sera guide

Healthy aquarium fish

- Recognize fish diseases, find out causes
- Treat successfully with sera treatments

Contents

1 Prevention is better than the cure!

Stress affects the immune system and weakens disease resistance. It therefore is – just as in humans – one of the main factors for fish disease outbreaks. Stress is caused by different factors. Maintenance mistakes (too many, insufficient or wrong measures taken), a fish stock that does not harmonize, adding too many fish, strongly varying temperatures, overfeeding and correspondingly high organic water pollution along with a large number of pathogens in the water are among the most common ones. Frequently, diseases then break out whose unnoticed corresponding pathogens were already present in the tank (secondary parasites, among others).

Other important stress factors include monotonous or unsuitable nutrition, fear due to being caught, frequent maintenance in the aquarium, transport, toxic substances in the water and unsuitable plant fertilizers.

You will find extensive and well founded information about keeping your aquarium fish stress free in the **sera** guides “How to set up an aquarium”, “How to feed your tropical fish naturally” and “Aquarium care according to nature”, and on www.sera.de. Your specialized retailer can counsel you in detail which fish are suitable for keeping together, and which special features and water parameters they require. If you then dedicate one to two hours per week to your aquarium it will provide you plenty of joy for a long time. In case a disease ever actually occurs, this guide and the **sera** products will provide excellent support for helping your fish quickly and effectively.

We want you to enjoy your aquarium and your healthy, lively fish to the fullest.

How does stress develop in an aquarium? – Examples

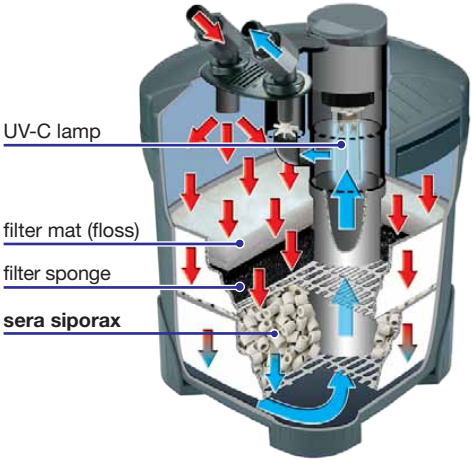
- Fish transfers and transports
- Varying temperatures
- Frightened fish, e.g. due to keeping unsuitable species together or due to permanent hierarchy fights
- Frequent maintenance in the aquarium, e.g. due to permanent decoration changes
- Aquariums without places to hide or retreat
- Too strong water agitation
- Unsuitable water parameters
- Improper application of chemical agents (e.g. unsuitable fertilizers, wrong application of treatments)
- Poor hygienic conditions, e.g. by insufficient or wrong care
- Overfeeding or wrong/deficient nutrition due to feeding poor quality food
- Overstocking

Avoiding stress = preventing diseases

1 Prevention is better than the cure!

Tip

The **sera UV-C Systems** reduce the number of pathogens in fresh and salt water aquariums as well as in ponds in a merely physical way, without chemical agents. Many pathogens as well as annoying algae are reduced or even almost entirely removed by directed use of a UV-C lamp. Filter bacteria remain largely unaffected as most of them cling to the filter material (**sera siporax** is particularly well suited) and to the bottom gravel. The **sera UV-C Systems** therefore provide an important contribution to disease prevention and largely contribute to high life quality in aquariums.



sera UV-C System 5 W for adding to existing filters

2 Recognizing fish diseases

Unfortunately, fish diseases may occur even when best care conditions are provided. It is important to recognize these diseases, allocate them correctly and treat them. Some basic knowledge about the most common fish diseases is required to do so.

You should observe the fish for disease symptoms and unusual behavior every day when feeding them, as to ensure you can judge their health status. Be extremely vigilant even if only one fish separates from the others or behaves conspicuously in another way.

Generally, external and internal diseases are distinguished, depending on where they occur.

External diseases mainly occur on the fins, the skin and the gills. They can usually be recognized in early stages and therefore be treated in time.

Internal diseases are less easy to recognize. However, upon careful observation almost all diseases lead to untypical behavior. This includes loss of appetite, conspicuous swimming behavior, apathy and color changes (especially darkening).

Attentive aquarists therefore can quickly notice something is wrong also in case of internal diseases.

Regular and careful observation allows to recognize many diseases already in their early stages. The affected fish are not yet weakened too much, and chances are good that healthy fish will not be infected at all.

Correct diagnosis is a precondition for successful treatment. **sera treatments** are tailored to specific diseases and does not unnecessarily burden the fish nor the aquarium.

A general rule applies for all diseases: treating quickly considerably increases the chances for recovery. This in particular applies for very contagious diseases.

We will provide you with exemplary pictures and symptom descriptions for diagnosis support in the following chapters. Please take your time and carefully read the sections about all possible disease causes as well as the general useful advice at the end of this guide booklet. Some disease symptoms look very similar at first. A hasty and, accordingly, possibly wrong diagnosis may lead to a wrong treatment with possibly far reaching consequences. If in doubt, please consult a specialized veterinarian.

Tip

Observation → **Diagnosis** → **Treatment**

2 Recognizing fish diseases

The contents of this guide were compiled by an expert team with all required care and according to newest scientific findings. Nevertheless, this short brochure can only give an overview about the most common fish diseases and their causes. Rarely occurring diseases or those that cannot be treated at all or only with support from a veterinarian (e.g. ulcers caused by cancer, nerve damages and genetic deformations) are not included here. In such cases, we wish to refer you to further specific literature, e.g. to the easily understandable and abundantly illustrated book, “Krankheiten der Aquarienfische” by the **sera** specialist Dieter Untergasser, issued by the Kosmos Verlag (available only in German language).

Please note that the chemical and biological conditions in different aquariums may differ very strongly. It is therefore not possible to precisely predict the exact reaction for each single aquarium and for each animal species. This in particular applies if chemical substances have entered the aquarium with water, organic pollution or previous treatments and might cause unpredictable cross reactions with the treatments. A general warranty and liability for personal injuries, property damage or financial loss due to the treatment suggestions in this guide is therefore excluded by the editor.

You will find extensive advice about setting up and maintaining your aquarium on our Internet site www.sera.de or in our numerous guide booklets.

2.1 Diseases caused by viruses

Pearl Gourami with *Lymphocystis* cysts in its skin

Observation
Firm, globular cysts measuring 0.5 to 1 mm on the skin and the fins (mucous membrane cells strongly enlarged by the virus).

Diagnosis: *Lymphocystis*
(possible in freshwater and saltwater fish)

Treatment: page 27

2.2 Diseases caused by bacteria

Columnaris disease, also affecting scale pockets

White lips caused by *Columnaris* disease

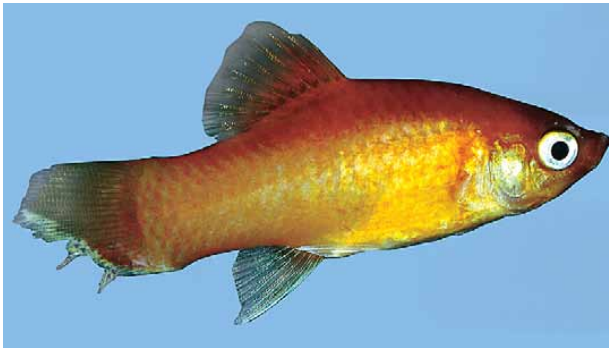
White spots underneath the skin

Observation
Clamped fins, white lips, white edged scales and white coatings in the head and back area; skin tears open; loss of scales; spreads wider within hours.

Diagnosis: *Columnaris* disease

Treatment: page 28

2.2 Diseases caused by bacteria



Decomposed caudal fin

Observation
Fins rot away with white edges, in final stages up to the fin base.

Diagnosis: Fin rot

Treatment: page 28

Bacterial gill rot (gill lid removed)

Observation
Pale gills, milky skin areas, the gill filaments decompose in final stages.

Diagnosis: Bacterial gill rot
(mostly secondary infection,
e.g. after a parasite infestation)

Treatment: page 28

2.2 Diseases caused by bacteria

… and at the caudal peduncle

Silver Molly with multiple bacterial infection:
Skin bleeding at the side

Observation
Small bleeding spots on the skin, the fins and the gills, or boils and ulcers that break up bleeding.

Diagnosis: Infection by ***Aeromonas*** or ***Pseudomonas*** **bacteria**

Treatment: page 28

Severe dropsy

Observation
Protruding eyes, puffed out anus, slimy fish waste, bloated belly and protruding scales (not all symptoms are always fully distinctive).

Diagnosis: Dropsy
(caused by bacteria)

Treatment: page 29

2.3 Diseases caused by fungi

Cichlid with fungal infection on the side

Fungus infected Firemouth Cichlid

Discus with injury infected by fungi

Observation

White, cotton-like outgrowths on the skin with long filaments standing away (often after a previous injury).

Diagnosis: Fungal infection (Mycosis)

Treatment: page 30

2.4 Diseases caused by flagellates

Fin clamping Platy

Platy with *Ichthyobodo* infection

Observation
Color changes to gray or milky in some areas of the skin (reddish in case of stronger infestation); long finned fish have frayed fins; clamped fins.

Diagnosis: *Ichthyobodo necator*
(formerly: *Costia necatrix*)

Treatment: page 30

2.4 Diseases caused by flagellates

Discus infected by intestinal flagellates

Observation
Decomposing fins, slimy, whitish fish waste, holes in and around the head (especially in case of discus fish), possibly emaciation and darkening.

Diagnosis: Intestinal flagellates (*Hexamita* sp., *Spironucleus* sp. as well as other parasites such as *Protoopalina* sp., *Trichomonas* sp., *Cryptobia* sp.) and/or hole-in-the-head disease

Treatment: page 30

Piscinoodinium on the back

Gourami with *Piscinoodinium* infection

Observation
The fish scrub themselves on decoration and swim hectically in early stages, later on fine whitish yellow dots (< 0.3 mm) on skin and fins; frequently infestation of the gills; fish looks – especially in backlight – as if dusted with flour; velvet-like coating.

Diagnosis: *Piscinoodinium*, Velvet disease

Treatment: page 31

2.5 Diseases caused by ciliates

Black Neon Tetra with white spot infection

Black Molly with “Ich”

Angelfish with infection by *Cryptocaryon irritans*

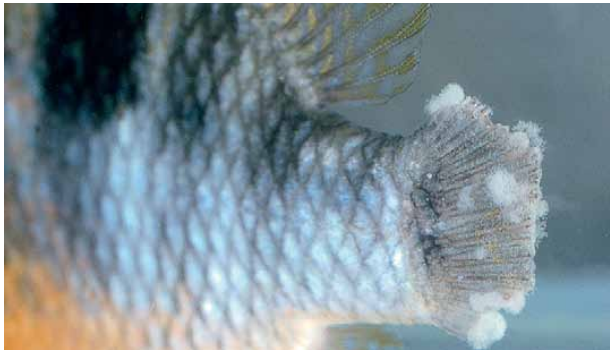
Observation
Clearly visible white spots (0.4 – 1.5 mm) on skin and fins, clamped fins and scrubbing on decoration.

Diagnosis: *Ichthyophthirius multifiliis*
(white spot disease),
Cryptocaryon irritans (saltwater ich)

Treatment: page 32

2.5 Diseases caused by ciliates

Infected Dwarf Gourami



Firemouth Cichlid with *Apiosoma* infestation at the caudal fin

Observation
Furry coating after mucous membrane injuries; many elongated protozoans on a short stalk (no long threads as in case of fungal infections) are visible with a strong magnifier.

Diagnosis: *Apiosoma* (formerly: *Glossatella*) or ***Epistylis*** (formerly: *Heteropolaria*)

Treatment: page 33

2.5 Diseases caused by ciliates

Infected Firemouth Cichlid

Dark colored Discus with *Chilodonella* infection
(elliptic white thickened skin areas)

Infection by *Tetrahymena*
(net-like thickened mucous membrane)

Observation
Isolated, whitish thickened areas on the mucous membrane (partially stringy); small pale areas on the skin; apathy and loss of appetite; mucus secretion (in case of marine fish). The fish scrub themselves and occasionally wince with their fins.

Diagnosis: *Trichodina*, *Tetrahymena*, *Chilodonella*, *Brooklynella* (in saltwater)

Treatment: page 33

2.6 Diseases caused by Plathelminthes (flatworms)

Corydoras with skin flukes

Observation
The fish scrub themselves and become apathetic. Cloudy skin and small, motile worms on the skin (partially visible with the naked eye, otherwise detectable with a magnifier; mostly smaller than 1 mm).

Diagnosis: Skin flukes / Gyrodactylidea

Treatment: page 34

Discus with breath shortage caused by gill fluke infestation

Observation
Breathing becomes stronger every day until the fish stay under the surface panting; sometimes one-sided breathing; one or both gill lids closed or spread open; small flukes usually sized less than 1 mm sit on the gills (possibly visible on a sedated fish with a magnifier); fish scrub themselves at the gill lid.

Diagnosis: Gill flukes / Dactylogyridea

Treatment: page 34

2.6 Diseases caused by Plathelminthes (flatworms)

Swordtail with *Transversotrema* infection

Large Metacercaria in a Kissing Gourami from an Asian outdoor hatchery

Metacercaria in the fins

Observation
Fish scrub themselves; inflammations underneath the scales; emaciation.

Diagnosis: *Transversotrema* sp.

Treatment: page 35

2.7 Diseases caused by fish leeches

Fish leech

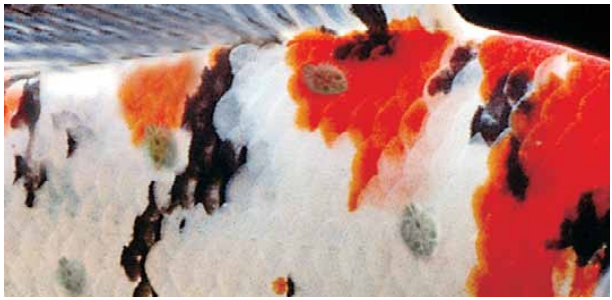
Fish leech on a Discus

Observation
Circular bloody inflamed areas measuring 3 – 8 mm on the skin of the fish; up to 5 cm (2 in.) long (often shorter) worms with suction cups at both ends of the body and a ring pattern; can be found on aquatic plants or on the fish themselves.

Diagnosis: Fish leech / *Piscicola* sp.

Treatment: page 35

2.8 Diseases caused by crustaceans



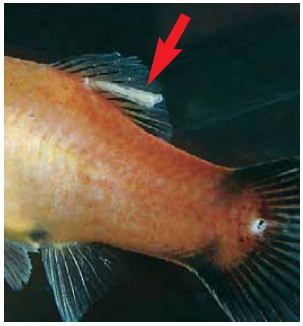
Argulus on a Koi

Observation
Fish jump and swim hectically; flat (louse-like), almost transparent crustaceans sized 4 – 14 mm with two black eyes visible on the skin of the fish; red sting marks on the fish skin.

Diagnosis: Fish louse / e.g. *Argulus*

Treatment: page 36

2.8 Diseases caused by crustaceans



Platy with *Lernaea*

Lernaea on a caudal fin

Observation
White, bar shaped crustaceans with two small sacs at the end, they stick deeply and firmly in the skin; anemia and emaciation of the fish.

Diagnosis: Anchor worm / *Lernaea*

Treatment: page 36

Ergasilus on the gills (gill lid removed)
Photo: Dr. Dirk Kleingeld

Observation
White to grayish blue crustaceans sized 0.5 – 3 mm on the gill filaments.

Diagnosis: Parasitic copepod / *Ergasilus*

Treatment: page 36

2.8 Diseases caused by crustaceans

Parasitic isopod on a Butterfly Cichlid

Parasitic isopod

Observation
Clearly segmented, oval, opaque, yellowish to brownish arthropods [1 – 5 cm (0.4 – 2 in.)] are attached to the fish; bloody, dot-shaped sting marks.

Diagnosis: Parasitic isopods

Treatment: page 36

2.9 Multiple infections

Siamese Shark with multiple infection

Observation
Strong mucus secretion, often with fungal infection in some areas, numerous other symptoms possible.

Diagnosis: Multiple infection (a differentiated diagnosis is usually possible only by a specialist)

Treatment: page 37

3 Deficiency diseases and malnutrition

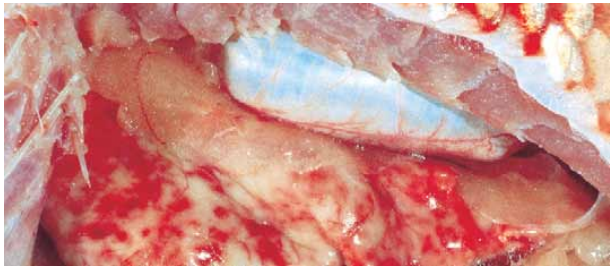
Discus with fin deformation caused by mineral deficiency

Gill lid deformation

Observation
Deformation of gill lids, fins and spine in offspring.

Cause: Mineral and vitamin deficiency
caused by too soft water and unsuitable food low in vitamins

Treatment: page 38



Fatty liver degeneration

Observation
Listlessness, too thin or too thick animals, poor development.

Cause: Poor quality, monotonous food leading to **liver fattening**, among others

Treatment: page 38

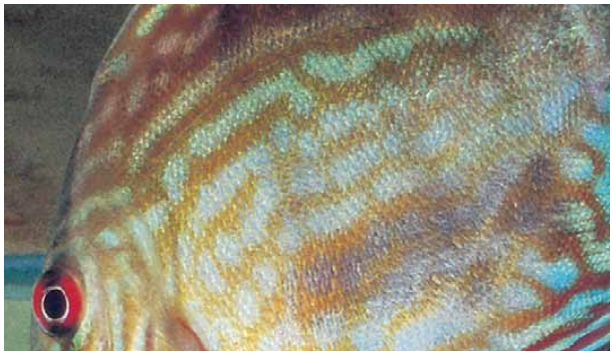
4 Maintenance mistakes and intoxications

Uniform darkening of the entire fish

Observation
Pale colors or, in some fish such as Discus, uniform darkening.

Cause: Feeling unwell, caused by unsuitable or **polluted water**, or by **not keeping the fish according to their requirements** (e.g. no hideaways, keeping unsuitable species together etc.)

Treatment: page 41



Large-area injury on a Discus

Observation
Mucous membrane rubbed off, skin injuries.

Cause: Injuries, e.g. by catching with a coarse net, transport injuries, injuries by trying hectically to escape (bouncing into sharp edged decoration objects) or by territorial fights

Treatment: page 41

4 Maintenance mistakes and intoxications

Air bubble disease
Photo: Dr. Sandra Lechleiter

Observation
Clear small blisters under the skin (0.5 – 2 mm).

Cause: Air bubble disease (oversaturation of the water with gas)

Treatment: page 41

Cornea swelling caused by a pH lower than 3

Observation
Slimy, milky skin, cloudy bleedings underneath; thick cloudy coatings on the eyes; brownish coatings on the gills.

Cause: Acidosis

Treatment: page 42

4 Maintenance mistakes and intoxications

Damaged gills after an ammonia intoxication
(gill lid removed)

For comparison: Healthy gills
(gill lid removed)

Observation
Whitish skin slime; frayed fins; gill filaments dying off.

Cause: Alkalosis or **ammonia intoxication**

Treatment: page 42

4 Maintenance mistakes and intoxications

Discus with fin parts missing after an osmotic shock

Observation
Mucous membrane comes off, fins fall off.

Cause: Osmotic shock

Treatment: page 42

Observation
Fish become apathetic and die suddenly in spite of beautiful colors, often without other outer disease symptoms.

Cause: Acute **nitrite intoxication**

Treatment: page 43

5 Treatment chart

Disease/Pathogen	Treatment in aquariums
Aeromonas or *Pseudomonas*	sera omnipur, sera baktopur, sera baktopur direct, sera bakto Tabs
Anchor worm (*Lernaea*)	sera baktopur, sera med Argulol
Apiosoma or *Epistylis*	sera costapur
Brooklynella (only marine fish)	sera costapur
Columnaris disease	sera omnipur, sera baktopur, sera baktopur direct, sera bakto Tabs
Cryptocaryon (only marine fish)	sera costapur
Dropsy	sera omnipur, sera baktopur, sera baktopur direct, sera bakto Tabs
Fin rot	sera omnipur, sera baktopur, sera baktopur direct, sera bakto Tabs
Fish leech	sera baktopur
Fish louse (*Argulus*)	sera baktopur, sera med Argulol
Fungal infection (Mycosis)	sera mycopur, sera costapur
Gill flukes	sera mycopur, sera omnipur
Gill rot (bacterial)	sera omnipur, sera baktopur, sera baktopur direct, sera bakto Tabs
Ichthyobodo necator (*Costia*)	sera costapur
Ichthyophthirius multifiliis (white spot disease)	sera costapur
Injuries (infected)	sera mycopur
Intestinal flagellates	sera baktopur direct, sera med Flagellol
Lymphocystis	sera pond cyprinopur
Multiple infection	sera omnipur
Parasitic copepods (*Ergasilus*)	sera baktopur, sera med Argulol
Parasitic isopods	sera baktopur, sera med Argulol
Skin flukes	sera mycopur, sera omnipur
Transversotrema and fluke larva	sera mycopur, sera omnipur
Trichodina, *Tetrahymena*, *Chilodonella*	sera costapur
Velvet disease (*Piscinoodinium*)	sera ectopur

6 Treating fish diseases

6.1 Treating virus caused diseases

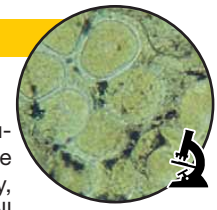
The best measure against virus caused diseases is to strengthen the immune system. Be sure to maintain good water values and provide your fish with all required nutrients – especially with vitamins (e.g. **sera fishtamin**). Fish with active disease resistance are considerably less frequently affected by virus infections than stressed animals. If ever they should be infected they will become healthy again more quickly.

You can suppress further spreading of viruses in your fish stock by quarantining infected fish and using disinfecting agents (e.g. **sera pond cyprinopur** from the pond product range). Gently increasing the water temperature supports and accelerates recovery in case of many viral infections. The immune system of the fish is then highly active.

The water temperature can be lowered again very slowly [max. 1°C (1.8°F) per day] to the normal keeping temperature after the disease symptoms have entirely vanished.

Lymphocystis

Diagnosis: page 7



Lymphocystis in a skin swab

After intruding into a mucous membrane cell, the virus multiplies strongly, and the infected cell grows into a giant lymphocyst that finally bursts and releases an enormous number of the pathogens into the water. These viruses then can infect the mucous membrane cells of the same fish or of other, not yet affected fish. Infected fish should therefore immediately be removed from the tank.

Treatment with **sera pond cyprinopur**, which is usually used in garden ponds, is suitable for suppressing this spreading within freshwater aquariums. The treatment prevents the viruses attaching to new skin cells. The infected skin spots heal within a few weeks. Duration of the treatment depends on the course of the disease. In case of treatments lasting longer than three days, the daily treatment addition should be reduced to approximately half dosage [0.5 ml per each 20 l (5.3 US gal.)]. Carry out a larger partial water change every couple of days (at least every fourth day). Invertebrates (e.g. snails) and plants may be harmed in case of longer treatment.

6.2 Treating bacterial diseases

Bacteria are present in every aquarium and fulfill important tasks in there, e.g. the breakdown of ichthyotoxic nitrogen compounds. However, some of the bacteria species may cause diseases. This in particular applies for fish with injuries, a weakened immune system and in case of high pathogen density. There should be hardly any problems caused by bacteria in an appropriately maintained aquarium.

The diseases described in the following are caused by different bacteria species. Precise species identification is usually only possible by a specialized microbiological laboratory. However, knowing the precise species is almost always not important for a treatment. The first symptoms for a bacterial infection may include fin clamping and the fish tending to hide.

The preparations **sera omnipur**, **sera baktopur direct**, **sera baktopur** and **sera bakto Tabs** are treatments that can safely heal most bacterial infections occurring in fish. Treating in time is very important as later infection stages increasingly affect internal organs, and the damages quickly become irreparable.

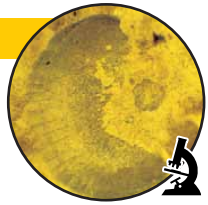
The broad range treatment **sera omnipur** effectively treats most ornamental fish diseases in freshwater aquariums – in particular bacterial infections. The liquid **sera baktopur** (in freshwater) has disinfecting and recovery supporting effects. It provides good support especially in the early stages of an infection. **sera baktopur direct** (freshwater and saltwater fish) and the medicinal food tablets **sera bakto Tabs** (freshwater and saltwater fish) are antibiotically effective and can even treat some very advanced infections. You may use the preparations **sera baktopur**, **sera baktopur direct** and **sera bakto Tabs** in combination. This is particularly advisable in case of advanced, severe infections. The care product **sera ectopur** provides support especially if the mucous membranes are also affected. It releases disinfecting oxygen and stimulates mucous membrane regeneration due to the included salt.

Proper water quality and good aeration must be maintained in case of all bacterial infections. You should generally not feed – possibly except for adding **sera bakto Tabs** – during the treatment as to prevent additional water pollution. During and after the treatment it makes sense to strengthen the immune system of the animals by additionally applying vitamins (**sera fishtamin**).

Various bacterial infections may occur in freshwater and saltwater. Some of the bacterial diseases most frequently occurring in ornamental fish are described in the following.

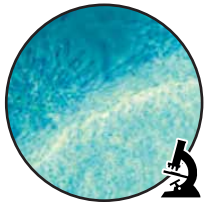
Columnaris **disease**

Diagnosis: page 7
Treatment: see above



Scale with areas dissolved by an infection

Treatment should begin without delay as the disease quickly develops and spreads. Lowering the pH value to just under pH 7 (e.g. with **sera pH-minus**) supports the treatment since the bacteria prefer alkaline water. Please make sure in advance whether the fish you keep tolerate this acidification. This disease frequently occurs on fish imported from Asia.



Agglomerates of *Columnaris* bacteria in a mucous membrane skin swab

There is a certain risk of confusing the disease with **neon disease**, which not only affects Neon Tetras but also numerous other fish species. It is caused by the single celled parasite *Pleistophora* (Microspora), which may also cause skin areas turning white. Swimming around restlessly at night and spine curvature are other common symptoms of neon disease. Affected fish should be isolated as quickly as possible as to prevent the disease from spreading. There is no known treatment.

6.2 Treating bacterial diseases

Fin rot

Diagnosis: page 8
Treatment: page 28

Fin rot in its final stage

This disease frequently occurs in case of poor hygienic conditions and overstocking. These bacteria, small numbers of which are also present in the tank otherwise, become a serious threat only under such conditions.

Bacterial gill rot

Diagnosis: page 8
Treatment: page 28

Aeromonas or ***Pseudomonas*** **bacteria**

Diagnosis: page 9
Treatment: page 28

Dropsy

Diagnosis: page 9

Long lasting stress situations, e.g. strongly organically polluted water, weaken the immune system of the fish, making the organism vulnerable for bacterial infections. Often, only a few of the fish are affected. The disease usually begins with a bacterial infection of the intestines. However, it can also occur as a final stage symptom of various other diseases. The infection of the intestines becomes visible by the excretion of slimy fish waste. During the further course the intestinal mucous membrane begins to decompose (it comes off as white slime threads). Nutrition taken up cannot be digested any more. The damaged intestinal mucous membrane has become penetrable for pathogens, leading to other organs being infected or degenerating due to lacking nutrients in this stage. When finally the kidney function is affected, unexcreted liquid accumulates in the body cavity (bloated belly), in the scale pockets (protruding scales) or at the background of the eyes (exophthalmus). Additional swimming bladder infections usually lead to abnormal swimming behavior. Fish showing these symptoms can often not be saved any more.

An extensive treatment with the above mentioned treatments must be carried out if only one of these symptoms is observed. It is ideal to put the affected fish, which excrete plenty of pathogens, into a quarantine tank and use a combination of the three **sera baktopur** preparations. You should also treat the main tank with, for instance, **sera baktopur** after you have removed the conspicuous fish, as to reliably prevent the disease from spreading. Be sure to maintain proper water quality in any case.

6.3 Treating fungal infections

Fungal infection (Mycosis)

Diagnosis: page 10

Fungi (e.g. *Saprolegnia*) are breakdown organisms present in every aquarium. They provide an important contribution for hygiene by utilizing waste substances such as fish waste. As long as the mucous membrane remains uninjured the fungi cannot harm the fish since it provides reliable protection against intruding fungus spores (their multiplication stages). However, if the mucous membrane is damaged, e.g. due to injuries or a parasite infection, spores can adhere within the skin and germinate. Once the fish are infested, the fungus can also overgrow healthy skin areas and inner organs, and it may even kill the fish. Too low water temperatures support fungal infections.

It is therefore important to immediately add **sera aquatan** or **sera blackwater aquatan** to the aquarium water even in case of small skin abrasions upon catching and transport as a preventive measure.
The contained mucous membrane protecting components quickly seal small injuries and abrasions. You can successfully treat fungal infections broken out with **sera mycopur**. Simultaneous application of **sera ectopur** supports the effect, accelerates healing and reduces the risk of secondary infections by protozoans and bacteria. **sera costapur** also shows very good effects especially in case of spawn being infected by fungi.

6.4 Treating flagellate infections

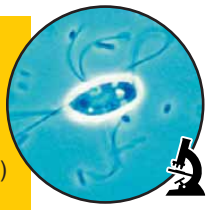
Ichthyobodo necator
(formerly: *Costia necatrix*)

Diagnosis: page 11

Ichthyobodo necator

Ichthyobodo or *Costia* is a single celled secondary parasite that only multiplies without restraint if the fish are stressed and already weakened. Being an obligate parasite, the organism exclusively feeds on the mucous membrane and dies in open water after a short time. Strong infestation leads to destruction of large skin areas, causing the death of the fish. Treat safely and successfully with **sera costapur**. Afterwards, the care product **sera ectopur** allows for an aftertreatment that supports recovery.

Intestinal flagellates
(*Hexamita* sp., *Spironucleus* sp. as well as other parasites such as *Protoopalina* sp., *Trichomonas* sp., *Cryptobia* sp.) and/or hole-in-the-head disease



Spironucleus sp.

Diagnosis: page 12

A flagellate infestation of the intestines plus the frequently occurring subsequent severe bacterial infection lead to insufficient uptake of vitamins and minerals. This deficiency becomes visible by the so-called hole-in-the-head disease, among others. However, the appearance of hole-in-the-head disease is often also caused by malnutrition and too soft water containing insufficient minerals alone.

The widespread single celled intestinal flagellates are harmless in low density but can multiply very strongly within the intestines in case of stress and unsuitable or poor quality fish nutrition. They will then harm the infected fish

6.4 Treating flagellate infections

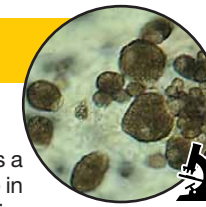
very badly and may even be fatal. The same applies for severe intestinal infestation with certain bacteria. The pathogens withdraw important nutrients, minerals and vitamins from the food pulp, affect digestion and damage the intestinal mucous membrane. The fish organism tries to compensate the subsequent deficiency of minerals, among others, by decomposing and reutilizing cartilaginous tissue at the head. This causes the typical holes.

Recovery of the fishes' digestive tract is a long lasting process and needs to be supported by an anti-bacterial treatment in many cases if there is a strong contribution of pathogenic bacteria. This treatment is very effectively carried out with **sera baktopur direct**.

A varied diet close to nature plus regular addition of **sera mineral salt** and **sera fishtamin** prevent hole-in-the-head disease and support the healing process. On the other hand, feeding beef heart or other warm blooded animal meat, to which no ornamental fish is physiologically adapted, supports the multiplication of harmful intestinal flagellates and bacteria. All **sera** foods – e.g. **sera discus granulat** – optimally match the requirements of the fish, as exclusively aquatic organisms are used as protein and fat sources. They therefore ensure healthy development and vitality. The high quality **sera** foods are entirely digested, thus avoiding unnecessary water pollution. Food with a high Spirulina percentage, e.g. **sera Spirulina Tabs** and **sera flora**, as well as food very rich in minerals and ballast substances, such as **sera GVG-mix** and the **sera FD** range, is particularly well suited for regenerating the intestinal flora.

Piscinoodinium, Velvet disease

Diagnosis: page 12



Piscinoodinium pillulare in a skin swab

Piscinoodinium pillulare is a single celled ectoparasite in freshwater that is often mistaken for *Ichthyophthirius* (white spot disease) due to its appearance. However, the spots caused by *Piscinoodinium* are considerably smaller in comparison. Longer salt baths with **sera ectopur** achieve good success (the concentration must be adjusted to the fish species in question).

6.5 Treating ciliate infections

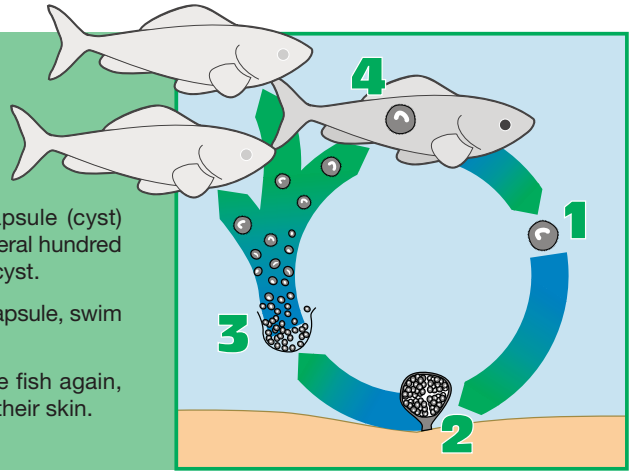
Ichthyophthirius multifiliis
(white spot disease),
Cryptocaryon irritans
(saltwater ich)

Diagnosis: page 13

Ichthyophthirius multifiliis

The treatment should by all means begin as soon as possible. The disease can literally spread at an explosive rate via swarmer stages of this parasite in the rather densely inhabited limited environment an aquarium provides. Treat effectively and safely with **sera costapur** (in freshwater and saltwater tanks). Please note that some invertebrates are sensitive towards a treatment – possibly treat in a quarantine tank. Cartilaginous fish (sharks and rays/skates) do not tolerate the active agent malachite green and similar compounds. A recovery supporting aftertreatment can be carried out with the care product **sera ectopur**.
As far as possible, it is advisable to raise the temperature slightly for a couple of days as to support the treatment (by all means consider the tolerance level of the fish!). The parasites generally do not tolerate the higher temperatures too well, furthermore the immune system of the fish works more effectively this way. A temperature of about 31°C (88°F) would be ideal. The elevated temperature should be maintained for a couple of days after the treatment before it is slowly lowered again. Furthermore, the water should be aerated well during the treatment, and the lighting should remain switched off at least on the according treatment days. The white spots on the fish skin remain visible for a few days also after a successful double treatment (on the first and third days) but become increasingly transparent (spots with live parasites appear straight white) and finally disappear entirely. Only in case you observe the formation of new spots for certain you should surmise pathogens have survived or were introduced again, making a further treatment (on the fifth and seventh days) necessary.

White spot disease can be diagnosed rather unmistakably. However, in some cases infections by *Lymphocystis* (viruses, page 7) or with some sporozoan species (other single celled parasites) lead to a surprisingly similar appearance. Some reports about suspected resistance, sometimes after having treated properly against “Ich” for several times, might be due to such understandable false diagnoses.



1 The adult parasites leave the fish and, swimming freely, look for well-protected places with little water flow.

2 The parasite forms a firm capsule (cyst) and divides several times. Several hundred swarmers develop within the cyst.

3 The swarmers penetrate the capsule, swim around and divide again.

4 The swarmers infest the same fish again, or other fish, penetrating into their skin.

Life cycle of *Ichthyophthirius multifiliis*

6.5 Treating ciliate infections

Apiosoma (formerly: *Glossatella*) or ***Epistylis*** (formerly: *Heteropolaria*)

Diagnosis: page 14

Apiosoma sp.

Apiosoma sp. and *Epistylis colisarum* are very similar protozoans that settle on existing wounds on the fish skin and thus avoid their healing (they are not parasites in the original sense). In the further course, adjacent healthy skin areas can also be infected, and further pathogens – e.g. fungi and bacteria – may settle. Using **sera aquatan** and **sera blackwater aquatan** prevents smaller wounds being infected. In case of slight infestations, using **sera ectopur** is usually sufficient. Treatment with **sera costapur** provides help in case of a stronger infestation by these ciliates.

Trichodina, ***Tetrahymena***, ***Chilodonella***, ***Brooklynella*** (in saltwater)

Diagnosis: page 15

Trichodina

These ciliates are mainly so-called secondary parasites. Mass multiplication usually only occurs if the fish has been previously harmed by another disease, or if the water conditions are poor. The skin and gill damages caused by the protozoan may be fatal. Quick action is therefore required. Be sure in particular to maintain good water quality and treat with **sera costapur** (freshwater and saltwater fish). Aftertreatment with **sera ectopur** is advisable also in this case.

6.6 Treating flatworm infections

Animals of different phylogeny are classified in the worm group. Their worm shaped body is all they have in common. The parasitic worms occurring in fish need to be treated differently and with different active agents, depending on their group of related species.
Flatworms include many important parasites. Planaria are independently living members of this group. They belong to the Turbellaria. They can quickly become annoying in case of mass multiplication. (If required, they can be removed with the **sera snail collect** trap, or by adding macropodes as predators.) Flukes (Monogenea) including skin and gill flukes are real parasites. Among the Trematodes, aquarists may know about scale worms. The fourth flatworm group, tapeworms (Cestoda) can also be found in ornamental fish.
sera omnipur or **sera mycopur** are effective against parasitic flatworms in aquariums. The care product **sera ectopur** has proven well many times as a preventive measure, in case of slight infestations, for accompanying a treatment or for supporting recovery after a treatment.

Skin flukes / Gyrodactylidea

Diagnosis: page 16

Gyrodactylus sp. with three larvae, one inside the other

Flukes of the order Gyrodactylidea are more likely to be found on the skin than on the gills of the fish. They can also be distinguished from gill flukes (*Dactylogyrus*) by their lack of pigment eyes at the front end. The worms attach to the skin of the fish with the clasping apparatus at their back end. Their mucous membrane becomes thicker as a defensive reaction. The occurring skin injuries often lead to secondary infections. While an infestation with only a few flukes often runs symptom free, a mass infestation may quickly cause the death of many fish.
Therefore treat with **sera omnipur** or **sera mycopur** according to the information for use in time – in a quarantine tank, if required. Since *Gyrodactylus* is livebearing, it is usually possible to reliably remove the parasites with one treatment cycle.

Gill flukes / Dactylogyridea

Diagnosis: page 16

Gill filaments with *Dactylogyrus* infestation

Gill flukes (Dactylogyridea) live as parasites mainly on the gills of fish. The gill filament irritations and injuries caused by their clasping apparatus induce increased mucus formation that inhibits gas exchange more and more, finally making it possible that the fish suffocate.

Dactylogyrus can be distinguished from *Gyrodactylus*, among others, by the presence of pigment eyes at the front end. The differences to the livebearing skin flukes is relevant for the treatment: As the gill flukes lay eggs whose shell is impermeable for the active agent, a second treatment must be carried out as to kill the larvae that have hatched in the meantime as well. **sera omnipur** or **sera mycopur** are used, just as is the case with skin flukes. A second treatment should be carried out after a few days. Development of the worm larvae depends on the temperature: it is complete after 3 days at a water temperature of 28°C (82°F), while it can take up to 7 days at water temperatures about 25°C (77°F). However, you should not wait too long before conducting the second treatment, as the fish might be re-infected by worm larvae and the worms possibly even lay new eggs again. In case of uncertain diagnostic differentiation to a skin fluke infection it is better to surmise a gill fluke infection and conduct a repeated treatment for safety reasons.

6.6 Treating flatworm infections

Transversotrema sp.

Diagnosis: page 17

The larvae of this worm penetrate the skin of a fish where they live under its scales until they are mature. (The adult animals are about 3 – 5 mm long and creep around on the skin. They are transparent and hardly visible.) The infection leads to inflammations and – in case of severe infestations – even to large area destruction of the fish skin and consequently death of the fish. *Transversotrema* require snails as intermediate hosts. Multiplication and spreading of the parasites therefore can be reduced by removing snails (you can, for instance, use the **sera snail collect** trap for this purpose). The worms themselves are removed with **sera omnipu**r or **sera mycopur**. The dead larvae (underneath the scales) are rejected by the tissue after a while.
Larvae of other flukes (so-called Metacercariae) wandering through the body of the host fish may cause damages that lead to some characteristic disease symptoms, such as worm cataract (the eye becomes cloudy) and black spot disease.

6.7 Treating fish leech infections

Fish leech / _Piscicola_ sp.

Diagnosis: page 18

Fish leech

Fish leeches belong to the **jointed worms (Annelida)** phylum which also includes many well known non-parasitic species such as earthworms or Tubifex.
Fish leeches use their oral suction cup to attach to fishes and suck their blood. While doing so they inject hirudine into the wound, a substance that inhibits blood coagulation. The full worm lets go of the fish at the latest after 2 days. While sucking blood it injures the skin of the fish (less frequently gills or fins). The loss of blood itself – including secondary bleedings – always causes weakening, in case of smaller fish sometimes even immediate death. Dangerous secondary infections often occur at the spot where the leech sucked blood. Furthermore, the leeches my transmit parasite stages while sucking blood that they took up the previous time they sucked blood from another fish.
Fish leeches or cocoons with their offspring can be introduced with newly purchased fish, live food or aquatic plants. Frequent water changes, collecting the worms and carefully cleaning the decoration and the plants reduces and finally entirely removes the leech population. Larger cichlids like to eat leeches and should be used for combating them, provided the remaining fish stock allows this.
In case it is necessary to remove leeches from the fish itself, e.g. in case of a mass infestation, you should remove the worms very carefully with an edgeless pair of tweezers close to the front suction cup. Avoid squeezing the stomach of the worm (in the middle), as the leech in this case regurgitates its stomach contents into the wound, thus increasing the risk of transmitting a disease. The same applies for other measures that might irritate the worm (e.g. by sprinkling salt directly on the worm). It is safer to remove the worm from the tank only after it left the fish by itself. Applying **sera ectopur** supports wound healing of the suction spots and prevents infections. **sera baktopur** provides help in case of already existing infections.

6.8 Treating crustacean infections

The large group of crustaceans (Crustacea) also includes some species that live parasitically on freshwater and saltwater fish. In spite of their sometimes misleading names (e.g. fish **louse** and anchor **worm**) and their often unusual appearance, all parasites mentioned in the following are crustaceans.

Bloodsucking crustaceans are a threat for fish not only because of the loss of blood and the possible infection of the wounds, but also transmit different pathogens from one fish to the next one. There is an additional group of crustaceans that do not live parasitically themselves but serve as intermediate hosts for other parasites. Fish can therefore become infected with parasite stages if they eat these crustaceans (e.g. copepods may be intermediate hosts for tapeworm larvae).

You can prevent introduction of these crustaceans by not using potentially dangerous frozen and live food (all **sera** foods are guaranteed to be parasite free) and being careful when purchasing new animals and plants (e.g. by quarantine measures). In case parasitic crustaceans should nevertheless occur once in a while, you can use, for example, **sera baktopur** for treating subsequent bacterial diseases. Strict hygienic measures such as repeated water changes and the careful cleaning of decoration, bottom gravel and plants reduce the population of the parasitic crustaceans until they finally disappear entirely.

In case of severe problems with parasitic crustaceans, please also refer to the information about **sera med Professional Argulol**, beginning on page 57.

Fish louse / e.g. *Argulus*

Diagnosis: page 18
Treatment: see above

Argulus

Besides usually domestic fish louse species that affect pond fish, there are also tropic fish lice that occur in freshwater and saltwater aquariums. They are good swimmers that look for a fish as a host in free water and attach to its skin using their two suction cups. They suck blood (sometimes for weeks) and often change the spots they attach to while doing so. Some species additionally inject a toxin or an allergen, which may cause infection or intoxication symptoms up to death. Furthermore, they may transmit pathogens from one fish to another while sucking. The affected fish are always weakened due to blood loss. There are frequent secondary infections.

Anchor worm / *Lernaea*

Diagnosis: page 19
Treatment: see above

The crustacean *Lernaea* is usually called “anchor worm” by aquarists, as it is deeply burrowed in the fish skin with a branched attaching organ on its front end, and has an elongated body shape without any visible limbs. There are two sacs at the back end of females in which the eggs develop. The fish are weakened very much by the constant loss of blood and severe infections at the deep attachment spots.

6.8 Treating crustacean infections

Parasitic copepod / *Ergasilus*

Diagnosis: page 19
Treatment: page 36

Gill infecting copepod, Photo: Dr. Sandra Lechleiter

The crustacean *Ergasilus* has pointed clasping hooks that it uses to cling to the gills of the host fish for its entire life. Only the females live as parasites on the fish where they feed on skin cells. The males swim freely in the water. The females develop two large egg sacs at the back end. Infected fish suffer from constant severe shortness of breath due to the constant gill irritation and the increased formation of mucus. Partially irreparable damages and dangerous bleedings occur at the gills. There are frequent secondary infections.

Parasitic isopods

Diagnosis: page 20
Treatment: page 36

Isopods also belong to the crustaceans. Some species parasitize on fish and suck blood there. The loss of blood and the sting injuries weaken the fish.

6.9 Treating multiple infections

Multiple infection
(a differentiated diagnosis is usually possible only by a specialist)

Diagnosis: page 20

Skin swab showing a multiple infection: *Ichthyophthirius, Chilodonella, Trichodina, Costia* and *Piscinoodinium*

Fish can be infected by several pathogen species at the same time. In such cases, mucous membrane swelling can often be observed as an unspecific symptom. There often is also a gray to whitish color change. With a microscope, it is often possible to detect both skin flukes and different protozoans such as *Ichthyobodo* (*Costia*), *Chilodonella, Trichodina* and *Tetrahymena* in a skin swab. Bacteria and fungi can also often be found. The fish often scrub themselves on the ground or on objects in early stages, later on they stand in the water flow of the filter outlet apathetically, swaying and with clamped fins. In advanced stages, mucous membrane shreds come off, and other unspecific symptoms occur. Depending on which pathogens are involved, the life of single fish or of the entire fish stock may be in danger sooner or later.

Obtaining a complete and reliable differentiated diagnosis is usually possible only for experts with appropriate equipment. This often means unreasonable effort or is not even logistically possible. The **sera** product range includes the reliable broad range treatment **sera omnipur** for such cases in a freshwater aquarium. This treatment covers almost the entire pathogen range and prevents secondary infections. You can again use **sera ectopur** as a support also in case of a multiple infection.

The cumulative occurrence of several pathogens at once indicates problematic keeping conditions. Therefore please check the water parameters and other conditions. Immediately carry out necessary changes (e.g. reducing the number of fish, filter maintenance, water change etc.) and support the disease resistance of your fish by adding vitamin preparations (**sera fishtamin**).

Mineral and vitamin deficiency caused by too soft water and unsuitable food low in vitamins

Cause: page 21

Prevention/Recommendation: Fish withdraw minerals and trace elements from the water via their skin and the gills. The balanced mineral level of **sera mineral salt** as well as the iodine and magnesium in **sera aquatan** along with important vitamins from **sera fishtamin** (e.g. vitamin D_3 for skeleton buildup) compensate deficiencies – e.g. in case of deionized (R/O) water. The fish are thus effectively protected against not genetically caused deformations (often on the gills or the fins). Sufficient supply with minerals and food rich in vitamins (e.g. **sera micron**) is crucial especially in early development stages. However, deficiencies may also lead to pathogenic physical changes also in adult fish (hole-in-the-head disease due to deficiencies in discus fish, among others). Lacking iodine leads to an enlargement of the thyroid gland to a prominent ulcer. Besides using **sera aquatan**, it is in such cases advisable to feed food types with a high natural iodine level, such as **sera marin granulat** and **sera GVG-mix**. They contain plenty of marine algae and crustaceans. The enlarged thyroid gland tissue will regress within the course of several weeks by itself if you feed food rich in iodine every day.

Poor quality, monotonous food leading to **liver fattening**, among others

Cause: page 21

Prevention/Recommendation: Monotonous and wrong nutrition with low quality food manufactured from poor quality, unsuitable ingredients leads to deficiencies and physiological problems. Such food can only be digested to an insufficient extent, causing unnecessary water pollution. Furthermore, there is the problem that your fish are on the one hand excessively battened by cheap fattening food and on the other hand receive insufficient essential nutrients such as vitamins, essential amino acids and omega fatty acids. Food sold loosely or in transparent plastic bags is exposed to light and atmospheric oxygen. The fats quickly become rancid, and the vitamins decompose. Some low quality foods even contains extremely toxic mold. Disease patterns such as a fattened liver, intestinal inflammations and related subsequent diseases. Many traditionally fed live foods or raw materials (e.g. beef heart) are a serious threat to the health of your fish. The first ones often transmit dangerous pathogens, whereas the latter ones are entirely unsuitable for the digestive tract of most fish due to their composition.

The high quality **sera** foods ensure that you supply your fish close to nature, well balanced and extensively.

Special

Nutrition – Beef heart etc. versus professional dried food

Many dedicated breeders and hobby aquarists undergo considerable efforts to provide their pets with an – according to their opinion – optimal supply with best food. Unfortunately, not all of these efforts are equally reasonable. For example, there are still legends that discus fish will only thrive if they receive scraped beef heart as food. It is now unknown where this misapprehension had its origin, but the facts are definitely against this widespread assumption. The discus fish of course like to eat fresh meat and quickly put on weight with this nutrition that contains plenty of fat and proteins, but at what price …

Nature has arranged things in a way that the organism of an animal and the nutrition usually available for it suit each other. The metabolisms of the specific fish species also have adapted to certain nutrient sources during their evolution, and only these can be digested optimally. No matter how hungry a discus in nature is, it will hardly have the opportunity to kill a cow and eat its heart. But let us be serious: The meat of warm-blooded terrestric animals is completely unsuitable for the nutrition of fish. Fish require a high percentage of unsaturated fatty acids in their diet, as they almost exclusively occur in aquatic organisms (e.g. marine fish, as in the **sera** fish meal). Furthermore, the protein composition of warm-blooded animal meat is unsuitable for fish. They do not contain sufficient amounts of certain amino acids. Necessary minerals and trace elements for the balanced nutrition of fish are also missing. Furthermore, it has been proven that the lack of digestion supporting ballast substances may cause an ileus in discus fish.

Beef heart or other warm-blooded animal meat (including poultry) can therefore in no way ensure the permanent supply of the fish with all required nutrients. Additionally, even feeding beef heart only occasionally bears certain risks, as the meat is unsuitable for the fish body and supports the growth of bacteria that do not belong to the natural intestinal flora of the fish. They can increasingly outcompete the healthy intestinal flora, thus making the intestines susceptible for pathogens (e.g. flagellates).

Besides these direct negative consequences for the fish and the danger of an infestation with pathogens that must not be underestimated, the enormous water pollution by feeding raw meat and some frozen food types must be considered. The large amount of protein that cannot be utilized by the fish gets into the water undigested, where it extremely increases the organic pollution.

The food blends for discus fish and other fish self-produced by aquarists, often improvised and following word of mouth without well funded specific knowledge, cannot replace **sera** food with the decades of nutritional research that goes into it. The **sera** food range provides suitable nutrition for all ornamental fish, for every development stage and for each nutritional type. Protein, fats and carbohydrates are balanced to corresponding fish groups, are entirely digested by the fish and do not unnecessarily pollute the water. The fats in **sera** food contain a large percentage of unsaturated fatty acids and have a very low melting point (easier to utilize by cold-blooded animals). The most modern manufacturing processes (e.g. low temperature extrusion and gentle freeze drying – so-called

7 Preventing and treating deficiencies and malnutrition

FD process) that **sera** uses ensure optimal consistency, taste and preservation of the important nutrients in our foods. The water will remain clear and unpolluted.

Consistently considering research results made it possible to develop high quality food even for the fastidious discus, e.g. **sera GVG-mix** and **sera discus granulat**, that ensure appropriate growth, brilliant pigmentation and increased fertility. The fish are well fed without being battened. The growth is even and allows building up a firm skeleton. The healthy intestinal flora is supported, and the immune system is strengthened by selected natural ingredients (e.g. garlic, beta glucanes and astaxanthene).

You can provide your fish safe and healthy variety with our poplar **sera FD** food and live brine shrimp nauplii (**sera Artemia-mix**).

The advantages of our professionally manufactured food types over most blends mixed "on good advice" are obvious:

- Balanced nutrition due to the usage of **over forty** natural ingredients that are selected to meet the requirements of the fish.
- The high percentage of valuable unsaturated fatty acids (especially omega fatty acids) and the ideal protein composition.
- Optimal preservation of the valuable vitamins and other ingredients due to careful processing.
- Guaranteed to be free of parasites – no danger of introducing pathogens!

8 Preventing and remedying maintenance mistakes and intoxications

Feeling unwell, caused by unsuitable or **polluted water**, or by **not keeping the fish according to their requirements** (e.g. no hideaways, keeping unsuitable species together etc.)

Cause: page 22

Prevention/Recommendation: Obtain detailed information about the special requirements of the fish you keep, use **sera** quality food and check all important water parameters. Regular partial water changes and using **sera aquatan** (alternatively: **sera blackwater aquatan**), as well as **sera bio nitrivec** or **sera marin bio reefclear** (in saltwater) for breaking down organic pollution, ensure constantly good water quality.

Injuries, e.g. by catching with a coarse net, transport injuries, injuries by trying hectically to escape (bouncing into sharp edged decoration objects) or by territorial fights

Cause: page 22

Prevention/Recommendation: Avoid injuries of any kind as far as possible, as the wounds often become infected and may lead to severe diseases. Always carry out necessary maintenance measures in the tank very carefully and calmly as to avoid unnecessary stress and panic escape reactions that might injure the fish. You should always use the fine mesh, rounded **sera fish nets** for catching them. Be sure to provide a sufficient number of hideaways, appropriate fish stock density and a suitable combination of fish species as to avoid dangerous fights among the fish. A double dose of **sera aquatan** or **sera blackwater aquatan** provides help in case the fish ever get injured nevertheless. Use **sera ectopur** additionally in case of deeper injuries, and treat with **sera mycopur** if required.

Air bubble disease (oversaturation of the water with gas)

Cause: page 23

Prevention/Recommendation: Gas oversaturation may for instance occur after a larger water change with colder water. Cold, well aerated water (e.g. directly from the faucet) dissolves more gas than possibly warm aquarium water that has stood for quite some time. Gas oversaturation then occurs when the added water quickly warms up in the warmer aquarium, since the warmer water cannot keep as much gas in solution. The gas oversaturation, which becomes visible by small air bubbles within the mucous membrane of the fish as well as on other surfaces, may cause an embolism within the veins. In case of gas oversaturation, you should uncover the tank and agitate the water surface well (e.g. by increased activity of the pump), as to allow for intense exchange with the air and, accordingly, removal of excess gases.

However, you should generally ensure carefully to not alter the temperature by more than a few degrees during water changes or when transferring fish. Strongly varying temperatures – e.g. also due to improperly working heaters – weaken the disease resistance of the fish.

8 Preventing and remedying maintenance mistakes and intoxications

Acidosis

Cause: page 23

Prevention/Recommendation: Measure the pH value with the **sera pH-Test**. Too low or strongly varying values are often related to too low carbonate hardness (KH). You should therefore also check the KH level (**sera kH-Test**). Please be aware that the pH value may vary during the day and may become considerably lower especially at night. If required, you can raise the pH value with **sera KH/pH-plus** and at the same time ensure sufficient buffering (due to the increased KH). Additionally, using **sera aquatan** or **sera blackwater aquatan** helps alleviate the damages and makes them heal quicker.

Alkalosis or ammonia intoxication

Cause: page 24

Prevention/Recommendation: Whitish skin slime occurs at pH values above 9, the fins may become frayed and the gills can get burned. Check the pH value using the **sera pH-Test** and lower it with **sera pH-minus** if required, or with **sera super peat** in the long term. Ammonia intoxications cause symptoms similar to those of too high pH values. Therefore you should also check the ammonium level using the **sera NH_4/NH_3-Test**.

At high pH levels, the ammonium is more and more converted into its extremely ichthyotoxic ammonia form. The measured value should ideally be below the detection level. In case of 0.5 mg/l ammonium or more you should immediately react with a partial water change and by adding **sera toxivec**, especially if the pH value is above 7. Ammonia is fatal even in very low concentrations.

Osmotic shock

Cause: page 25

Prevention/Recommendation: You should by all means avoid strong conductivity variations, as they may occur when transferring fish or when carrying out a large water change. The sudden change to a considerably higher or lower salinity than the usual one cannot be compensated by the fish.

If fish are transferred from water with a high conductivity (high salinity) into water with a lower conductivity without an adaptation phase they will suffer from an osmotic shock (also the other way round). The mucous membrane comes off, and the organism of the fish is extremely stressed and weakened. Secondary diseases occur frequently. In case of large conductivity differences, the fine cartilaginous joints in the fin rays can burst due to the high osmotic pressure. The fins then fall off in large chunks.

Avoid osmotic shocks by checking the pH value and the conductivity of the transport water and the aquarium water before transferring the

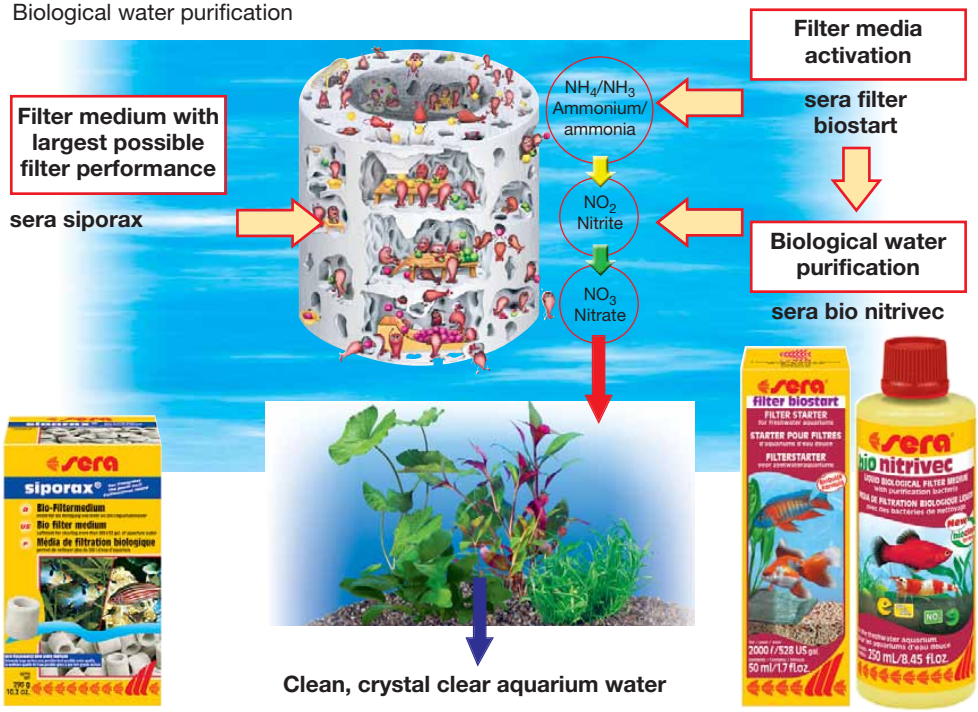
fish. If in doubt, and if you do not have a conductivity meter at hand, please ask your retailer whether the fish were kept under salt addition when purchasing new fish. You must of course also be careful when re-transferring fish from a salt bath. The fish are generally less sensitive to conductivity increases, i.e. when adding salt. Rather quick addition of salt improves the therapeutic benefits of a salt bath. However, you should nevertheless adjust the conductivity stepwise if you want to maintain a high final concentration. Adaptation can be achieved by adding **sera mineral salt** or **sera ectopur**. Differences between 100 and 200 µS/cm are negligible (for example, a single preventive dosage of **sera ectopur** with 0.1 g/l or 5 g per each 50 l (13.2 US gal.) increases the conductivity by only 200 µS/cm). The water conditions can be adjusted to the according desired levels in small steps with adaptation phases of several hours each.

Acute **nitrite intoxication**

Cause: page 25

Prevention/Recommendation: Check the nitrite level with the **sera NO_2-Test**. In case of dangerously elevated levels (above 0.5 mg/l) you should immediately react with a large partial water change and by adding **sera toxivec**. In the long term you can effectively prevent the accumulation of toxic nitrite by using a filter with a – considering the water amount – sufficient settling area for bacteria that break down pollutants (especially well suited: the bioactive filter system consisting of **sera siporax** with **sera filter biostart**). Even long lasting low level nitrite pollution may cause permanent damages. Use **sera bio nitrivec** (freshwater aquariums) or **sera marin bio reefclear** (saltwater aquariums) regularly for maintaining good water quality.

Biological water purification



8 Preventing and remedying maintenance mistakes and intoxications

Simply pour **sera filter biostart** onto **sera siporax**. The filter will immediately become biologically active. Add **sera bio nitrivec** to the aquarium water. The pollutant breakdown in the aquarium water will immediately begin or improve.

Further intoxication causes

Intoxications may be acute or gradual. Sometimes the only symptom is that the fish startle more easily. A precise diagnosis according to the behavior and the appearance of the fish is thus often not possible. Therefore proceed very carefully when researching the causes if you observe the fish being unwell and cannot explain it by the usual pathogens. Also consider unusual causes such as spraying insecticides in the room where the aquarium is located or having used self-built decoration elements (e.g. with unsuitable glue) in the tank.

Uncontrolled **carbon dioxide** addition, especially at night, may become dangerous for the fish. An intoxication may lead up to apnea. Supply your plants safely and reliably with carbon dioxide by using the **seramic pH Controller**.

Lacking oxygen is likely if the fish suddenly dwell underneath the surface and gasp for air. This can be fatal in extreme cases. Even slight oxygen undersupply may cause deformations in young fish. Check the oxygen level with the **sera O_2-Test**. **sera O_2 plus** provides quick help in case of acute oxygen deficiencies. Use a **sera air plus air pump** if required. Check the hygienic conditions in the aquarium as to prevent oxygen deficiencies in the long term. A large amount of organic material compiles especially in overstocked, abundantly fed tanks. Its breakdown consumes oxygen. Make sure you siphon off the sludge regularly. Also make sure the filter is well maintained and works ef-

8 Preventing and remedying maintenance mistakes and intoxications

fectively (bioactive filter system: **sera siporax** and **sera filter biostart**). Plants enrich the water with oxygen during daytime.

Rot processes occur if anaerobic zones form, i.e. regions that are not supplied with oxygen. This may, for instance, happen in the filter if the pump fails, or in case of firm, non-aerated bottom ground. Organic material is broken down anaerobically (without oxygen consumption) there. This leads to the formation of **hydrogen sulfide** which stinks like rotten eggs, and **nitrite** – both of them are highly ichthyotoxic substances. Therefore, be sure to check the function of your filter regularly and loosen the bottom ground while siphoning off the sludge.

Heavy metals may also lead to severe chronic or acute intoxications. They are introduced by, for example, old copper pipes, lead containing wire on aquatic plants or unsuitable decoration elements (such as some kinds of coated gravel). Lead and mercury are particularly toxic. In particular, invertebrates react extremely sensitive to copper – please always consider this when using copper containing treatments such as **sera mycopur**. Zinc and even iron (in concentrations above 0.5 mg/l) are also harmful. If in doubt, check the water values, e.g. by means of the **sera Cu-Test**. **sera aquatan** and **sera toxivec** bind and neutralize heavy metals. Furthermore, they remove corrosive **chlorine**.

In case of acute intoxications – also with toxic substances not mentioned here – it is always advisable to carry out a large water change and to remove the remaining toxic substances with **sera super carbon**.

9 sera med Professional treatments

Highly effective and well tolerated

In close cooperation with the working group of the well known parasitologist, Prof. Dr. Heinz Mehlhorn (Heinrich-Heine-Universität Düsseldorf/Germany), **sera** succeeded in marketing a range of unique, highly effective over-the-counter treatments, for some of which a patent is already applied. The products mainly appeal to versed, experienced users who look for quick and specific support from highly effective treatments after having diagnosed a specific disease. Such high performance treatments require a certain amount of care while using them. Therefore, be sure to treat according to the corresponding information for use as to ensure safe and unproblematic application.

Currently, the **sera med Professional** range comprises **sera med Professional Protazol**, **sera med Professional Tremazol**, **sera med Professional Nematol**, **sera med Professional Argulol** and **sera med Professional Flagellol**. Each of these treatments is optimally designed for professional use and works in a safe, effective and directed way even in extremely persistent cases.

In some fields the Professional treatments add to the well proven, reliable **sera treatments** of the standard range. In some other areas the preparations of this range are unrivaled – also concerning competitors – and we keep on researching…

Tip

Please also read the detailed descriptions about the specific diseases on pages 27 to 37 as well as the general application recommendations on page 60.

9.1 sera med Professional Flagellol

This treatment effectively rids ornamental fish of intestinal flagellates and other single celled intestinal parasites. The preparation additionally contains vitamins K and C that support quick recovery – especially in case of hole-in-the-head disease. Furthermore, the treatment is effective against the cause of velvet disease (*Piscinoodonium pillulare*).

Use the water conditioner **sera bio nitrivec** after a treatment with **Flagellol** as to ensure quick and reliable regeneration of possibly affected filter bacteria.

Discus infected by intestinal flagellates

Hole-in-the-head disease

Observation
Decomposing fins, slimy, whitish fish waste, holes in and around the head, possibly emaciation and darkening.

Diagnosis: Intestinal flagellates (*Hexamita* sp., *Spironucleus* sp. as well as other parasites such as *Protoopalina* sp., *Trichomonas* sp., *Cryptobia* sp.)

see also page 30

The treatment duration can be extended from three days to seven days in single cases, i.e. in case of particularly persistent flagellate strains. Should cloudiness occur during this time, you can carry out a large partial water change (about 80%) and then re-dose the treatment. The treatment is concluded with another water change (at least 80%) after (maximum) seven days in total.

9.1 sera med Professional Flagellol

Piscinoodinium on the back

Gourami with *Piscinoodinium* infection

Observation
The fish scrub themselves on decoration and swim hectically in early stages, later on fine whitish yellow dots (< 0.3 mm) on skin and fins; frequently infestation of the gills; fish looks – especially in backlight – as if dusted with flour; velvet-like coating.

Diagnosis: *Piscinoodinium pillulare*, Velvet disease

see also page 31

A treatment with **sera med Professional Flagellol** achieves good success against *Piscinoodinium pillulare* (freshwater Oodinium). Apply the treatment in the same way as described in the information for use against intestinal flagellates.

9.2 sera med Professional Protazol

Infections by *Ichthyophthirius multifiliis* (causes white spot disease) and many other single celled parasites (e.g. *Ichthyobodo*, *Apiosoma*, *Trichodina*, *Chilodonella*) as well as fungal infections are reliably, quickly and effectively removed by **sera med Professional Protazol**. The treatment is colorless in the water and very well tolerated by plants and invertebrates (e.g. snails and shrimps). Cartilaginous fish (sharks and rays/skates) do not tolerate the active agent the product contains. A recovery supporting aftertreatment can be carried out with the care product **sera ectopur**.

9.2 sera med Professional Protazol

Cichlid with fungal infection on the side

Fungus infected Firemouth Cichlid

Discus with injury infected by fungi

Observation
White, cotton-like outgrowths on the skin with long filaments standing away (often after a previous injury).

Diagnosis: Fungal infection (Mycosis)

see also page 30

Fin clamping Platy

Platy with *Ichthyobodo* infection

Observation
Color changes to gray or milky in some areas of the skin (reddish in case of stronger infestation); long finned fish have frayed fins; clamped fins.

Diagnosis: *Ichthyobodo necator*
(formerly: *Costia necatrix*)

see also page 30

9.2 sera med Professional Protazol

Black Neon Tetra with white spot infection

Black Molly with “Ich”

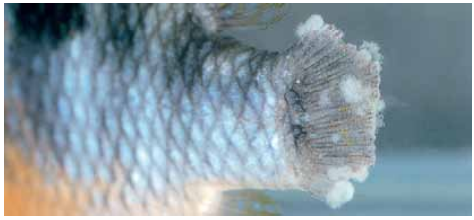
Observation
Clearly visible white spots (0.4 – 1.5 mm) on skin and fins, clamped fins and scrubbing on decoration.

Diagnosis: *Ichthyophthirius multifiliis*
(white spot disease)

see also page 32

Apply the colorless treatment according to the information for use. All parasite stages on the fish and in the water – including cysts – are reliably killed with just one treatment. A repeated treatment is therefore required only in exceptional cases (in case of a very persistent *Ichthyophthirius* strain or the parasites being introduced again), if the formation of new spots was clearly observed after having finished the treatment. The treatment is stable against light. The aquarium lighting can therefore remain switched on. However, strongly affected animals feel better when they are given more calmness for recovering by longer dark phases.

Infected Dwarf Gourami



Firemouth Cichlid with *Apiosoma* infestation at the caudal fin

Observation
Furry coating after mucous membrane injuries; many elongated protozoans on a short stalk (no long threads as in case of fungal infections) are visible with a strong magnifier.

Diagnosis: *Apiosoma* (formerly: *Glossatella*) or ***Epistylis*** (formerly: *Heteropolaria*)

see also page 33

9.2 sera med Professional Protazol

Firemouth Cichlid with *Trichodina* infection

Observation
Isolated, whitish thickened areas on the mucous membrane (partially stringy); small pale areas on the skin; apathy and loss of appetite. The fish scrub themselves and occasionally wince with their fins.

Diagnosis: *Trichodina*, *Tetrahymena*, *Chilodonella*

see also page 33

Dark colored Discus with *Chilodonella* infection

Infection by *Tetrahymena*

9.3 sera med Professional Tremazol

sera med Professional Tremazol contains the reliably and directedly effective Praziquantel, which has been successfully used against flatworm infections in human and veterinarian medicine for a long time. The patented, highly effective agent dissolving complex ensures even distribution of the otherwise poorly soluble substance in water, making the active agent get to the pathogen very quickly.

The effect spectrum of the treatment ranges from gill and skin flukes to tapeworms and digenetic trematodes (symptoms include worm cataract). Besides its excellent efficacy it is also very well tolerated.

Treat your freshwater and saltwater fish according to the information leaflet and provide good aeration. Prophylactic application in a short-term bath is possible in case of newly purchased animals or plants that might introduce pathogens. Treatment support or a recovery supporting aftertreatment are possible with **sera ectopur**.

9.3 sera med Professional Tremazol

Corydoras with skin flukes

Observation
The fish scrub themselves and become apathetic. Cloudy skin and small, motile worms on the skin (partially visible with the naked eye, otherwise detectable with a magnifier; mostly smaller than 1 mm).

Diagnosis: Skin flukes / Gyrodactylidea

see also page 34

Discus with shortness of breath caused by gill fluke infestation

Observation
Breathing becomes stronger every day until the fish stay under the surface panting; sometimes one-sided breathing; one or both gill lids closed or spread open; small flukes usually sized less than 1 mm sit on the gills (possibly visible on a sedated fish with a magnifier); fish scrub themselves at the gill lid.

Diagnosis: Gill flukes / Dactylogyridea

see also page 34

Please note that a second treatment must be carried out against these egg-laying flukes, and that it should take place at different times, depending on the tank temperature, since the development of the larvae within the eggs depends on the temperature. With a water temperature of 28°C (82°F), the second treatment should best be carried out 72 hours after the beginning of the first treatment. In case of lower water temperatures you need to wait correspondingly longer. For example, it takes 7 days at 25°C (77°F), as is common in many community tanks. However, if you wait too long before conducting the second treatment, the fish might be reinfected, and the worms possibly even lay new eggs again. In case of a second treatment carried out too soon, not all larvae have hatched yet.

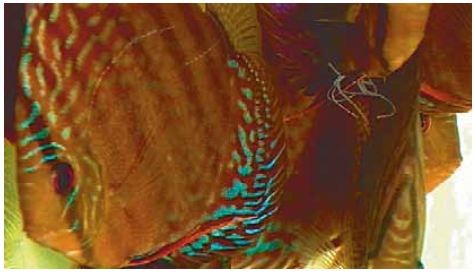
9.3 sera med Professional Tremazol

Swordtail with *Transversotrema* infection

Observation
Fish scrub themselves; inflammations underneath the scales; emaciation.

Diagnosis: *Transversotrema* sp.

see also page 35



Tapeworm on a Discus

Observation
Emaciation, loss of appetite, gelatinous fish waste; sometimes so-called proglottides (whitish, tape-shaped worm segments) can be found constricted in the fish waste, or the worm end hangs out of the anus of the infected fish.

Diagnosis: Tapeworms / Cestoda

Tapeworms (Cestoda) live in the intestines of their hosts where they withdraw important nutrients from the pre-digested nutrition pulp. The infected fish become emaciated and suffer from deficiency symptoms. The worms attach to the intestinal wall with their front end, which often leads to irritations and secondary infections. Small fish may suffer from ileus.

These parasites are introduced with infected wild caught fish or by intermediate hosts (e.g. copepods or Tubifex) from open waters. You should therefore generally abstain from feeding live food from doubtful sources. (All **sera** foods are guaranteed to be free of parasites!)

The inside of the hermaphroditic, flattened tapeworms mainly consists of sexual organs. Large amounts of eggs are released with the feces of infected fish. Some tapeworm species expel proglottids, i.e. worm body segments including fertilized, mature eggs, instead of single eggs. The hatching larvae are able to swim and require an intermediate host before they can infect a fish again. Among others, Cyclops (a copepod) is suitable for them. The infected small crustaceans can then be eaten by a fish and thus transmit the tapeworm.

There are therefore two possibilities – either to combat the worms directly, and/or to remove the intermediate hosts, thus interrupting the cycle. Being crustaceans, the intermediate hosts are successfully and reliably removed by **sera med Professional Argulol**. Be careful when keeping “desired” crustaceans (e.g. shrimps and crayfish). They may also be harmed when using this treatment!

Combating the tapeworms themselves is achieved with **sera med Professional Tremazol** according to the information for use. The dead, excreted tapeworms should be siphoned off the bottom ground daily as to keep water pollution low. One treatment is usually sufficient. A repeated treatment after a few days can be advisable in severe cases. Suspected newly added fish can be treated prophylactically in a short-term bath. The preventively treated fish should be quarantined another two to three days in the changed water before in-

9.3 sera med Professional Tremazol

troducing them into the main tank. This is to ensure that all tapeworm eggs have been excreted with the fish waste.

Please note that the combined addition of different treatments may lead to unpredictable side effects (although our tests do not indicate this so far), in case you wish to conduct a therapy with both **sera med Professional Tremazol** and **sera med Professional Argulol**. The treatments should be carried out one after the other for safety reasons, while considering the scheduled water changes and monitoring the most important water parameters.

9.4 sera med Professional Nematol

This treatment reliably allows to remove parasitic threadworms in freshwater and saltwater fish. The threadworms or nematodes are characterized by a round cross section and a usually slender body. They can become a severe problem that is often not detected for a long time, especially in freshwater aquariums. Tropical nematode species with a direct development do not require an intermediate host and can multiply at an explosive rate. Cichlids are particularly frequently affected.
Adult nematodes live in the intestines of the fish while their larvae wander through different tissues. It is not possible to help the fish anymore if essential organs have been irreversibly damaged. Preventive treatment with **sera med Professional Nematol** is possible – and also advisable due to the often uncertain diagnose – in case you suspect nematodes in newly purchased fish.
The active agent in **sera med Professional Nematol** paralyzes the nematodes. The immobile worms are then excreted from the intestines of the fish and finally die at the aquarium bottom. They should be siphoned off as to reduce the further spreading of eggs and freshly hatched larvae, and as to avoid water pollution. You can conduct a second full dose treatment for two days after the scheduled 80% water change if some worms remain in or on the fish in case of very severe infections. However, this does not replace the treatment repetition after 3 weeks, as it is scheduled for egg-laying nematodes such as hairworms!
Please follow the application advice by all means, since the treatment is not tolerated by desired invertebrates (e.g. shrimps and crayfish). Treat all fish in a quarantine tank in that case, i.e. if you keep invertebrates worth protecting in the tank.
It is advisable to leave the cured fish in the quarantine tank for a while, since the nematode stages that have possibly remained in the main tank (larvae and possibly eggs) only die by and by without fish hosts. By doing so, you will considerably reduce the risk of the fish being infected anew by possibly still living nematode stages in the main tank.

9.4 sera med Professional Nematol

If you have the opportunity to keep your fish in a separate tank for a longer while (at least four weeks in case of egg-laying nematodes) after having treated them with **sera med Professional Nematol**, the main tank without the fish will be entirely free of the parasites after this period, so no reinfection can occur.
In case this method is not applicable for you it is possible to treat the fish in quarantine a second time and, if required, even further times in intervals of three weeks each, which will finally remove possible reinfections entirely. However, leave the fish for at least two days in fresh, non-treated water in the quarantine tank after the corresponding treatment is finished. This will avoid possible active agent remainders from getting into the main tank where the sensitive invertebrates are.

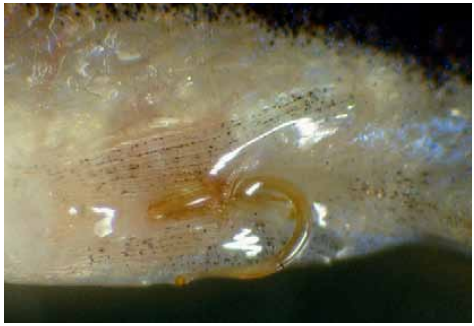
Discus pinworm

Observation
Loss of appetite, apathy, weakness, dead adult worms [up to 1 cm (0.4 in.)] in the fish waste.

Diagnosis: Discus pinworm / *Oxyuris* sp.

Discus pinworms occur in the intestines of discus fish, where they withdraw important nutrients from the predigested food pulp. The affected fish become emaciated and suffer from deficiencies. The worms form tight tufts within the intestines of the fish, which may cause an ileus. The animals weakened by the infection often suffer from subsequent diseases that sometimes are fatal. The distribution of the worms throughout the fish stock takes place by the worm eggs being taken up while the fish eat from the bottom of the aquarium. **sera med Professional Nematol** according to the instructions is used for treating the oxyurids. A second treatment is carried out after about 3 weeks as to kill the larvae that have hatched in the meantime as well.

9.4 sera med Professional Nematol



Camallanus cotti

Observation
Reddish worm ends hang out of the anus; whitish fish waste, emaciation due to loss of blood, apathy.

Diagnosis: *Camallanus* sp.

Camallanus worms parasitize in the rectum of fish. There they attach to the intestinal wall with their front end that resembles a milling head, and suck blood. The intestinal wall may get perforated and increasingly permeable for pathogens by the clasping. Due to their blood meals, the worms have a brownish red color. The end of the adult females hangs out of the anus of the infected fish by a few millimeters. In case of being disturbed it quickly retreats into the intestines. The larvae are released from the worm end sticking out, fall to the ground, are swallowed by fish that consider them food organisms, and infect them this way. This allows the parasite to spread quickly in the aquarium once it has been introduced.

The treatment is carried out with **sera med Professional Nematol** according to the instructions for use. Single application is sufficient in case of the livebearing Asian species *Camallanus cotti* (no intermediate host), which is most frequently found in freshwater aquariums, as in this case larvae (no eggs) are released, which are directly killed as well.

Pearl Gourami with *Capillaria* infestation in the intestines

Observation
Frightened behavior, loss of appetite, emaciation, slimy fish waste.

Diagnosis: *Capillaria* sp.

A slight infection of the intestines with this very thin, long worm often remains unnoticed for a long time. It can thus spread gradually over the entire fish stock. In particular, juvenile fish are permanently harmed by growth problems. A follow-up treatment with **sera med Professional Nematol** after about three weeks is required in case of these egg-laying worms.

9.5 sera med Professional Argulol

A safe and reliable treatment against parasitic crustaceans – and crustaceans that serve as intermediate hosts – is now possible with the unique treatment **sera med Professional Argulol** (for freshwater and saltwater fish). This treatment is also excellently suited for a preventive treatment of animals and plants that possibly might carry such parasites. The crustaceans (everywhere in the water and on the fish) will be gone after just one day. The treatment is broken down biologically, thus no remainders will remain in the water. Water changes or filtering through active carbon are therefore usually not necessary. However, a partial water change is recommended in small aquariums, as to maintain constantly unobjectionable water quality. Repeating the treatment after about three weeks is advisable as to kill the crustacean larvae that have hatched from eggs in the meantime as well.

Please follow the application advice by all means, since the treatment is also not tolerated by some desired invertebrates (e.g. shrimps and crayfish). A quarantine treatment is therefore often favorable. The fish treated in the quarantine tank should first be transferred into non-treated water as to wash off the treatment remainders before they are put back into the main tank. This in particular applies for saltwater tanks with very sensitive invertebrate inhabitants. According to our observations, **sera med Professional Argulol** is tolerated by amphibians and plants without any problems.

In case the treatment cannot take place in the main tank due to sensitive invertebrates, there is a certain risk that parasitic crustacean stages remain there and may infect the fish again when they are put back. This especially applies if the fish can be kept in the separate tank only briefly and the crustaceans in the main tank that require a fish host have not yet died. Consistent hygienic measures, such as repeated water changes and carefully cleaning the decoration items, the plants and the bottom ground by intense siphoning, reduces the population of parasitic crustaceans until the finally disappear entirely. If required, strongly infected fish must be caught again and treated in a short-term bath.

It may be necessary in some cases to conduct an aftertreatment for the wounds the crustacean parasites caused on the fish, as to avoid subsequent infections. Use **sera ectopur** in slight cases, **sera med Professional Protazol** is recommended in case of more severe infections.

9.5 sera med Professional Argulol

Argulus on a Koi

Observation
Fish jump and swim hectically; flat (louse-like), almost transparent crustaceans sized 4 – 14 mm with two black eyes visible on the skin of the fish; red sting marks on the fish skin.

Diagnosis: Fish louse / e.g. *Argulus*

see also page 36

Platy with *Lernaea*

Lernaea on a caudal fin

Observation
White, bar shaped crustaceans with two small sacs at the end, they stick deeply and firmly in the skin; anemia and emaciation of the fish.

Diagnosis: Anchor worm / *Lernaea*

see also page 36

9.5 sera med Professional Argulol

Ergasilus on the gills (gill lid removed)
Photo: Dr. Dirk Kleingeld

Observation
White to grayish blue crustaceans sized 0.5 – 3 mm on the gill filaments.

Diagnosis: Parasitic copepod / *Ergasilus*

see also page 37

Parasitic isopod on a Butterfly Cichlid

Observation
Clearly segmented, oval, opaque, yellowish to brownish arthropods [1 – 5 cm (0.4 – 2 in.)] are attached to the fish; bloody, dot-shaped sting marks.

Diagnosis: Parasitic isopods

see also page 37

Parasitic isopod

10 General recommendations for application

About risks and side effects…

Some factors may affect an effective and safe treatment in the aquarium or even lead to undesirable side effects. You should generally read the information for use carefully before using any kind of treatment. Make sure in particular that the treatment is suitable for the intended application (for instance, not all treatments are suitable for saltwater), and that the information for use, the label and the outer package do not contain any warning notes concerning the animals and plants you keep.

Furthermore, you should only treat tanks with unobjectionable water chemistry. The application of some treatments may make the water conditions "turn over" and subsequently cause, for example, a bacterial bloom that in return may cause oxygen deficiency if there is strong organic pollution (check ammonium/ammonia, nitrite and nitrate, for instance).
It may even be necessary to stop the treatment by carrying out a water change if cloudiness should occur during the treatment or if the fish signalize lacking oxygen (e.g. by gasping for air at the surface). Therefore make sure you provide very good water quality and sufficient aeration before, during and after a treatment. At the same time you are considerably increasing the chances that your fish recover successfully and quickly by doing so.

Do not use during a treatment

Furthermore, active carbon must not be used during a treatment as it binds medicinal agents and thus reduces or even inhibits the efficacy of the treatment. Some of the active treatment agents can also be broken down or bound by a particularly large and active biofilter. It may therefore be advisable in single cases to slightly (e.g. to 1.5 times as much) increase the treatment dosage as to maintain full efficacy under such special conditions. Using water conditioners, especially ones with finely ground rock powder immediately before (within 1 – 2 days) or during a treatment may also lead to slightly diminished efficacy due to binding the agents. Therefore it is best not to use water conditioners during this limited period. Their use, however, is even more reasonable after the treatment (see page 62, "Concluding the treatment").

UV-C lamps for water disinfection should in any case be switched off during the treatment. The high energy light destroys many active agents. The normal aquarium lighting can usually remain switched on, but it may in some case (e.g. when treating "ich") be supportive to darken the tank. This will both protect light sensitive agents and calm down the ill fish.

In case you fertilize with carbon dioxide you should stop the addition during the treatment and a couple of days after the treatment. Using some of the treatments may lead to a subsequent oxygen deficiency. High CO_2 levels in the water additionally make the respiration of the fish more difficult.

Filtration during the treatment

Information for use leaflets often recommend removing biological filters from the aquarium circuit during the treatment. This is a precautionary measure, as some treatments may also harm filter bacteria and – as stated above – very active filters might reduce the efficacy of the treatment. However, disconnecting the filter is usually laborious and inconvenient. You would need to spread the filter material, e.g. in a tub with aquarium water, or ideally operate the filter connected to a separate tank especially in case of long lasting treatments. Rot processes might occur if water does not flow through the filter material for too long (it can get critical after half an hour), which possibly

10 General recommendations for application

leads to anaerobic conditions and rot processes. This leads to the formation of, among others, highly toxic hydrogen sulfide that may poison the aquarium inhabitants if the filter is put back into operation again without being cleaned. Pathogens may also be present within the filter itself which might cause a new infection after the filter has been connected again, which is another disadvantage. A stable, biologically well established filter with suitable filter materials (e.g. **sera siporax**) usually gets through a treatment without any problems. It can therefore remain switched on. However, by all means be sure to keep the filter appropriately clean before and after the treatment. It must not contain any rotting sludge. Cleaning is done by gentle squeezing or rinsing with aquarium water in a bowl (do not rinse under running or even hot water).

Feeding during a treatment

It is best to not feed at all, or – if you keep juvenile fish or the treatment duration exceeds three days – only extremely sparingly during a treatment. As already described, many treatments harm the filter bacteria or affect the biological equilibrium in another way, therefore excess organic pollution may quickly make the water “turn over”.

Supporting measures – sera ectopur

Preferably do not use any other water conditioners or even other treatments, except is expressly recommended. There might be unpredictable cross reactions. There are some important exceptions including the care product **sera ectopur**. It can reasonably complement different treatments. **sera ectopur** releases disinfecting oxygen, which makes breathing easier for the ill fish, and it increases salinity, which stimulates mucous membrane growth. Healing is supported. In some cases (slight infection or prevention) application of **sera ectopur** can even replace using a treatment. Generally, normal table salt (NaCl) without additives (e.g. anti-caking agents) can also be used for stimulating mucous membrane regrowth. You should nevertheless consider that – even if you find sufficiently pure salt – there is no disinfecting and breath alleviating oxygen release as with **sera ectopur**. You can therefore only achieve a partial effect.

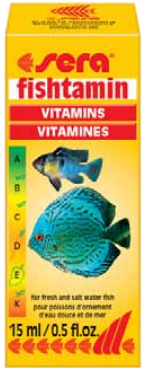
The recommended normal dosage of **sera ectopur** is about 0.01 to 0.02%. This concentration is unproblematic even for fish such as catfish or other scaleless fish that otherwise might react sensitively to elevated salt levels. Higher salt concentrations (about 0.03% to 0.3%, i.e. 0.3 to 3 g/l) should only be used in case of acute stress situations or a disease and be lowered stepwise by normal water changes after these problems have vanished. Make sure you know exactly about the salt tolerance of the fish in question before applying high salt concentrations (e.g. in a short-term bath).

10 General recommendations for application

Vitamins

Using vitamin preparations is another exception. It is also safe and recommendable in combination with treatments. Just as in humans, vitamins fulfill many vital functions within the fish organism. They are, among others, required for a strong, active immune system. The own disease resistance – provided it is optimally functioning – is the best possible protection against diseases an organism can have. If you feed your fish high quality **sera** food, you already ensure, good basic supply with vitamins and all other important nutrients. Please be aware that the included vitamins may increasingly be broken down by the effects of atmospheric oxygen, light and moisture. It is therefore ideal to choose food cans that you can consume within several weeks to a few months.

You should additionally support the immune system with an extra vitamin supply in stress situations (e.g. fish transfers, courtship, brood care, temperature changes) or if pathogens got into the aquarium. Use **sera fishtamin** in such situations. You can add the preparation directly to the water according to the information for use or soak the food with it just before feeding. The **sera FD foods** are particularly well suited for this purpose. Regular addition (once or twice weekly) or using the vitamin drops as a treatment (once daily) for several weeks are both possible. Such treatments are advisable in the mentioned stress situations and during a disease. Continue the treatment for at least a week after the disease symptoms have vanished as to support recovery and minimize the risk of a relapse.



Concluding the treatment

Partial water changes and removing treatment remainders through active carbon (**sera super carbon**) are in most cases required. Please observe these measures exactly as well. A considerably longer treatment application time caused by not carrying out these measures does not improve efficacy but – on the contrary – may lead to undesirable side effects. Some treatment agents can have harmful effects if applied for a longer time. Other treatments contain solvents that are broken down by bacteria as nutrients, which increases the risk of a bacterial bloom. In case of large water changes being required (e.g. at least 80% for the **sera med Professional** products) it is possible to proceed stepwise: e.g. several 30% water changes within one or two days. This reduces the stress for you and your fish, especially in case of large fish, using reverse osmosis (R/O) water, etc. The water should by all means be conditioned with **sera aquatan** or **sera blackwater aquatan** when conducting a water change – among others, this will bind remaining treatment remainders. You can quickly

10 General recommendations for application

top up an affected filter bacteria flora by using **sera bio nitrivec** (freshwater aquariums) or **sera marin bio reefclea**r (saltwater aquariums).

You must of course also be careful with dosages considerably higher than stated in the information for use. Calculate the dosage according to the actual amount of water, not for the entire volume of the aquarium (roughly estimate and deduct bottom ground and decoration elements). Slight, accidentally administered overdosages are covered by the safety margin. In case of more than double dosage you should generally carry out a partial water change for safety reasons.

Important

All **sera treatments** have been carefully checked considering their efficacy against the corresponding pathogens and their safety for users, the kept animals and the environment before they were ready for marketing. As a pharmaceutical manufacturer, **sera** is subject to regular observation by the authorities in charge. The close cooperation with successful breeders and retailers as well as the valuable feedback from our customers allows us to recognize possible problems or desires at any time and immediately react in an appropriate way. Our cooperation with scientists from different universities, plus of course the quality control and research activities of the highly qualified **sera** laboratory team ensures highest safety standards and new developments according to the current state in science and technology.

11 Checklist

Some problems are not easy to sort out. Beginners – but also experienced aquarists – should not hesitate to seek advice from their specialized retailer, breeder or veterinarian. The **sera** Team (info@sera.de) will of course be pleased to provide support at any time if you have special questions about our products.
The list below covers the most important conditions in your aquarium and will support you in finding out about causes. When carefully completed, this list will give yourself or an expert you consult a quick overview about possible problem sources.
Please read our recommendations about aquarium setup and care as well as special questions such as lighting, algae growth etc. in our broad guide booklet range, or inform yourself on our internet site (www.sera.de).

1 How large is your aquarium?

Dimensions in cm:

Width _____ x depth _____ x height _____

Result: _____ cm^3

divided by 1000 = _____ liters (volume)

Remember to roughly estimate the volumes of the bottom gravel and the decoration elements and to deduct them from the water volume.

2 When did you set up the tank?

_____ _____

_____ _____

3 Which filter do you use?

Model: _____ _____

Filter materials: _____ _____

4 Which fish species do you keep? How many of each species?

_____ _____

_____ _____

_____ _____

_____ _____

11 Checklist

5 **Do you also keep animals other than fish in the tank?**

6 **How many plants are there in the aquarium, and which species?**

7 **When did you last add new fish or plants?**

8 **Which additional devices (e.g. membrane pump, UV-C clarifier) and decoration elements (e.g. bottom gravel) do you have in the tank?**

9 **Which water conditioners (e.g. sera aquatan) or treatments are used or were recently used?**

11 Checklist

10 How often do you carry out water changes? How much water do you change while doing so?

11 When and how do you clean the filter?

12 Feeding

a) Which food types?

b) How often do you feed? Are there remainders?

c) Which food additives (e.g. vitamin preparations) do you use?

13 Which water parameters do you measure?

Measuring date

pH

Temperature

GH

KH

NH_4/NH_3

NO_2

NO_3

PO_4

Cu

Fe

Further advisable measuring parameters: Conductivity, chlorine, oxygen, carbon dioxide, plus calcium and magnesium in saltwater. Please fill in as far as available.

Do also check the parameters of the tap water you use for comparison. Sometimes the tap water contains undesirable substances or provides unsuitable water parameters.

11 Checklist

14 When was the disease first noticed?

15 Which symptoms did you observe?

16 Which fish are affected (old ones, young ones, a specific species)?

17 How severe is the disease? (Do the fish eat? Have some already died? etc.)

18 Did you notice anything else that is unusual?

E.g. on the plants or other water inhabitants, or did you carry out unusual activities in or near the aquarium (e.g. did you paint the walls or spray an insecticide)?

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For natural aquariums

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