

How to feed Sea Water Animals?



AquaCare GmbH & Co. KG
Am Wiesenbusch 11 - D-45966 Gladbeck - Germany
☎ +49 - 20 43 - 37 57 58-0 • 📠 +49 - 20 43 - 37 57 58-90
www.aquacare.de • e-mail: info@aquacare.de



photo: Othmar Pötsch

Why feeding?

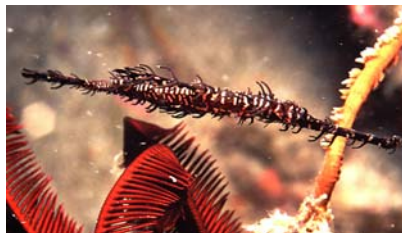
All fishes and many invertebrates depends on food. Only corals and some other animals with zooxanthellae are able to live without organic food. They need much light, currents and macro and micro elements (trace elements). But an additional feeding with organic matter, e.g. plankton, can induce better growth.



Lurking predators like *Taenianotus* spec. need seldom food – but if they are hungry they prefer normally life food (photo: Michael Kokoscha)

Since primitive times most coral fish – except lurking predators like stone fish, lion fish etc. – are habituated to begin to eat at dawn and they will end at twilight – but only in small bits. In the course of time the capability to starve decreases, in contrast to fresh water fishes. Normally in coral reefs bad times do not exist – except storms - and the animals has not adapted to starving. This circumstance the aquarist should never forget. Unfortunately some hobbyists are afraid against bad water quality and so they feed the fish only once or

twice a week. Many fishes will find in those aquaria between the living rocks some food, e.g. small crustaceans. And some animals like sea needles can survive very good in those aquaria. But most tropical fishes like *Anthias*, *Chromis* and others need a lot of food to feel good. Even surgeons and tangs, that scrape algae from the stones, must be additionally fed.



Sea needles can survive between living rocks by searching for small food like crustaceans. (photo: Michael Kokoscha)

If you can see the fishbones of a fish or the fish has a shrunken abdomen be sure: this fish will not survive very long. Thin fishes are sensitive to parasites and behave aggressive against others. One public fairytale is that you cannot keep two or more fish of one species. For many district forming fishes this is true, because the aquarium are normally too small. But tangs (e.g. yellow sailfin tang) can be kept easily as a pair or a small group. They feel better in a group than swimming alone. But if they are hungry the whole day, because the algae growth is too less and the aquarist does not feed, these harmless fish gets aggressive and injure their buddies and others. All aquarists should be fare away from this cruelty to animals!

How much to feed and what risks are involved with it?

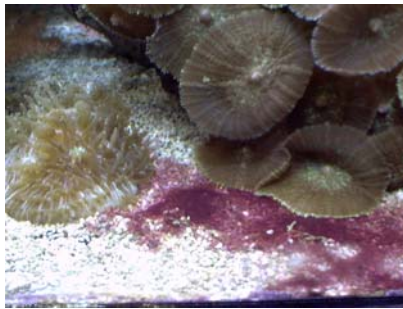
To feed much and good is not only favourable. Because every kind of food is loading the water. The food is eaten by fish or other animals and they excrete substances into the water that they do not need.



Many of the well known aquarium fishes eat the whole day but only small bits. (photo: Dirk Walber)

Organic wastes and the part of the food that is not eaten by the animals will be degraded by bacteria and others to metabolic end substances: water, sulphate, Phosphate and carbon dioxide (will be absorbed by algae and zooxanthellae; but this part is no object in modern reef tanks). But persistent substances will accumulate, too. And therefore a regularly water change should be made by the aquarist.

Nitrate and phosphate are more problematic. In higher concentrations (more than about 0.2 mg/l phosphate and more than about 20 mg/l nitrate) they can induce the growth of green algae, blue green algae and dino-flagellates. Sensitive invertebrates (some hard corals, *Tridacna*) can die slowly.



Red coloured blue green algae: one possible cause is too much nitrate and/or phosphate. (photo: AquaCare)

The conclusion: you may feed so much that nitrate and phosphate will not accumulate over the limits. But the animals should never starve! Every aquarium system tolerates a specific amount of food. This limit depends on the built-in technique, the kept animals and the lights (the more the lights the faster growing the corals the more nitrate and phosphate will be consumed). To determine this specific amount of food is not easy. But if you have this food limit, be sure that all animals are well-fed. The stock of fish must be chosen in that way that any animal will starve. If nitrate and phosphate are accumulating very fast you must lower the stock of fishes or you must install a more effective technique: a bigger skimmer or a more efficient working skimmer, nitrate filter and phosphate adsorber. Only small transgressions can be compensated by a larger water change.

An additional disadvantage of too much feeding is the rapid growing of unwanted animals like *Aiptasia*. In this case the aquarist should try to fight against these creatures with biological strategies. In an aquarium with dwarf angles you will normally not find *Aiptasia*. And if dwarf angles are fed very well the danger is low that they eat hard corals regularly.



Too much phosphate causes even at rigid hard corals a coral bleaching. The tissue collapses and the coral dies. (photo: AquaCare)

How to feed?

An important point for preventing a too high enrichment with waste sub-

stances is the right feeding. If you feed once a day a large quantity of food a significant part will disappear in the filter system, between the reef construction and in the substrate. The best way is to feed several times a day but only with small portions. So most of the food will be eaten by the fish. There is only one exception: if you introduce new fish into the tank. If these fish are shy you need larger quantities of food to ensure that these fish will get some crumbs. Normally new fish must learn to eat food replacement. If only a little bit of food is swimming in the water the new and shy fish will never get a bit and they will not survive the settling in.

An additional advantage of the method "often but less" is the fact, that the skimmer will work more equally. If a large amount of proteins or similar substances occur, a skimmer will slop over very fast. To prevent this the skimmer must be adjusted very roughly. At smaller loads the skimmer can be adjusted more sensitive. The result is a lower threshold value and the water will be more clean. To prevent the skimmer against over foaming you can equip nearly every skimmer with a skimmer shutoff. The living room carpet will be happy.

Depending on how the aquarium system is built you can shut down the skimmer during feeding. In every case it should be prevented that too much food reaches the filter system.

Garbage men in a reef tank

In spite of carefully feeding a part of the food will not arrive at the stomach of the fishes. The food disappears behind the rocks and other animals like corals help oneself. To prevent the unused food against direct degrading by bacteria it is useful to set in garbage men. Especially brittle stars, hermit crabs, shrimps and some snails take the unused food and utilize it.



Hermit crabs eat everything they can get. (photo: AquaCare)

One question will stay: what kind of food? In our opinion the best is to

feed high quality food in many variations. Fishes like diversification, too. With different fare the risk of a wrong nutrition is minimal. And please consider, not all fishes eat all kind of food.

Frozen food

The most popular food in serious sea water aquaristic is frozen food. It is similar to the natural food. Frozen food is available in many different kinds but unfortunately in different qualities, too.



Frozen food will be eaten by nearly every kind of fish. (photo: AquaCare)

Before feeding the frozen food should be defrosted. Therefore take only so much food that you need and put it into a small cup with little water (do not take reverse osmosis water). Do not wait hours until you feed it. Frozen food is very sensitive to temperature like all sea food and it will go stale very fast. If it is completely unfrozen you will see the quality of the food. Good food consists of whole animals and the water has no or a very light colour. You can check the water quality by measuring phosphate – you will be astonished. The better the food quality the lower the phosphate concentration. - Due to this fact the water should not be put into the aquarium – except the aquarium water has too low concentration of phosphate (below 0.05 mg/l) and nitrate (below 5mg/l). Pour the unfrozen food through a fine plastic sieve and use the food at once. Many aquarists think that the water from the unfrozen food contains a lot of vitamins and trace elements. With bad food this statement is true but with good food you have all these important substances inside of the food animals.

One trick: if you need food several times a day you can take the whole amount and defrost it. If it is unfrozen you can dump the water by pouring through a sieve. Transfer the food animals into a plastic bottle with a nozzle and a little bit cold

aquarium water. Then you can feed your fishes several times a day. In the meantime kept the bottle cool. It is possible to mix other food like flakes into the bottle, too.



In aquaria with exclusive hard corals it is possible that the water contains too less nitrate and phosphate. In these cases you can put the defrosted water into aquarium, too. (Foto: AquaCare)

Without much work it is possible to feed your fishes many times a day with some bits. Important: if food is defrosted you must use it the same day. Do not freeze it again – the quality of the food gets very bad. Unfrosted food from the day before should be dumped, too. Your fishes will thank you.

You can find a large variety of frozen food in the retail shops. For sea water tanks only sea food should be fed. You can take all kind of fish (do not take smoked or laid-in products), crustaceans like *Artemia*, *Mysis*, Krill and the products (roe) without qualms. We do not recommend fresh water animals like *Tubifex* or *Daphnia* or even heart of a cow. These food has either too much fat or the fatty acids has a wrong composition. Sea food contains a lot of omega-3 and omega-6-fatty acids (a group of highly unsaturated fatty acids = HUFA or PUFA; some examples are: DHA, EPA, ARA). Only be careful with mussels or other filtrating animals. These can contain high concentrations of heavy metals or persistent organic toxins.

Fishes gets problems to digest the wrong food. For that reason take care if you buy frozen food at your retail shop.

Flakes and dry frozen food

The quality of flake and dry frozen food came better the last decades. The added vitamins and other supplements like omega-3 and omega-6-fatty acids and minerals makes flakes to a valuable food.

Our tip: to mix flakes and frozen food should be the best way to give the fishes all substances they need.

Flake are normally swimming at the water surface. You can use a food ring or you can soak it before feeding. Not all fishes are used to eat from the water surface. If one fish will not learn it please make sure that the flake will be submerged.

Flakes and dry frozen food should be stored air-tight, dark and at a cool place. If you buy larger packs it is advisable to put a small part into the daily food box and freeze the bulk quantity. It is important that the bought food has a best before imprint. During too long storage the food will loose a lot of the valuable substances.

Spirulina and other micro-algae

Spirulina spec. is a high-grade micro alga with much vitamins, essential fatty acids and other secondary metabolites. You can buy *Spirulina* or *Chlorella* as flakes, in tablets or as a powder. We think that these micro algae are very important supplements. In particular for grazing animals like surgeons and tangs the green algae are very important. And not every day the aquarists feeds lettuce leaves.



Tangs like these *Zebrasoma flavescens* needs green food – e.g. enriched flakes. (Foto: Günther Hubner)

Fluid food for invertebrates

The last year it is very popular to feed fluid food for benthic invertebrates. In many cases the aquarist acts according to the motto: the more the better. But normally these fluid food contains high concentrations of organic substances and these will pollute the water very fast. If a tank has too high concentrations of nitrate and phosphate you should not use these food. In aquaria with low or too low concentration of these fertilizing substances fluid food can help to support the invertebrates.

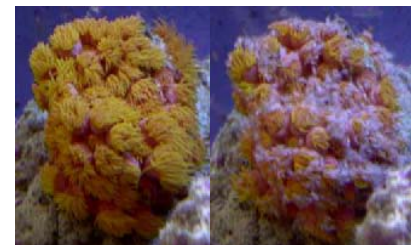
It is possible that the dosing of fluid food can cause the rapid growth of dino-flagellates (brown or reddish

“blue green algae” carpets, that disappear at night).

Nearly all corals for aquaristics contains zooxanthellae – highly specializes micro algae that provides the coral with essential substances. As a rule an additional support of organic substances is not necessary. Even if nearly all corals are able to absorb dissolved organic substances like amino acids or small particular stuff. The risk of an overdosing of fluid food is very high, especially in aquaria with many fishes and / or too low or bad technique.

The aquarist gets enthusiastic if he see that the corals will protrudes their tentacles after feeding with fluid food. Often only stimulating substance induces the coral to enlarge their tentacles. Every animal need a special size of food. Additional the water currents plays a role if an animal can incorporate the food or not. If an animal protrudes its tentacles without picking up the food it is possible that it looses more energy than without stimulation. At a low nutritional condition it is possible that the animals will die after frequent stimulation.

If corals never enlarge the tentacles it is possible that other factors like water quality, lights or currents are not in order.



before feeding direct after feeding



after 5 min after approx. 1 hour
Some corals like this *Tubastrea* spec. must be fed regularly with much food because they do not have zooxanthellae that supply them with energy substances. Without food they will degenerate slowly and in the end they will die. (photo: AquaCare)

Corals without zooxanthellae must be fed daily to prevent starving. They cannot exist with light like the other corals. But these animals are only for very professional aquarists.



Dendronephthia spec., a coral without zooxanthellae. It needs regularly food in the right size and composition. These animals are only for professionals or for nature. (photo: Dirk Walber)

Medical flakes

A special food are medical flakes. These food contains medication and should only be fed in emergency cases. If fish is infected slightly with *Oodinium*, *Cryptocarium* or *Ichthyophthirius* these flakes can help without destroying invertebrates. In grave cases the fish will not eat and the flake cannot help. Then you must catch the fish by a trap. In an extra tank the fish can be medicated conventionally.

It is very important not to use the medical flakes regularly as a prophylaxis. The only effect you get are immune strains of parasites. And if a disease occurs the active agent of the medicine will not work against immune parasite strains.

If diseases often occurs in you tank the water conditions are not o.k.. In a nearly perfect aquarium system you can introduce new fishes with good fitness but with some ecto-parasites symptoms. These fishes will convalesce very fast and the old fishes in your tank will not fall sick. – But in the last time there are some very aggressive parasites that are immune against all normal medicines. If you get these strains your fishes will not have a chance. To prevent a total loss of your fish a quarantine tank should be purchased.

Basic tips for erecting an aquarium system you will find in the chapter „The AquaCare way to a perfect working reef tank”.

Plankton

In aquaristic terms plankton is a variety of small and smallest herbal or animal organisms, that can be used as food for aquarium animals like corals or fish.

In scientific terms the definition is more wide: all pelagic organisms that cannot move or can only slightly move – these organisms depend on the sea currents. Among others jellyfish with some meters diameter are plankton, too.

If you feed live plankton most of them should be still alive. Dead plankton can bring some disadvantages. Frozen plankton must be handled in the same way like larger frozen food. Only the sieve should be very fine.

If you do not know the exact age of the fresh plankton the food value is uncertain. If plankton starves the concentration of vitamins, minerals, highly unsaturated fatty acids (HUFA) will diminish very fast.

The quality of purchased plankton differs. The numbers of the plankton animals and algae differs, the quality of the transport water differs (please measure the phosphate concentration of the water – but you must take only the water for this experiment; you need minimum 1 µm filters for this) and the biodiversity differs.

Mostly mono-cultures are offered. The value of these mono-cultures is not very high, but to produce a mixture of some or many organisms is not very easy. But to feed you animals like corals you need different size of food and different ingredients.

The durability of plankton is very low. Zoo-plankton (small food animals) can survive only some days, if enough food for them is in the container, too.

The well known *Artemia* should be fed within some hours after hatching. Even very young *Artemia* has a too low food value for breeding fish. The fresh *Artemia* larvae must be enriched by special substances to get the right food for breeding.

Phyto-plankton (micro algae) in general can survive better – up to some weeks. But phyto-plankton must have an intensive green (except species with reddish pigments). If a green algae gets yellow or even red, the algae are nearly dead and the

food value is extremely low. In this condition most important ingredients are consumed by the algae themselves.

In the near future living plankton, that is specially enriched, will play the decisive rule at breeding coral fishes and in reef aquaristics. The first basic approaches are made, but for the average hobby aquarist these techniques are too expensive in time as well in money.

Soilage for surgeons, tangs and other grazing animals

A huge number of fishes depends on green food. Some of this animals are specially introduced to reef tanks to graze filamentous green algae and macro algae like *Caulerpa spec.* The yellow tang *Zebrasoma flavescens* is the most common “algae” fish, even though there are better grazers: *Ctenochaetes spec.*, especially *Ctenochaetes striatus* (this fish is unfortunately not very colourful), *Salarias spec.* (good locking, but some of this genus are exclusively grazing algae and if the do not get them they will starve), and many kinds of sea urchins.



Typically algae eating fish in the Red Sea: *Zebrasoma desjardini* (photo: Dirk Walber)

In many tanks different species of surgeons and tangs are kept in large numbers. The natural growing algae are too less to supply all fishes with their main food. Unfortunately all *Acanthurus* and *Zebrasoma* take nearly every kind of food. And so the part of vegetarian food get too less. These fish groups need absolutely soilage. Flakes with a high amount of green products like *Spirulina* and other algae can help out.

But the better way is to feed green stuff directly. There are two advantages of green food: firstly only the vegetarian fish will get the green food and secondly the surgeons and tang must work for their food like in nature.

Very practical are all kinds of lettuce. Lettuce kinds with hard structures are better because they will not decay so fast. Sea lettuce (*Ulva spec.*) is a very natural food but you have problems to get it. Some happy aquarist have sea lettuce in a second aquarium and it grows very rapidly. Even cucumber (not laid-in cucumbers), dandelions, spinach, nearly everything with green colour will be eaten. Very popular are macro algae from the asian shop. The different sea weed kinds have important ingredients like iodine and many minerals.

In winter time you shall not take lettuce from green houses because these products contain normally high concentration of nitrate and herbicides.



A leaf of lettuce is bounded with elastic bands on a stone – the salad bar is ready. (photo: AquaCare)

If any fish knows this food you must be a little bit tricky. If you put the lettuce leaf into the tank, normally the fishes are afraid for the “killer leaf” and they will hide behind the reef construction. If you have cowards in your tank they must learn step by step. Take a small leaf put it on the aquarium ground and cover it with a stone. Only a small bit of the leaf should be visible. With the time the first snoopie fish will taste it – a small thing could not be dangerous! Day by day you can enlarge the area of the visible leaf. In the end you can take some leafs and fix it with elastic band on the stone. Or you can use special plastic clips that can be fixed at the aquarium glass.

Be sure that you can see very interesting situations in the near of the lettuce leaf. Especially if you keep more kinds of surgeons and tangs the leaf will be the centre of interest in you tank. The fishes are busy and are less aggressive, they must work for the food and gets important vitamins and secondary plant metabolites.

Vitamin addition

Normally a diversified food of a good quality is enough to keep fishes healthy and strongly. If food should be enriched you can take fluid vitamin solutions and soak the dry food like flake or dry freezes food for some minutes. An enrichment with vitamins is advisable by weakened fish or by fish with deficiency symptoms.

Take care: most of the vitamins solutions induce an over-foaming of the skimmer. The vitamin solutions should be stored cool and dry, because some of the substances are sensitive against heat, oxygen and light.

Feeding and skimming

If food arrives at the tank water polluting substances like proteins will accumulate in the water. How strong the skimmer reacts depends on three points: the kind of food, the quantity of the food and the efficiency of the filter system including circulation between filter tank and aquarium and of course the kind of skimmer and its settings.

Generally the more sensitive the skimmer is adjusted (the lower the reaction limit) the more easy it can foam over. You can reduce the efficiency by throttling the air input and after a while you can adjust it at the previous settings. A skimmer that will not foam over even if fish or crustacean roes are fed should be changed against a more efficient system. In the normal operation mode it will never make it.



Modern skimmers take extreme quantities of dirt substances out of the aquarium water. (photo: AquaCare)

There are some kinds of food, that hardly affect the skimmer. The better the quality the lower the effect on the skimmer. But others causes extremely over-foaming. It is possible to blend different foods to a mixture that only slightly affects the skimmer.

How strong the skimmer will be affected by food depends on some matters: the kind of food, the processing, the storing and the treatment by the aquarist. From batch to batch and depending on the season the quality can considerably vary. The following table gives only some ideas.

Plankton	⊖ ⊕ ⊕ ⊕
With vitamin E strongly enriched products	⊖
Vitamin products (except vitamin E)	⊕
Mussels	⊕
Mysis	⊕ ⊕
Krill	⊕ ⊕
Artemia	⊕ ⊕
Dry flakes	⊕ ⊕ ⊕
Roe of fish or crustaceans	⊕ ⊕ ⊕ ⊕

- ⊖ the foam will collapse
- ⊕ ⊕ skimmer reacts slightly
- ⊕ ⊕ ⊕ skimmer reacts very strongly