Sea. At the age of 10, I set up an aquarium and learned to maintain it. I began breeding various species after a few years. I discovered marine aquariums when I was 18. I set up and kept a 500 liter (132 US gal.) aquarium with live corals, and a 1,500 liter (396 US gal.) aquarium with bigger fish shortly afterwards. My hobby became a profession when I was 28 years old. I bought an aquarium store that was specialized on selling exotic fish.

What makes aquarium care fascinating for you and your customers?
An aquarium is an intellectual, optical and aesthetical attraction. Everybody can live up to their imagination when designing an aquarium according to their ideas, their desires and even according to their interior design. It is a window into another world, a world of calmness and colors, that reduces stress and inspires the mind.

What is your view of the development of aquarium care in the past and future?
Aquarium care will continue to be omnipresent in our societies, but it will be subject to constant change. New animal and species protection guidelines will lead to further developments in breeding fish and corals. Aquarium care will remain attractive, because the French love animals, and having an aquarium at home or at work causes little effort.

How do you estimate the interest in aquarium care in France, especially in the Provence/Alps/Côte d'Azur region?
Our geographic position near the Maritime Museum of Monaco and the sea itself provides us with a situation favorable for developing the aquarium hobby in the region. This environment creates interest in aquariums all by itself.

Which are the characteristics of the aquarium hobby in France? Are there major differences compared to other countries in the world?
Specialized retail stores are rather unusual in France. During my visits in Belgium, the Netherlands, Germany, Spain and Italy, I still find that what made the French aquarium hobby strong in the Eighties: independent stores, small pet shops in quarters, there were dozens of them on the Côte d'Azur, as well as numerous aquarium clubs. All these enthusiasts formed a net of useful knowledge for aquarium beginners.
At the moment, the market in France aims at small aquariums, including round bowls and other variants for goldfish and Siamese Fighters. We can find aquariums holding a few liters even for marine environments. Keeping small aquariums is currently a strong trend in France. However, a small water volume is a bit more difficult to keep stable. We are aquarium manufacturers ourselves. We even offer self-manufactured ones, but we always recommend aquariums holding several hundred liters. »»

Which fish species and aquarium types (marine water, invertebrates, terrapins) are most popular in France?
Goldfish, tetras and livebearing fish are still the best selling fish in France. *Amphiprion ocellaris* as well as surgeonfish, among them *Zebrasoma flavescens*, are very popular for marine aquariums. Reef aquariums are still very popular.
However, there are still high demands for fish-only aquariums, and big fish are back again. Due to developments in technology, products and available information, successful marine aquarium care has become possible for every aquarist. We are thus experiencing a real boost in marine aquarium care.

But it is important for beginners to proceed step by step, as aquarium maintenance requires experience, knowledge, precision and respect towards nature. We therefore recommend beginners to do the first steps with freshwater before converting to marine water.

What do beginners need to know before starting their first aquarium?
Our position in the store is that appropriate counseling is very important when purchasing an aquarium. But the very extensive sera brochures also support the customers and provide them with very important information. Given the omnipresence of the Internet in our modern world, I believe in the stress reducing effect of aquarium care. An aquarium is nice to look at, it is a concentrated piece of nature that we all need sometimes. There is nothing that compares to watching your aquarium after a long and hard day.

Is aquarium care, in your opinion, rather a hobby for children or for adults?
The aquarium hobby is attractive for all age groups and all social classes. It is interesting for the youngest, as they become aware of the beauty of nature and ecology. The aquarium hobby allows for contact between the hobbyists (forums, swap meets, visits of different stores, museums). It invites to improve by reading magazines. This is the reason why it is particularly interesting for the youngest, as keeping an animal contributes to taking over responsibility for nature and for living beings.

It is often a relaxing hobby for adults. We forget everyday stress when maintaining or watching our aquarium. Aquarium care is a passion without fulfilled and with complex aims. We have to learn from nature every day, we try to improve without any interruption. This is the challenge.

Aquarists have made further developments of the aquarium hobby possible due to their experience – and have contributed to new findings in biology, chemistry or geography!

The Oceanographic Museum

Located at the coast of Monaco, the "Temple of the Seas", inaugurated in 1910, gives visitors the possibility to discover the worlds of marine inhabitants on over 6,000 m² (64,600 sq.ft.) of exhibition area.

A magnificent carnival procession takes place in Nice every year. Colorful flowers that can be found in all possible shapes and kinds are especially important in Nice's carnival.

Carnaval de Nice

Heureux comme un poisson dans l'eau

Due to its location directly at the sea, water and its inhabitants are omnipresent in Nice. The beautiful city is also impressing due to numerous buildings worth seeing as well as the legendary boulevard "Promenade des Anglais". Nice has a very mild climate and is a rewarding destination throughout the year!

Marseille

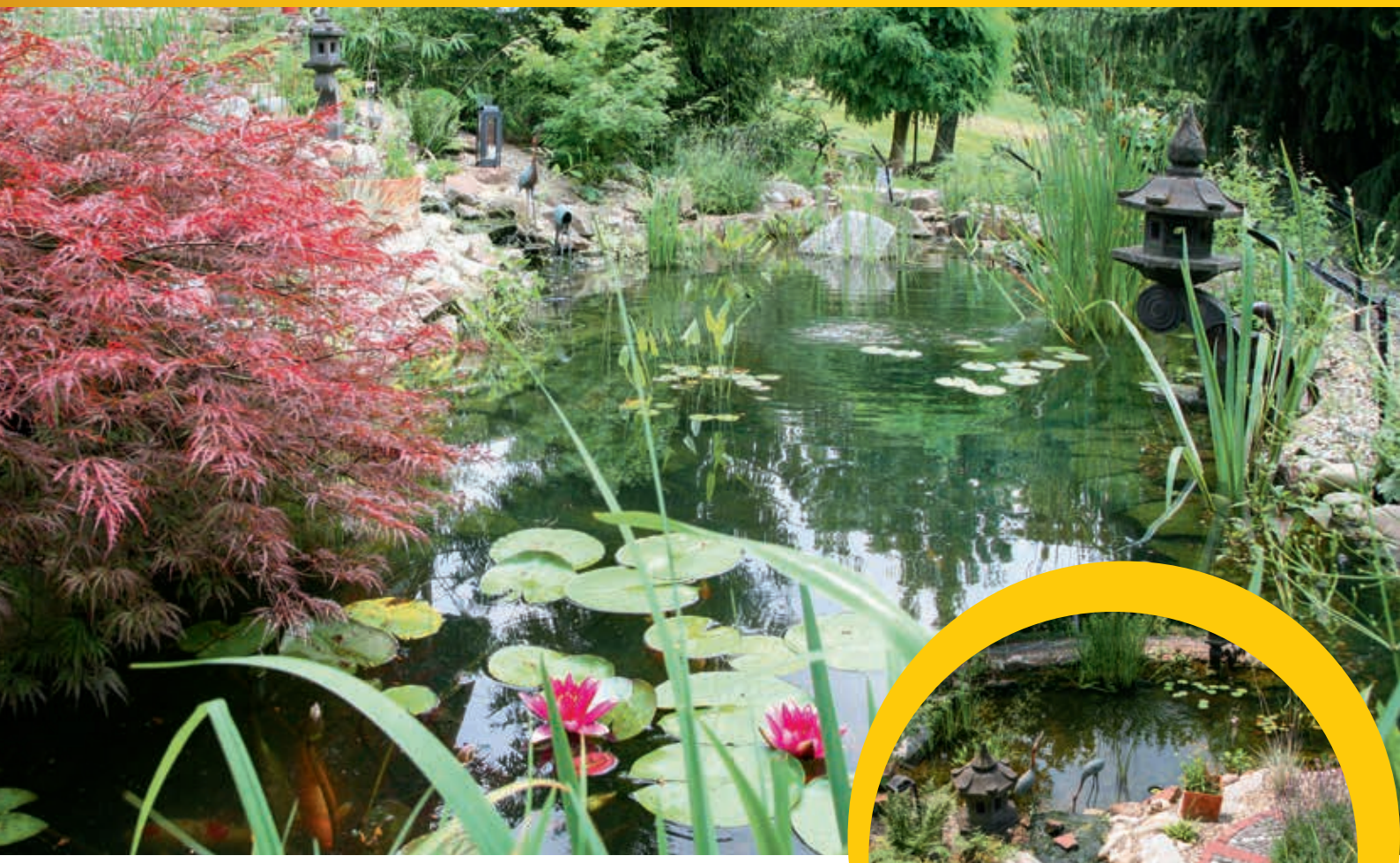
Toulon

Cannes

Nice

Sculpture by Sacha Sosno 2012

A mobile steel sculpture, a symbol for the works of Sosno, was placed at the Nice harbor as a memorial for the veterinarian Dr. Pierre-Richard Dick, who specialized in research, production and distribution of veterinary medicines



Beautiful **ponds**

An additional brook with a waterfall has a special appeal and allows for manifold observation opportunities of different amphibians and colorful dragonflies. Marsh plants with differently colored blossoms during spring and summer, located at the brook and the bank zone, give each pond its individual appeal.

by Dieter Untergasser

Your own pond can become a personal calm oasis. After a busy day, it allows relaxing and recreating, enjoying your favorite drink or meal surrounded by nature while watching life in and around the water.

Whether you prefer a fish pond or a natural pond, or if you wish to combine both, there are opportunities to put all ideas into practice. Due to their unbelievable color and fancy variants, Koi are undisputedly the most popular fish among fish pond keepers. Some pond keepers describe their animals, to which they often built up a personal relationship, in an actually enthusiastic way: "They majestically make their rounds through the pond flooded by sunbeams. Their scales reflect the light like diamonds." There are many ways to express the enthusiasm for the beauty of Koi.

The animals of course have to swim in clear water so they can be watched in their entire beauty. Effective filtration breaking down occurring waste products in the fish pond is therefore obligatory. Professional food with special ingredients according to seasonal requirements is required. You will find further details on this matter in the "sera KOI Professional" folder as well as in the latest articles on mannan oligosaccharides (MOS) in this and the previous 2012 issue of sera VIVO.

Maintaining constant and good water quality requires regular water changes. Newly added water should be treated with sera KOI PROTECT for protection against heavy metals it may contain, such as copper, lead and zinc, as well as against chlorine compounds.

The water of the pond becomes poor in minerals especially now in spring. Snow and rainfalls have reduced the amount of mineral substances, the water is worn out. Replacing a part of the water with tap water in spring tops up essential minerals only to a limited extent. Tap water mostly contains only calcium and carbonates. The fish, however, require many more elements that must be present in dissolved form. sera mineral salt contains all minerals in the correct ratios as an easily soluble salt blend that allows adjusting the correct ratio of calcium, magnesium and potassium in pond water.

Adding sera pond phosvec effectively prevents the multiplication of floating algae and the resulting green water, which often takes place in spring. Adding it in early spring, before algae multiplication begins, removes phosphate that has enriched during winter and thus withdraws the algae their nutrient supply. They cannot develop at all, the water remains crystal clear.

These simple maintenance measures ensure unspoiled joy with the pond, and the lively behavior of the fish will make their keeper happy.

Part 5

Indispensable for healthy life in a pond

Oxygen

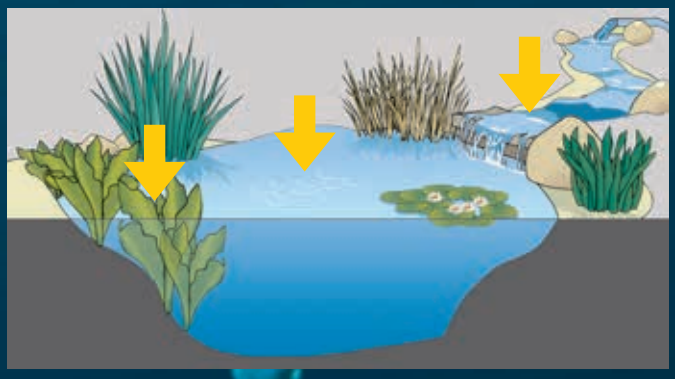
Atmospheric air contains approximately 21% oxygen which is mainly being produced by plants. It dissolves in water fairly well, and thus makes animal life possible. A part of the dissolved oxygen is directly formed by plants living in the water, another part is taken up from the air via the surface.

by Dr. Bodo Schnell

It is well known that oxygen is essential for the respiration of all animals, and fish are no exception. Good oxygen supply is therefore important. The oxygen requirements of different pond fish differs depending on their natural habitat. Fish from warm, slowly flowing or standing water require considerably less oxygen than species from cool or rapidly flowing water.

Besides respiration, oxygen ensures oxidative breakdown of organic waste matter such as waste, dead plant parts, leaves that have fallen into the pond etc. This breakdown is mainly carried out by bacteria, fungi and other microorganisms. These organisms utilize waste as nutrients and convert them into mainly harmless breakdown products. The oxygen requirement depends on the species, number and size of the fish, on feeding, presence of other pollutants as well as on the water temperature. Live processes are quicker in warm water, however the saturation concentration becomes lower at the same time. Careful monitoring and, if required, additional oxygen supply are therefore particularly important during summer.

Insufficient oxygen supply is dangerous: Due to the above mentioned breakdown processes, it may happen that not enough oxygen is left for respiration. Furthermore, pollutant breakdown also takes place in case of oxygen deficiency (anoxic breakdown). However, dangerous, toxic and foul-smelling breakdown processed are being formed during this process – this is called rotting. This must by all means be avoided in ponds. Leaves that have fallen into the pond must be removed immediately as to avoid oxygen deficiencies arising from their decomposition. Considering good pond hygiene that largely reduces problems and disease outbreaks, good oxygen supply is therefore indispensable.



Flowing water of a brook takes up additional oxygen.

How does oxygen get into the water?

Plants produce oxygen during photosynthesis – another reason to use plants in a pond! Fast growing submerged plants release particularly much oxygen into the water and thus strongly contribute to a healthy pond climate. It may at least in large ponds be possible to separate a part inaccessible for the fish and cultivate the plants there. This prevents the fish from considering them a welcome vegetable food and eating them.

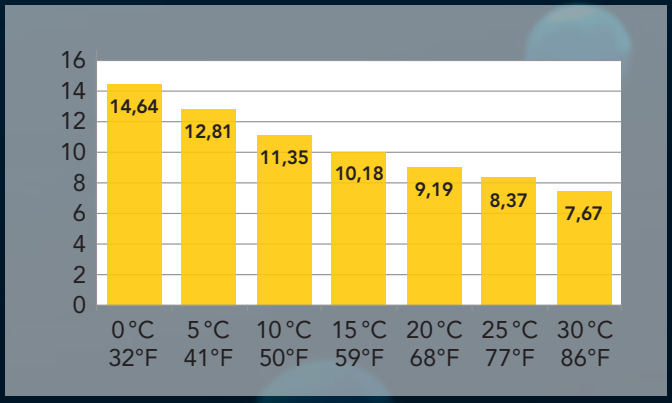
An entirely sufficient amount of oxygen gets into the pond water via the water surface. It is advantageous to provide the pond with a brook. The flowing water takes up additional oxygen, furthermore the surface becomes larger due to the formation of waves. This surface agitation is at the same time an effective measure against the formation of oily layers that inhibit oxygen uptake. Reasonable water circulation by a filter pump is important for distributing the oxygen evenly.

Ponds are subject to seasonally and climatically caused temperature variations. Accordingly, the oxygen level varies strongly. Like all gases, oxygen dissolves better in cold than in warm water. More than 14 mg/l are dissolved at 0°C (32°F) and 100% oxygen saturation. At 20°C (68°F) it is approximately 9 mg/l, at 25°C (77°F) only about 8 mg/l. Depending on the organic pollution, 100% saturation are often not achieved – and 50% oxygen saturation at 25°C (77°C) then only represent approximately 4 mg/l!

Measuring the oxygen level

It is therefore recommended to check the oxygen level regularly. 4 mg/l are considered a minimum level for keeping fish. However, higher oxygen levels are advisable and create some safety margin, especially during summer. The sera oxygen-Test makes it easy to check the oxygen level of the water within minutes. In case of insufficient oxygen it is important to find out about the causes immediately and to remove them.

In case of acute oxygen deficiency it is advisable to add sera O_2 plus for immediately improving the oxygen supply. The powder is simply sprinkled onto the surface. sera O_2 plus combines immediate and long term oxygen supply.



Temperature dependency of the oxygen level (always 100% saturation) mg/l O_2

Part 1

Fish welfare – Not a merely ethical consideration

by Elena Rathgeber

Fish as pets

From a statistical viewpoint, fish are the third favorite pets. However, we still find it relatively difficult to make contact with these very distant relatives. They cannot make themselves understood neither by gesture nor by sound. We are not familiar with their living environment. They are nevertheless sensitive creatures and not easily replaceable decoration items. Although or maybe especially because their horizon of experience and their emotions strongly differ from ours, we should try to find out when a fish that we keep really feels well.

An appropriately kept aquarium or pond allows the kept animals to lead a life relatively natural and according to their requirements. Unlike, for instance, many dogs and cats, ornamental fish are ideally kept in an environment close to nature that allows keeping them together with members of their own kind as well as reproducing. Optimal, stable conditions in the water are, however, rather difficult to maintain, especially in small tanks. To make things worse, the actual requirements are often poorly researched so far.

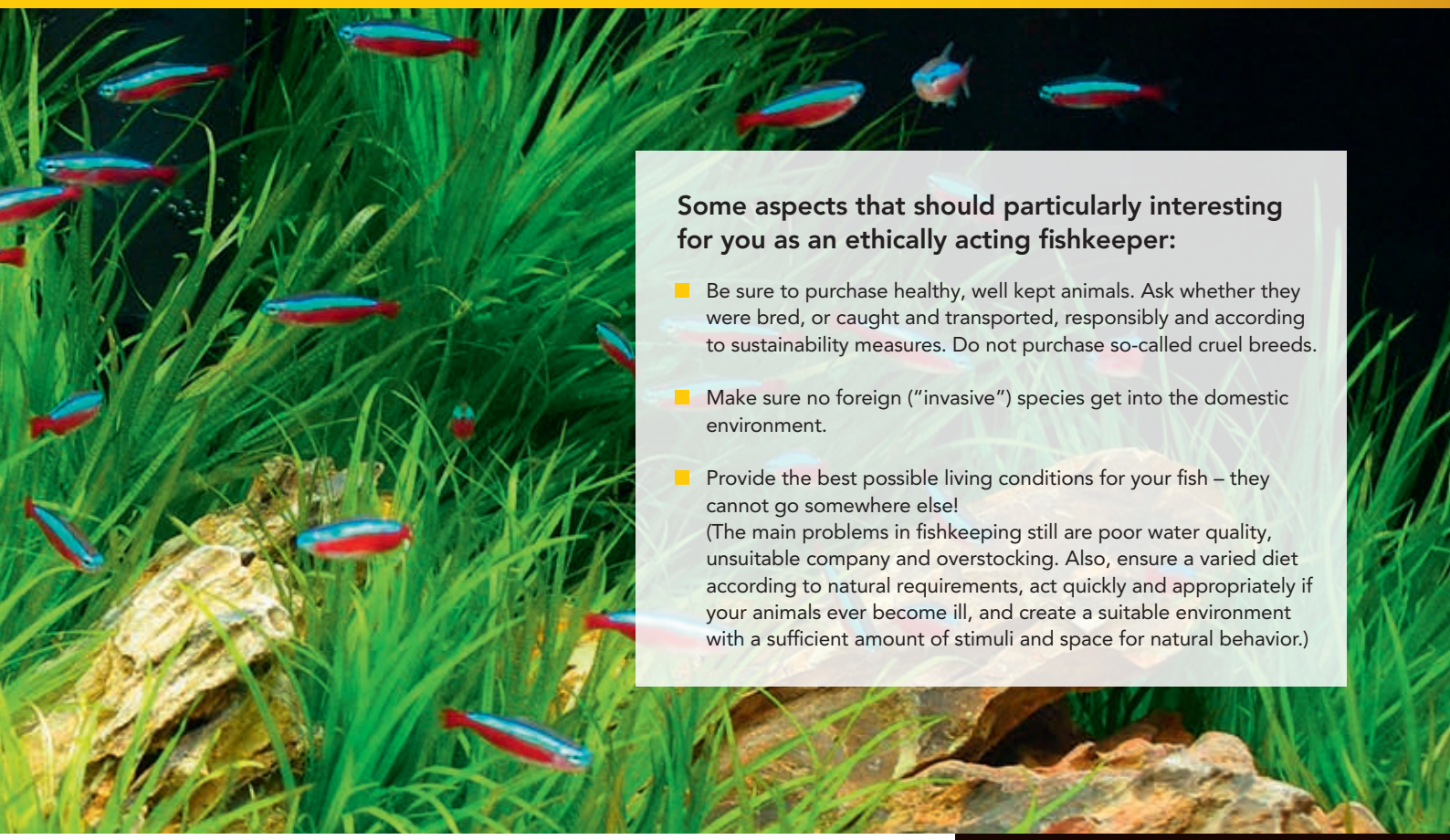
Definition of welfare

It as very complex task to recognize these requirements, in other words to define welfare on a scientific basis. It is not sufficient to just measure isolated factors such as mortality or the growth rate. Besides these factors that objectively affect health, the subjective preferences of the animals should also be considered, provided they can be made measurable by behavioral research. This is accompanied by the question for the behavioral repertoire of the fish in the wild (e.g. migration or schooling behavior). There is, unfortunately, still plenty of research required for many species before the findings can be formulated in practical keeping recommendations.

Beyond these observations one should not forget that fish living in the wild are also confronted with considerable impacts to their welfare (e.g. predators, hunger, diseases, unfavorable environmental conditions). Only few fish survive until they become sexually mature. This is in no way supposed to justify poor keeping conditions, but it shows that due to their evolutionary adaptation, fish are basically able to cope with these challenges in their environment.

Stress reaction – an adaptation strategy

Stress reactions are an important adaptation strategy for overcoming such problems. Upon contact with stress factors, the (fish) body reacts with a number of physiological changes (among others, by releasing the "stress hormones" adrenaline and cortisol, by increasing the heart and blood circuit performance, and by mobilizing energy) that make the fish more resistant in this exceptional situation. Long-term stress reactions, such as reducing food uptake, stopping reproduction, weakening the immune system and affected growth, also first support overcoming the stress causing situation. In the long run, however, they themselves become a problem which considerably reduces the welfare of the fish and may lead to disease and death.



Some aspects that should particularly interesting for you as an ethically acting fishkeeper:

- Be sure to purchase healthy, well kept animals. Ask whether they were bred, or caught and transported, responsibly and according to sustainability measures. Do not purchase so-called cruel breeds.
- Make sure no foreign ("invasive") species get into the domestic environment.
- Provide the best possible living conditions for your fish – they cannot go somewhere else!
  (The main problems in fishkeeping still are poor water quality, unsuitable company and overstocking. Also, ensure a varied diet according to natural requirements, act quickly and appropriately if your animals ever become ill, and create a suitable environment with a sufficient amount of stimuli and space for natural behavior.)

Tolerance for suffering?

Do animals and, in particular, fish have feelings and can they suffer in a human sense? Recent studies allow the conclusion that fish – as well as decapod crustaceans (e.g. shrimps and crayfish) and cephalopods (squids) – have the ability to feel pain stimuli. If they experience such a pain stimulus, they try to avoid it. The corresponding reactions can be very complex and exceed mere reflex by far. Fish are able to perform the pain avoiding reaction they once learned even a long time after the corresponding experience. (Unlike the often quoted alleged seconds-only memory of goldfish, they and many other species have proven their well functioning long term memory in laboratory experiments.) This leads to the conclusion that injuries or harmful conditions affect the welfare of each single fish. Based on our ethic responsibility, our acting must aim at avoiding such lacking welfare conditions for fish we keep as far as possible – in compliance with the core statements of German animal protection laws (§1 s. 2).

Reconsidering: Species protection and protection of single ones

Luckily, increasing awareness for the welfare of fish in all relevant areas (research, aquarium care, aquaculture, fishery and angling) among both people and legislative and counseling authorities can be generally recognized. While fish used to be worth protecting only in their entirety (prohibition of overfishing, environmental protection measures, etc.), if at all, today also their rights as individual living beings are increasingly acknowledged.

Fish are highly developed, sensitive creatures which, however, are different to us warm blooded vertebrates in many important aspects. We must honor both similarities and differences as to effectively support fish welfare.

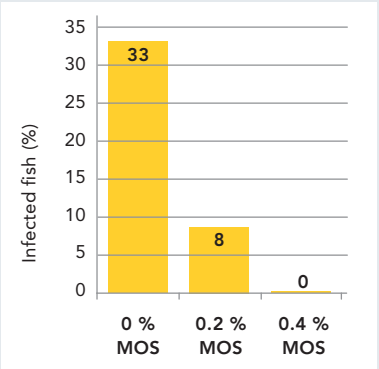
Easily applicable indicators for evaluating fish welfare:

- **Color changes**
- **Changes of breathing frequency**
- **Changes of swimming and other behavior**
- **Loss of appetite**
- **Reduction of growth rate**
- **Loss of condition**
- **Physical anomalies**
- **Injuries (with recovery delay)**
- **Increased disease occurrence**
- **Reduced reproduction rate (if applicable)**

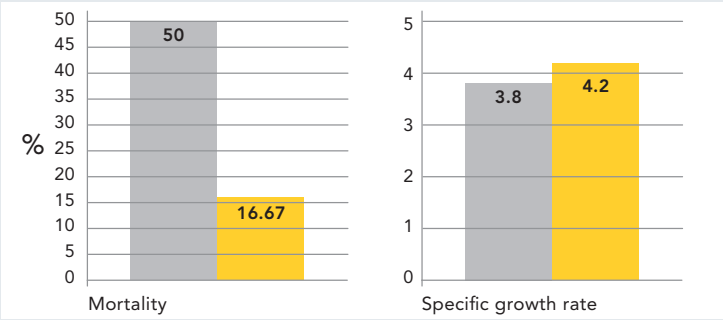
Functional Food –

The benefits of Mannan Oligosaccharides

by Elena Rathgeber



Frequency of infection by *Vibrio alginolyticus* in sea bass that were fed with different MOS concentrations (sera foods include 0.4% MOS)
Diagram according to Torrecillas et al., 2007



Effects of MOS on tank-kept young carp
Diagram according to Culjak et al., 2006

Functional food: More than just eating your fill…

Today, well informed fishkeepers expect more from a brand food product than just fish that have eaten their fill. Correct nutrition is a basic precondition for a long and healthy life. As usual for sera ever since, high quality and manifold ingredients according to nature must be carefully blended and gently processed to make a good food. This ensures the fish being supplied with all required components in suitable amounts.

Furthermore, modern foods that follow recent scientific findings may considerably enhance the fish doing well in an objectively measurable, while merely natural, way by using functional additives. These functional additives include mannan oligosaccharides (MOS).

Which effects do MOS have?

MOS are prebiotically effective cell wall components of a specific yeast strain that support intestinal health in a natural way and improve the general health status of the fed animals. The efficiency and functionality of MOS has been proven extensively in numerous scientific studies as well as in long-term practical use (e.g. aquaculture). Among others, the following effects of MOS in fish have been scientifically proven: Growth and weight enhancement; improved specific growth rate; performance improvement, intestinal health and immunity (especially while under stress); reduced mortality (improved ability to survive), improved food and nutrient utilization; improvement of intestinal health and intestinal function; denser and longer mikrovilli; the intestinal mucous membrane protects – under the influence of MOS – against infections more effectively and die blood health improves.

How do MOS work?

There are numerous basic mechanisms of action of MOS. Being prebiotics, they support a healthy, balanced intestinal flora. Furthermore, MOS specifically reduce the growth of pathogenic bacteria by inhibiting them attaching to the intestinal mucous membrane. Studies have revealed that, for instance, the number of Vibrio bacteria that cause severe damage in many fish species (especially in aquaculture) was considerably reduced when using MOS.

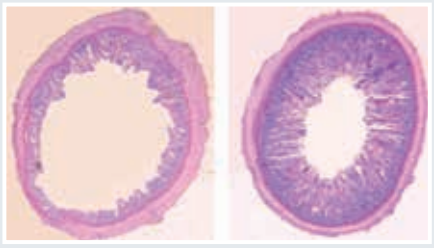
MOS also have a positive effect on the intestinal structures. The number and length of the mikrovilli (protrusions of the intestinal epithelia cells) are considerably increased by using MOS, which strongly increases the intestinal surface. This leads to optimized digestion performance. Besides these effects, a direct positively stimulating effect on the entire immune system could also be proven for MOS.

Prebiotics are indigestible oligosaccharides, i.e. carbohydrates, that positively affect their host by stimulating growth and/or activity of one or several bacteria species – especially lactic acid and bifido bacteria – within the intestines in a targeted way. They thus alter the intestinal flora in a positive way. The "good" bacteria multiply while the "bad ones" become less.

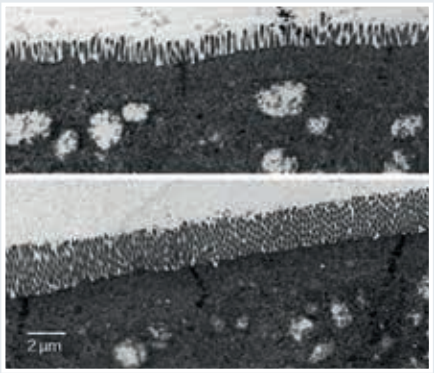
Why does sera use MOS?

In summary, using MOS is an important preventive measure for maintaining the health of the fish being fed. The animals become ill less easily, infections take course more mildly and the recovery phase becomes shorter. Medicinal treatments, e.g. against bacterial infections, are required much less frequently.

Due to their proven positive, safe effects, in particular referring to enhancing immunity, and as natural, functional ingredients, MOS have deserved their place in the ingredient list of sera food products.



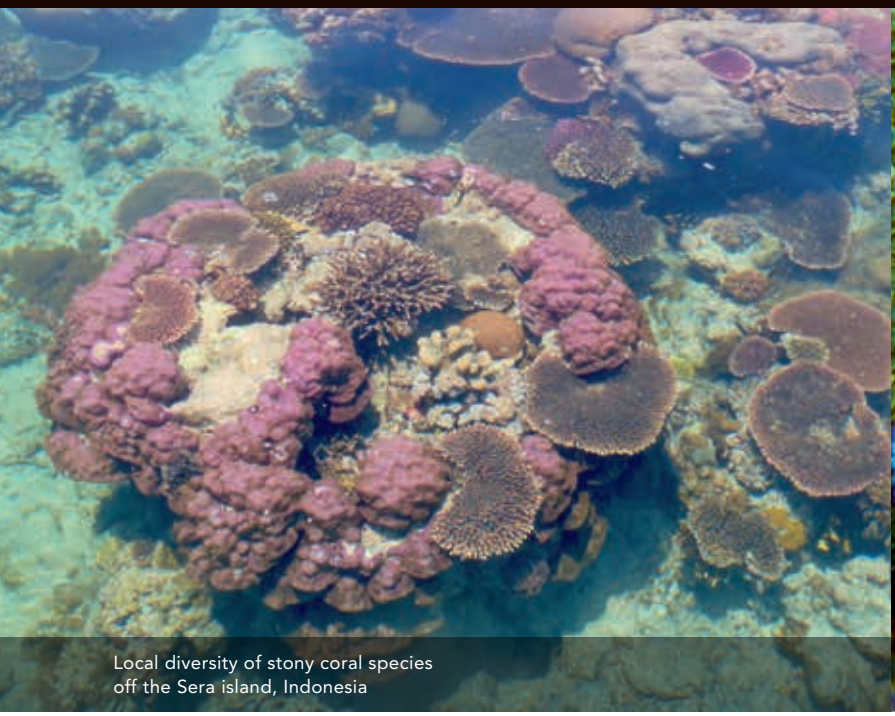
Comparison of intestinal sections of rainbow trout fed without or with MOS addition, visualized by light microscopy. The intestinal structures are considerably more complex when feeding with MOS (on the right).
Source: Sweetman et al., 2010



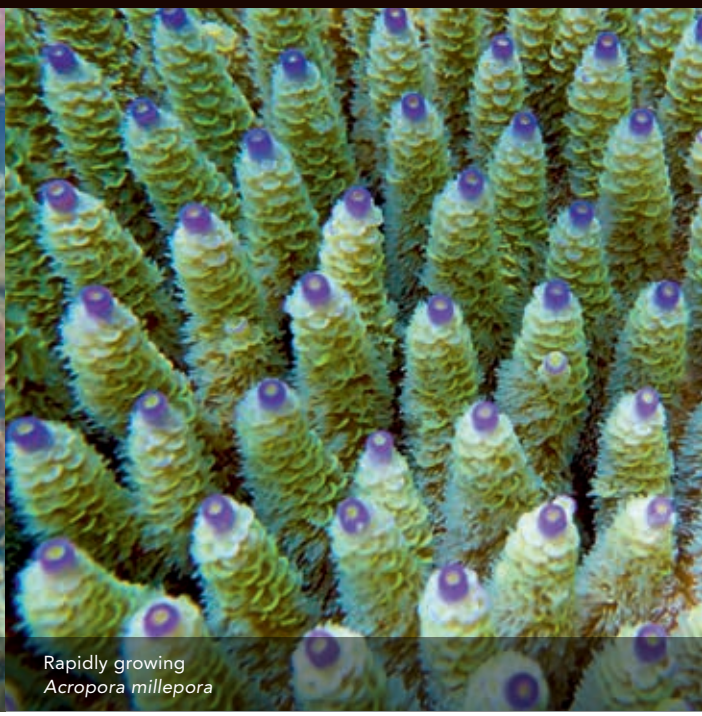
Comparison of intestinal epithelia cells of *Cobia* fish larvae fed without and with MOS, visualized by electron microscopy. With MOS (bottom), a considerable prolongation and compaction of the mikrovilli. The number and sizes of vacuoles and vesicles within the cells became lower.
Source: Salze et al., 2008

Corals and temperature

Temperature influences the metabolism of every organism. Unsuitable temperatures, however, affect symbiotic life partnerships between animals and plants, not only in an aquarium. Discovering bleaching corals in an aquarium may be a symptom caused by overheating.



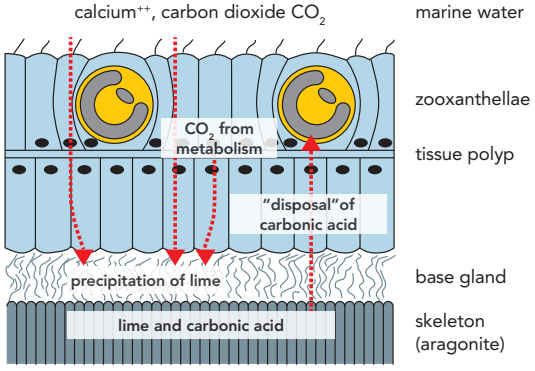
Local diversity of stony coral species off the Sera island, Indonesia



Rapidly growing *Acropora millepora*

by Johannes Dürbaum

A complicated cooperation between different organisms explains the success of corals in tropical waters particularly low in nutrients. The symbiosis between microscopically small single-celled algae or autotrophic (buildup metabolism depending on light) dinoflagellates and stony and soft corals led to an evolutionary breakthrough which, among others, allowed the complex coral reef biotopes being formed. However, other organisms took up these so-called zooxanthellae in their tissues as well: some mollusks (e.g. giant clams and nudibranchs) as well as the single-celled foraminifers are some examples. Foraminifer species were so successful and dominant in the past that their fossilized hard shells deposited as marine sediments that formed entire mountain ranges.



Cross section through polyp tissue and skeleton forming zone of a stony coral
(Illustration according to Schumacher)


Daymaniat Islands, Oman


Green tide

The idea behind the symbiosis is: The animal partner supplies the light requiring herbal partner within its tissues with nutrients and compounds that arise from its heterotrophic metabolism (ammonium, CO_2). In return, the zooxanthellae within the animal tissues supply their host with oxygen and carbohydrates. However, the function of the zooxanthellae is not restricted to this: Their CO_2 consumption (due to photosynthetic activity) influences the calcium equilibrium in a way that calcium hydrogen carbonate, which is easily soluble in tissue water, precipitates as poorly soluble calcium carbonate. This is regulated by the animal component of the symbiosis, and precipitations of the calcium carbonate construction material only take place where the animal requires it for skeleton growth. The zooxanthellae must therefore permanently be moved. The even skeleton growth reveals how well this functions.

There is an ideal temperature for every physiological process. Depending on the coral species and their environment, this ideal value is between 24 and 28°C (75 to 82°F). The cooperation gets under pressure especially when temperatures rise above approximately 28°C (82°F). Under adverse conditions, the physiologically powerful zooxanthellae do not produce any oxygen anymore (other plants behave in the same way and stop their photosynthetic performance), but only process their carbohydrate supplies into CO_2 (light-independent reaction, a breathing process that does not depend on light). This CO_2 adds to the CO_2 of the animal component of the symbiosis and presumably leads to hyperacidity within the tissues of the polyp. The polyp now in return puts the brakes on and expels most of its partner who now only generates CO_2 and consumes oxygen. Coral bleaching is the result: the polyps appear pale, transparent and without color. Most of its herbal partner is now missing. However, a new population can be grown from the remaining zooxanthellae within the polyps in case the conditions improve. If the high temperature phase lasts too long, however, the coral cannot recover anymore and dies.

Some corals already expel their zooxanthellae at 29°C (84°F) water temperature, others only at even higher temperatures or simply longer exposition. Such high temperatures in coral seas have occurred in succession of El Niño. They have repeatedly led to massive damage and large-scale dying of coral reefs in the Indian Ocean during the past 10 years. But it of course almost never happens that all specimens of a species die within a region, and so the survivors can spread via sexual and non-sexual multiplication. The survivors apparently have specific abilities or higher tolerance.

When I was diving and snorkeling in the Arabian Sea off the Oman coast a couple of years ago, I noticed the extremely high water temperature in late autumn. It was still around 32°C (90°F) in November. Such "bathtub temperatures" are usually fatal for stony corals, but in contradiction of what I learned the stony corals surrounding me were perfectly healthy. The water current also was extremely weak, and the temperature was constantly high until more than 10 m (33 ft.) water depth. I was informed on location that the water temperature in midsummer was even higher for weeks and is supposed to reach more than 35°C (95°F) at times. Furthermore, temperatures regularly caused unbelievable densities of single-celled green algae that concentrate at the surface of coastal water so strongly that it becomes impossible to see your own hand in front of your diving mask when snorkeling. It is said that there is a "red tide" besides this "green tide" during other seasons, plus very low tides that directly expose corals close to the coast to the desert sun for hours while they are separated from the water. Stony corals with the highest stress tolerance in the entire world probably live in this region of the Arabian Sea. Unfortunately, most corals in our aquariums do not have such capacities. We therefore must keep temperatures within narrower limits. There are often actually the same coral species as in Asia or the Arabian Sea, but their zooxanthellae possibly belong to different species.

When applied together, sera marin COMPONENT 1 and 2 provide calcium hydrogen carbonate for stony corals in an aquarium. They are particularly easy to use.


Cherax boesemani


Caridina cf. cantonensis

Invertebrate aquarium inhabitants have become very popular during the last few years, since it is possible to keep them in relatively small aquariums. An aquarium that is nicely set up with aquatic plants and in which shrimps, crayfish and fish live together, is particularly attractive.

Community aquariums **with crayfish and shrimps**

by Dieter Untergasser


Procambarus clarkii

The size of the fish must match the expected size of the crayfish. Crayfish are often only half their final size when you purchase them. Predatory crayfish species that consider their smaller co-inhabitants prey are of course not suited for such a community aquarium. Most American crayfish species such as the well-known *Procambarus clarkii*, are therefore not a suitable choice. They can be kept with similarly sized or bigger fish.

The species from the *Cherax* genus that originate from Australia and the Indonesian islands are considered particularly suitable for keeping together with shrimps and fish: *Cherax* sp. "Blue Moon", *C. boesemani* or *C. destructor*. Suitable fish include small labyrinth fish, characins, barbs, Endler's livebearers, platies and small cichlids. These *Cherax* species are so peaceful that, even when breeding them, they can be kept together with small shrimps that climb around on them.

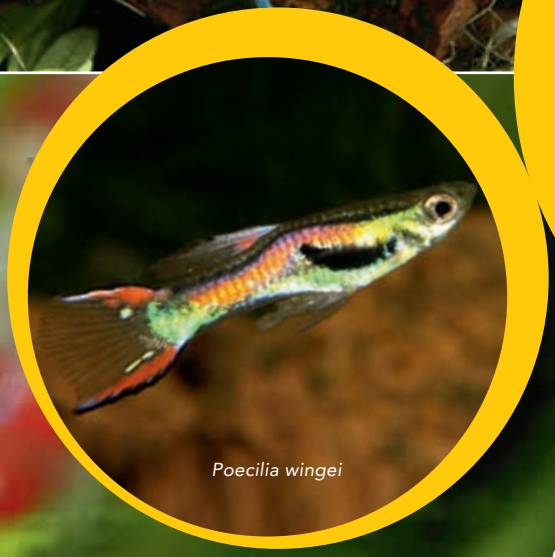
You must by all means make sure to provide caves and shelters appropriately sized for the crayfish. You can build them very decoratively from flat limestone and plant them with moss, ferns or *Anubias*. Crustaceans need to shed their skin as they grow. During and after skin shedding, the crayfish are very soft and lack protection until their new shell has become hard again. Small clay tubes, coconut shells and root caves serve as hideaways.

If you are lucky to have a harmonizing crustacean pair they will start breeding soon. Shrimps multiply particularly frequently. Plenty of very small shelters and caves are required for the tiny offspring so they do not get in trouble while shedding their skin.

You must also make sure the little crustaceans are not drawn into the filter. The sera Biotop Cubes with internal filter are equipped with a fine mesh net on the intake grid. You should protect the intake pipe with some fine mesh net or a sponge when using an external filter.


Cherax destructor


Colisa lalia


Poecilia wingei

Crustacean care

Consistent water conditioning including the regularly required water changes is the most important factor when keeping crustaceans. Smallest amounts of chlorine or heavy metals in the tap water will kill the crustaceans. It is therefore necessary to add sera aquatan for the entire aquarium contents after siphoning off the old water and before adding new water. Double dosage is not harmful at all but provides even more protection. In case of strongly contaminated water, you should first add sera toxivec followed by sera aquatan. You may also use sera blackwater aquatan instead of sera aquatan as humic substances are very beneficial for crustaceans.

Nutrition of invertebrates

A balanced diet is as important for crustaceans as it is for fish, as they require special proteins and high quality carbohydrates that allow them to grow well, shed their skin and harden their shell. The sera shrimps natural and crabs natural foods contain these nutrients. A balanced mineral supply is also by all means required. You should add one heaped teaspoon sera mineral salt per each 100 liters (26.4 US gal.) of aquarium water about one hour after the water change.

Caridina cf. cantonensis

The sera Biotop Cube complete systems are particularly well suited for keeping crayfish, shrimps and fish together. Due to their sizes they can be set up with plenty of imagination and according to the requirements of their inhabitants. You will enjoy interesting observations with the vivid crustaceans for a long time when doing so.

New VDA Expertise Center at sera's

Training and further education have a long tradition in the sera company. sera has been taking care of professional training in the specialized trade for over four decades.

by Dieter Untergasser

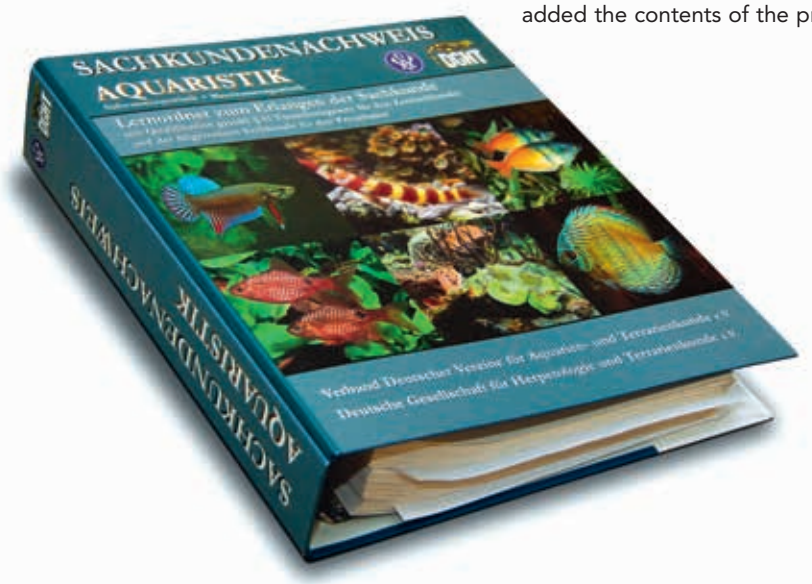
In another step, sera will establish the Expertise Center West in cooperation with the Verband Deutscher Vereine für Aquarien- und Terrarienkunde (VDA)* in spring. Expertise trainings according to § 11 of the German Animal Protection Act with official examination, as well as according further education courses, will take place there.

Expertise has an almost 20 year old tradition in aquarium care. Proof of expertise was originally intended for VDA members. It allowed them to refute claims that aquarists had insufficient knowledge for keeping the fish according to their requirements. A 600 page training folder, a training course and an examination provided unique competence. In the meantime, the vast majority of VDA members successfully passed this examination.

During the second half of the Nineties, § 11 of the German Animal Protection Act set forth for every store selling live animals commercially that a responsible person had to prove his or her expertise during a personal interview with the state veterinarian in charge. The same applies for keeping and breeding vertebrates commercially exceeding an annual turnover of € 2,000. State Veterinarians got in touch with the executive committee of the VDA and asked whether the VDA could review the expertise folder and the examination, as to make training the salespeople in the pet trade possible. The authors then added the contents of the proof of expertise according to § 11 of the German Animal Protection Act to the expertise folder and the examination. Many trainings and examinations in the areas of freshwater aquarium care, marine aquarium care and terrarium care were held at the company sera's as well as nationwide.

During the last years, the VDA training was reviewed completely by Dr. Stefan Hetz and Dieter Untergasser and filed for acknowledgment as equal. The new training and examination comprises the areas of freshwater aquarium, marine aquarium and pond care. It is intended to add the area "invertebrates" later on.

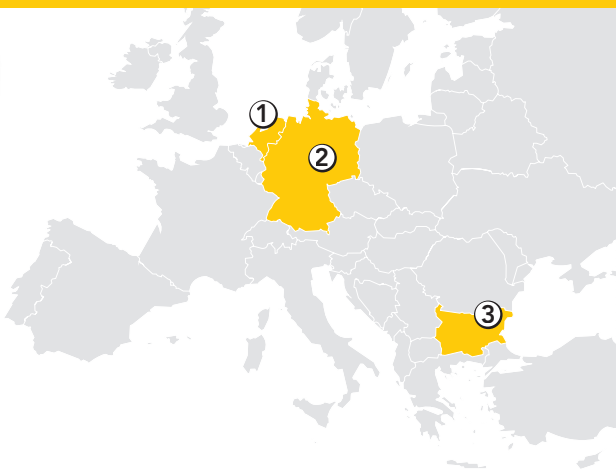
The legislative authority required to set up five permanent training institutions, so-called expertise centers. Trainings can be conducted according to consistent guidelines, and examinations can be held there. The examination must be held by an examiner of the association in the presence of the state veterinarian in charge for the location. Upon passing the examination, the examinee will receive a personal certificate from the VDA which he can present to his or her state veterinarian.



*Association of German Clubs for Aquarium and Terrarium Care

Besides the one on the sera premises, further expertise centers are so far located in Hamburg, Berlin, Landau and Munich.

Those who want to get informed about the trainings and examinations according to § 2 and § 11 of the German Animal Protection Act may check out the web site www.sachkundenachweis.de operated by VDA and DGHT. The dates of trainings and examinations as well as up-to-date changes of the legal situation are announced there.



With sera, of course ①

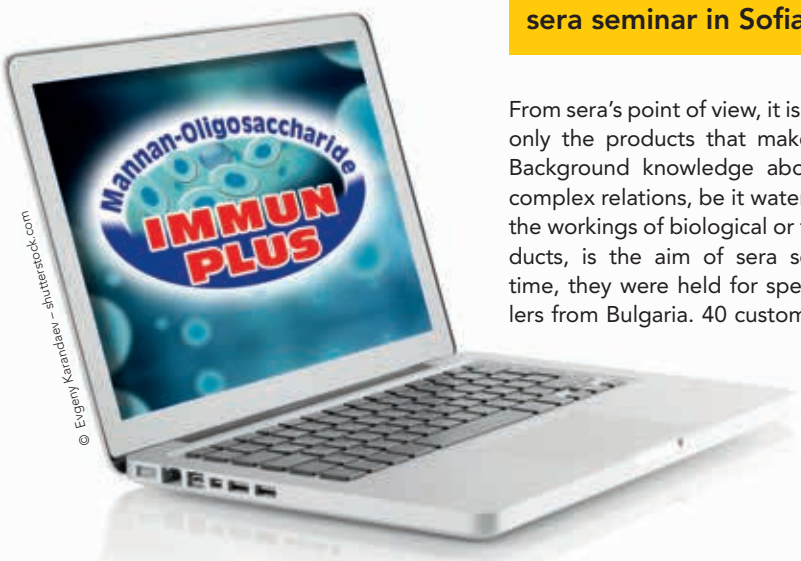
On September 30, 2012, more than 80 retailers from the Netherlands enjoyed a fascinating day in one of the most beautiful zoos in Europe, Burgers Zoo in Arnhem.

While the sun was shining brightly, the participants first explored the zoo on their own before taking part in a seminar explaining the innovative sera products.

SERA WORLD

sera supports kindergarten ②

The children are enjoying the beautiful aquarium sera donated, and whose setup was supported by the aquarium association "SCALARE" from Münchberg/Germany. Beauty and interesting aspects of nature become clear and understandable this way.



sera seminar in Sofia/Bulgaria ③

From sera's point of view, it is of course not only the products that make the hobby. Background knowledge about the often complex relations, be it water chemistry or the workings of biological or technical products, is the aim of sera seminars. This time, they were held for specialized retailers from Bulgaria. 40 customers gathered in Sofia on November 28, 2012 and gathered valuable information about new sera developments. This time, the focus was on the entirely new prebiotic ingredient Mannan oligosaccharide (MOS) with their health supporting effect. Mr. Untergasser from sera led through the informative program whose aim it was to get more informative knowledge to end customers via the retailers.

children's page

Hello children,
choosing was very difficult for us due to the large number of beautiful pictures.
Don't be sad if your picture is not shown here – maybe you'll be successful next time!

THE WINNERS

1st PRIZE
A shopping voucher worth € 100,–
Anna P. from Jessentuki, Russia, 7 years

3rd PRIZE
A shopping voucher worth € 25,–
Lars van B. from Hulst, Netherlands, 9 years

2nd PRIZE
A shopping voucher worth € 25,–
Dominik L. from Bydgoszcz, Poland, 6 years

Send your most beautiful picture to:

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We are looking forward to your contributions.
Please write your age and your address on the back of the picture.
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A food blend optimized for the corresponding season, for a diet that Koi need by nature.

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Contains the sera Vital Immune Protect Formula, manufactured in the very careful low temperature process.

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Spirulina Color Food
from 8°C (46°F)
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below 17°C (63°F)
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with a well-balanced ratio between energy and protein for optimal growth and minimum water pollution

Winter Food
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