AquaCalculator Reef Aquarium Compendium - Part 4 Animal pests

Pests are unfortunately a reality in many reef aquariums.







In this compendium you will learn everything you need to know, to get rid of unwanted animal pests in your aquarium.

We wish you good luck (Martin Kuhn and the AquaCalculator team)



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Liability exclusion

The information and recommendations made in this compendium represent the author's state of knowledge at the time of the last update.

No guarantee can be given for the topicality and correctness of the contents! Any liability as a result of correct or incorrect application is rejected.

Symbolism

i	INFORMATION	Important note
٢	WARNING	Things that are particularly often done/understood wrong
Ein	AVOID	You should definitely NOT do this
(Y	COMPLEX TOPIC	For advanced students - allow time to read through.

About us

We are a team of 3 software developers and have been working since 2005 to support reef aquarists worldwide in their hobby. We are enthusiastic MW aquarists ourselves, not dealers or manufacturers of aquarium products.



Our expenses are financed by income from our computer program **AquaCalculator** which is specially designed for marine aquarists.

The license fee is less than 10€ per year. You can then use AquaCalculator on as many of your own devices as you like. Each license is linked to one of three different operating systems, for each of which we create and maintain separate versions.



Over ten thousand aquarists worldwide are already using our program and have successfully improved the water values of their aquariums. Complicated calculations, e.g. for the dosage of salts or additional chemicals, are done for you by our software.

Water values, animals and maintenance work can also be perfectly documented.

With every license you support and appreciate our development work!

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PART 1 - Identification

What to do if you suspect a plague?

You are probably reading these lines because you have discovered something disturbing in your aquarium. Possibly even animals/corals in your aquarium have died or are behaving conspicuously.

The logical consequence: You want to **get rid of** this problem **as quickly as possible**. The whole thing immediately and with as little effort as possible.

This is 100% understandable. Unfortunately, it is not quite so simple in MW aquaristics, because:

- Maybe your pelvis does not need any intervention, but just some rest
- Possibly an intervention is useful and perhaps even urgently necessary, since doing nothing would worsen the situation
- The treatment methods are partly completely different depending on which pest you have to fight with

Stick to the following procedure!



It is not recommended to do step 3 before step 1 or 2! You also do not swallow antibiotics if you only have a small cold....

Not all creatures described in the FAQ are pests in the usual sense. Some of them are often even deliberately introduced into marine aquariums, e.g.: because they are particularly attractive or interesting. A few months later, usually when they have proliferated excessively or are crowding other animals, you wish you hadn't put them in at the time. Xenia, crustose anemones, disk anemones etc. belong to this category. To avoid unpleasant surprises later, they are listed in this FAQ.

1.1 Aiptasia



Appearance:

- Smaller anemone species
- transparent / brownish
- Tentacles mostly thin and arranged laterally around oral disc (not planar). Shaft of the anemone relatively long compared to the size.
- Can adhere to all objects (reef rock, coral, glass, plastic parts, ...).
- Size up to 5cmSeldom also up to 20cm
- Very fast multiplication rate

Continue to Aiptasia

1.2 Manjanos (Fire anemones)



Appearance:

- Smaller anemone species
- Different color varieties
 Most common: yellowish/orange, less common attractive deep green
- Somewhat thick tentacles arranged laterally around oral disc short shaft
- Attachment to reef rocks, sometimes corals as well
- Different species: size 2 10 cm
- Rapid reproduction rate, often become colonies/plague

Continue to Manjanos

1.3 Xenia / Pumping Xenia





Appearance:

- (Soft) coral species
- There are several different growth and color varieties with pumping and non-pumping species
- Somewhat thicker shaft, from which several tubes are attached to polyps
- Attachment to reef rock, glass, and sometimes coral
- very fast reproduction rate, sometimes forms huge colonies, often overgrowing other coral species (see photo below)

Continue to Xenia / Pumping Xenia

1.4 Crustose anemones , Disc anemones





Appearance:

- Crustose/disc anemones displace other invertebrates due to cnidarian toxins
- May discharge a secretion if touched/harassed too violently
- Rapid growth, partially undesirable spreading.

Continue to crust anemones / disk anemones

1.5 Hydropolyps





Appearance:

- Brush shaped soft coral like polyps
- Golden brown coloring
- Individual polyps as well as whole colonies are strongly sensitive to touchPolyps contract completely, then only a tiny ball is visible
- Polyps expand again after a few minutes
- Extremely fast spread

Continue to Hydropolyps

1.6 Flatworm infestation of stony corals (Acropora flatworms)



Appearance:

- Affected are Acropora stony corals. Flat worms attached to the coral are difficult to recognize (almost transparent coloration). Partly massive damage of the coral tissue
- Noticeable is condition / behavior of the corals: Larger areas of the coral become lighter and lighter
 Starting point is the trunk of the coral, i.e. from below
 tips lose their original coloration
 due to tissue loss of the coral,
 the calcium skeleton becomes visible Coral turns white, dies off
 In the long run algae accumulate on the dead areas
- Flat worms reproduce via spawn packsThese are usually located at the bottom of the coral (stem) where tissue is already detached

Continue to Acropora flatworms

1.7 Red whirl worms (Turbellaria)



Appearance:

- Parasitic infestation in the entire aquarium (panes, substrate, rocks and later on corals).
- Yellow / red coloring
- rapid expansion

Continue to red whirl worms (Turbellaria)

1.8 Red Bugs





Appearance:

- Acropora stony corals are attacked by parasites (crustaceans)
- Coloration of corals as well as polyps expansion decrease.
 Affected corals reduce their growth
 In case of severe, infestation: tissue detachment up to death of the coral
- Size: Approx. 0.5 mm and thus almost not recognizable without magnifying glass or magnification of a photograph
- Yellowish body with red head

Continue to Red Bugs

1.9 Montipora feeding thread snails



Appearance:

- Partial damage of Montipora stony corals: white spots / feeding traces
- Additionally: Absence/absence of polyp expansion around affected areas
- Affected are especially plate-like growing Montipora
- Thread snails pictured above are only recognizable by close inspection, as they almost always reside on the underside of corals and preferentially in darkened crevices.
- If the infestation is unclear (snail not clearly identifiable), fan the supposed snail in the aquarium with water.
 If one recognizes moving threads the identification is unambiguous
- Size approx. 5-8 mm
- Rapid multiplication

Continue to Montipora eating thread snails

1.10 Tridacna/monster clam feeding snails







Appearance:

animal. world.com

- Approx. 3mm large, cone-shaped, white snails. (rice grain-like formations) on the upper side of the clam.
- Not visible during the day, but only about ½ hour after the lights go out.
 → Use flashlight
- Condition of the clam deteriorates. Mantella lobes are no longer or less stretched out during the day than before. Possibly smaller holes (feeding spots) on the shell lobes of the clam. May lead to the death of the clam

Continue to Tridacna/Monster clam eating snails.

1.11 Asterina (mini) starfishes









Appearance:

- Mini starfish
- variable number of arms (5-9) usually different length
- white, beige or pink coloration
- Size: up to about 1cm, but there are also larger genera (see bottom photo)
- Prefer to sit on reef rock or glass (rarely on corals).
- Under favorable conditions: rapid multiplication rate

Continue to Asterina (mini) starfish

1.12 Worm snails



Appearance:

- Worm snails cast mucus-like nets (photo 1 / close-up).
- tubes or crater-like snail dwellings on the reef rock (photo 2) as well as calcareous skeletons of LPS or SPS stony corals (photo 3).
 Sometimes they also attach themselves to the shells of hermit crabs, turbo snails or other fixed parts such as flow pump housings.

Continue to worm snails

1.13 Bristle worms, jaw worms



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1.14 Crackers, Mantis Shrimp, Crabs



Appearance:

- Cracking noises in the aquarium (only cracking crabs, mantis shrimp)
- Animals themselves often live hidden and show themselves rarely, possibly when feeding
- Partial disappearance of animals, especially often shrimp

Continue to firecrackers, mantis shrimps, crabs

1.15 RTN on stony corals (Rapid Tissue Necrosis).



Appearance:

- Stony corals (SPS) bleach quickly, sometimes within a few hours What remains is a (dead) calcareous skeleton The tissue of the coral disappears practically without residue
- After a few days, algae attach to the dead coral
- RTN starts at the bottom of the coral

Continue to RTN on stony Corals

1.16 Brown Jelly



Appearance:

- Tissue/polyps of corals are covered by a thick, transparent brownish slime. Sometimes even the underlying coral skeleton is visible (see photos above).
- Almost all corals as well as disc/crustose anemones can be affectedBrown Jelly occurs especially frequently in large polyp stony coral species (Euphyllia, bubble corals, Xenia, Goniopora, Catalaphyllia, Alveopora)
- Starting point quite often is a part with mechanical injuriy of the coral

Continue to Brown Jelly

PART 2 -Description and effects of the pests

2.1 Aiptasia

Aiptasia belong to the genus of anemones. They do not serve as host anemones for clownfish, among other things because they are only relatively small. They have their name because of the glass-like transparent tentacles. There are several subspecies. They occur in all seas worldwide. In our aquariums they get, unfortunately much too often, as appendages of live rock, coral offshoots, ...

Aiptasia, like other anemones, can deliberately change their position (migrate). They have moderately strong stinging venoms that they use to defend their own position and create colonization space for their own offspring. They can also stretch them and migrate towards other corals. The larger and more numerous they are, the more invertebrates they will nettle. They also release cnidarian toxins into the water. This then also stresses corals that are not in the immediate vicinity of aiptasia.

Aiptasia are extremely consistent, persistent (even survive for days without water) and fast in terms of their own reproduction. To do this, they lace polyps from their own tissue, starting from the foot. These drift in the water for a short time until they have found a suitable place to attach. There new aiptasia grows and reproduces again. Unlike most anemones, aiptasia grow even in dark places behind reef rocks. From fragmented, single aiptasia usually become several new animals whereby a spreading is relatively difficult to contain. Spreading often occurs in a snowball effect and throughout the entire aquarium.

Conclusion/Risk:



Check your aquarium incl. piping and technical aquarium at regular intervals, but especially when introducing new live rock or offshoots for aiptasia.

If you notice aiptasia, you should react quickly. Even a few harmless looking and possibly smaller aiptasia can become a plague.

... keep aiptasia in check

Very few aquariums remain permanently free of aiptasia. No matter which method is used to eliminate, aiptasia release spores in case of danger, e.g. shortly before their demise, in order to reproduce. These adhere to various objects and are thus sooner or later introduced into your own aquarium.

Due to the high reproduction rate and the undemanding nature of aiptasia consistent action is called for.

All methods known to me only have the effect of preventing the spread. A complete destruction of aiptasia might be close to impossible in the long run. By far the best method is to put predators in your aquarium that can stay there for the long term. The earlier this is started, the better.

Hostiles:

They destroy/eat aiptasia only temporarily. Spores of the already eaten aiptasia will still grow into new ones. If the predator is removed or dies, aiptasia will spread again.

If you put a predator in your aquarium early, it can prevent a massive infestation later on. The initial costs will pay off in the long run.

Lysmata wurdemanni (shrimp)

They are usually good aiptasia exterminators. Aiptasia are eaten at night. 1-3 shrimps per 100 liters of aquarium volume recommended, as these animals are not pure food specialists. They are inconspicuous, can also be used in smaller aquariums and remain in the aquarium permanently. It is only necessary to make sure that there is no predator for these shrimps in the aquarium.

Chelmon rostratus (Pinzettfish)

Eats aiptasia in most cases, but also all tubeworms. Sensitive fish! Before purchase should be tested whether he goes to food. Should only be used in well acclimated aquariums with a lifetime > 1 year.

Chaetodon kleini (Small butterflyfish)

Very good aiptasia eater, almost all specimens eat aiptasia with preference. Unfortunately, the fish also goes after many other invertebrates, such as tube worms, LPS, crustose anemones, horn corals and clams (e.g. Tridacnas). Therefore, it is only conditionally applicable







Acreirychthys tomentosus (seaweed / kelp filefish)

Eats in many aquariums with preference aiptasia, as well as manjanos and xenia.

The fish is not picky and also eats crustose anemones, some LPS, soft corals, tubeworms, bristle worms and sometimes SPS. Likewise, attacks on sea hares have been reported.

This animal is recommended in reef aquariums only as a *temporary care guest*.

Some aquarists claim these animals only ate offered food and no invertebrates. However, these are probably subspecies. Make sure when buying that it is a "real seaweed filefish" (e.g. food sample of aiptasia).

Pomacanthus Navarchus (Dream Emperor)

Eats in most cases aiptasia, unfortunately also polyps of stony corals (

LPS), crustose anemones and tube worms.

Only for very large aquariums.

Berghia verrucicornis (aiptasia eating nudibranch)

These animals are relatively difficult to obtain and also quite expensive.

Depending on the infestation, 10-30 snails per 100 liters of aquarium volume are needed. The animals should therefore be bred separately before use. This snail is an absolute food specialist and dies as soon as there are no more aiptasia in the aquarium. Exactly here lies a problem: If the animals have eaten all aiptasia, they must either be removed from the aquarium (passed on to other aquarists) or they

will die. Within a few months, however, aiptasia will grow back again. The problem starts again.

I would therefore rather advise against purchase/use.

ightarrow Consider husbandry conditions and necessary aquarium size

For all predators, except Berghia verrucicornis, be careful not to feed them too well elsewhere. This increases the chances that aiptasia will be eaten.





As mentioned aiptasia predators should remain in the aquarium for the long term. Otherwise, it is recommended to contain the spread and thus also to support in case of too heavy infestation.

- Regularly check the aquarium for aiptasia
- React quickly in case of infestation
- Choose a method of destruction that does not encourage to multiply/spread.
- In case of heavy infestation, temporary cessation of feeding of fine feeds reduce the rate of spreading
- Depending on the severity of the infestation a mix of several treatment methods is recommended.



Unprofessional removal attempts lead to increased reproduction.

Methods for temporary removal

Once aiptasia have been introduced into the aquarium, they can only be destroyed temporarily. The use of the methods described below should therefore be repeated from time to time.

"Calcium hydroxide slurry" method

<u>Conclusio</u> n	Application:	++	Easy
	Effectiveness:	+	Good

Continue to the "calcium hydroxide slurry" method

"Spraying away"

Inject concentrated hydrochloric acid (25 - 33%) or caustic soda (32%), using a syringe, through the oral disc directly into the animal (shaft). Aiptasia will dissolve completely. Some practice is required with this method. The injection must be done quickly and accurately, otherwise there is a risk that parts of the aiptasia survive and continue to multiply.

<u>Conclusio</u> n	Application:	0	Needs some practice
	Effectiveness:	++	very good (if applied correctly)



<u>Caution:</u> When handling concentrated acids/alkalis. Use protective equipment. Store in a safe place and protect from access by children.

With both methods you should make sure that there is no excessive increase/reduction of the pH value or other pollution of the aquarium water.

Roughly adhere to this dosing:

-	Sodium hydroxide solution:	up to 5 ml	per 100L per day
-	Concentrated hydrochloric acid (33%):	up to 5 ml	per 100L per day
-	Calcium hydroxide:	up to 3 ml slurry	per 100L per day

Parallel application of caustic soda / hydrochloric acid can destroy more aiptasia per day, since acid/alkali approximately neutralize each other.

"Boiling water"

- Heat water until boiling
- Draw up syringe with the boiling water and inject directly into the oral disc of the aiptasia as immediately as possible
- Suck off contracted aiptasia with hose/syringe and dispose of
- With this method, partial damage to live rock occurs.
 However, this is usually quickly colonized by bacteria again

<u>Conclusio</u> n	Application:	0	easy, 3 working steps
	Effectiveness:	0	medium

"Gluing up"

- Stimulate aiptasia by tapping on it so that it contracts

- Then glue the area where the aiptasia is located with coral glue or reef mortar. Note: Works only with rock that is not too porous.

<u>Conclusion</u> Application: ++ Easy Effectiveness: o /+ medium to good (depending on location/rock)

"Suction"

- Suction of individual aiptasia by negative pressure Dispose of water & aiptasia afterwards
- Suitable for this: a) Thin hoses during water chnage
 b) Larger syringe (~50ml) with hose attachment.

<u>Conclusio</u> n	Application:	++	Simple
	Effectiveness:	0	as aiptasia can grow again from remaining residues

"Chiseling off"

Another method is to chisel off aiptasia infested areas, or in the case of airy/soft reef construction, to pry them off (screwdriver). However, it should be noted that no aiptasia should be cut. This makes sense before inserting new living stones, if aiptasia has been discovered.

In case of heavily infested stones, you should better remove them from your aquarium.

<u>Conclusio</u> n	Application: -	mostly complicated, because of reef construction
	Effectiveness: ++	Very good

"Flowerpot method"

- If possible, put a small clay flowerpot (hole in the bottom upwards) onto aiptasia
- Aiptasia will move along the inside of the flowerpot to the opening as of light withdrawal
- As soon as the aiptasia has left the substrate/reef rock with its foot, remove the flowerpot from the aquarium and dispose of the aiptasia from it.
- Rinse flowerpot well with fresh water

<u>Conclusio</u> n	Application:	0	somehow cumbersome,
			especially with many aiptasia
	Effectiveness:	++	Good

Means for sale

Special products for the destruction of aiptasia are also offered in the trade. These are probably based on the identical methods as described above

Means similar to "calcium hydroxide slurry method":

- RedSea Aiptasia-X

- Joes Juice (US manufacturer)

Viscous porridge, probably calcium hydroxide Dosage/conclusion analogous to "*calcium hydroxide pulp method*" (see above)

Means similar to "splash away method":

- _- Elimi aiptas (Tropic Marin)
- Aiptasia kill (Wilt)
- DeletriX (J&H Aquaristics)

This agents are thin. Presumably, they are sodium hydroxide solution (Elimi Aiptas, Aiptasienkill) or concentrated hydrochloric acid (Deletrix). Dosage/conclusion analogous to "*spraying method*" (see above).



2.1 Manjanos

Manjanos, also called fire anemones, belong to the genus of anemones. They usually do not serve as host anemones for clownfish, among other reasons because they remain relatively small. There are some color variants, which are also visually attractive. Manjanos are usually introduced as appendages of live rock.

Manjanos are mostly sedentary, rarely migrate, but have stinging venoms that can harm many invertebrates. They often divide to reproduce, which can lead to a plague in reef aquariums within a short time, but not necessarily.

Fragments/shreds of Manjanos degenerate, so at least they do not become more small minianemones. The spreading therefore usually starts from one spot, and not in the whole aquarium.

This mini-anemone is very dominant and has already killed/overgrown entire coral population in some aquariums.

Conclusion/Risk:



Manjanos are considered attractive by some aquarists and are deliberately inserted or left in the aquarium. If this is desired, consistent control is called for, as they can quickly develop into a plague! I therefore recommend Manjano free aquariums.

... get rid of Manjanos

Manjanos multiply according to the snowball effect. Therefore, the greater the amount, the more consistent should be the removal.

Unlike aiptasia, Manjanos do not regenerate/reproduce or rarely do, from shreds/broken pieces. Therefore, mechanical removal is usually effective.

Mechanical removal

- "Lever off" Manjanos with fingers, spatulas, etc. and dispose of them
- By spraying them with fresh water beforehand, they can be peeled off more easily
- Brush away any residue adhering to stones with a toothbrush or similar.
- Switching off the flow pumps during treatment prevents fragments from being washed away
- Sever/remove heavily infested areas on the reef structure by chiseling them off

<u>Conclusio</u> n	Application:	0	Somewhat cumbersome,	
			especially in poorly accessible places	
	Effectiveness:	++	Very good	

"Calcium Hydroxide Mash" method (or Aiptasia-X, Joe's Juice, etc).

<u>Conclusio</u> n	Application:	+	easy, suitable for beginners
	Effectiveness:	+	Good

Continue to the "calcium hydroxide slurry" method

Unfortunately, there are **no reliable predators** of Manjanos. They are most likely to be eaten by Acreirychthys tomentosus (seaweed filefish), and sometimes by some butterflyfish and angelfish.

Berghia verrucicornis (aiptasia eating nudibranch) as well as Lysmata wurdemanni, (Wurdemanni shrimp) also sometimes eat Manjanos.



Consider husbandry conditions and necessary aquarium size

2.3 Xenia / Pumping Xenia

Xenia belongs to the tubular corals. They are found in all oceans and sometimes form huge colonies there. Some species perform a pumping motion with their polyp, presumably to get enough food even in the absence of current. Some xenia species (e.g. Xenia umbellata in light pink or even red) are very attractive, which is why they are regulars in many reef aquariums. Xenia reproduces by strangulation of polyps, these drift until they have found a new settlement area and then grow firmly in this place. They sometimes multiply rapidly and have already become a real nuisance for some aquarists.

Xenia hardly nettle, but they like to overgrow other invertebrates or settle in the middle of other coral reefs. In doing so, they form regular xenia colonies.

Conclusion/Risk:



Xenia are attractive and a visual enhancement to reef aquariums. However, they can spread quickly and become a plague.

If you want to keep xenia deliberately in the aquarium, you should intervene regularly to prevent too much spreading.

... keeping Xenia under control

- Xenia should be already grown on an object so that they are not washed away (small stone, clam shell, ...)
- Place the object with the xenia in a place that is not in contact with the reef rock, other invertebrates or glass (e.g. in the sand).
 The distance between xenia and other objects or animals should be at least 5 cm in all directions. The growth of possibly still small colonies should also be taken into account. The larger the object, the larger the colony will grow.
 Rule of thumb: Xenia grow in all directions up to 10 cm beyond the object.
- Check and thin out xenia stock approx. every 2 weeks: Generously remove all free-moving, strangulated polyps and then dispose of them.
 - Also remove xenia that have grown on other substrate or have washed up. Use a spatula, toothbrush, etc. for this purpose.

... Destroy entire colonies

You can kill xenia by mechanical injury or remove them relatively easily.

- Pulling off / peeling off the polyps
- Scrape or chisel out (spatula, toothbrush, screwdriver, ...)
- Spraying with concentrated hydrochloric acid or use of calcium hydroxide slurry
-

The slimy residues remaining in the water should be sucked off. In addition, this usually results in increased skimming (risk of "boiling over").

2.4 Crustose anemones , Disc anemones

Crustose anemones and disk anemones are colorful and beautiful animals. They are therefore regular guests in our marine aquariums. Both genera can "migrate" like other anemones, but do so relatively rarely.

They feed on plankton and through their symbiotic algae (zooxanthellae). These animals are undemanding, and therefore the care is relatively simple. However, they can multiply relatively quickly and also displace other invertebrates through their cnidarian venoms.

Caution: Two genera of crustose anemones (Protopalythoa and Playthoa species, especially the popular green crustose anemones) possess a strong neurotoxin called palytoxin. However, they only spray it as a defense in case of danger. This toxin is not only harmful to other animals in the aquarium, it can also affect the keeper during cleaning/removal operations. The spectrum of the reported complaints goes, depending on the dose of the ingested poison from malaise, vomiting, cold-like symptoms, chills to paralysis of the muscular apparatus.

Various aquarists have handled these animals frequently for years without any symptoms. Others have suffered symptoms described above and required medical attention. In these cases, however, large colonies of animals were scraped off unprotected in each case. All in all, however, no reason for panic, which is made completely unnecessary especially in the media about this. A certain minimum of knowledge is sufficient to be able to care for these animals without any problems. You should never hastily remove animals that you have been keeping in your aquarium for years.

Conclusion/Risk:



Crustose disk anemones are beautiful and also grateful aquarium inhabitants. However, they can/will displace other organisms in order to spread themselves.

Choose suitable, separated sites with sufficient distance to sensitive corals and reef rocks and trim back overgrowing colonies regularly.

Some crustose anemones have a strong neurotoxin. Caution is advised when working in aquariums with these animals (risk of

injury!).

... keep crustose/disc anemones in check



Caution is advised when working on **crustose anemones of** the genera **Protopalythoa** and **Playthoa**. Poisons sprayed by you can cause symptoms of poisoning. Other animals are not critical.



For safety reasons, when working on colonies of these animals outside the aquarium, or destroying larger colonies, use protective goggles as well as a breathing mask. Otherwise, there is a risk of poison getting into your eyes/mucous membranes, or into your lungs via the enemy dispersed particles in the air.

Likewise, you should work with acid/alkali resistant protective gloves. This will prevent the poison from entering your bloodstream in case of mechanical injuries (cuts, etc.).



New stones with crusts/disc anemones should be placed so that they are not too close to other invertebrates or poorly accessible areas of the reef structure. Optimal is a separate stone, which can be removed from the aquarium if necessary (island solution). This way no other rock will be overgrown unintentionally.

This is how you keep discs/crustacean anemones in check:

- If possible, remove the substrate to which the animals adhere from the water (easier processing).
- Peel animals from the substrate (scraper, screwdriver) or
- Chisel off together with the substrate/reef rock (chisel, screwdriver).
- Brush off smaller animals or remaining residues with toothbrush etc.
- Afterwards check the skimmer and clean it if necessary.

The use of predators is usually not useful, as they would indiscriminately eat all the crustose anemones.

2.5 Hydropolyps

Hydropolyps are found worldwide in all seas, mainly in shallow water and lagoons. They enter our aquariums very rarely, as appendages of living stones. They are largely insensitive to fluctuations in water parameters and even toxins.

Hydropolyphae feed exclusively on their symbiotic algae (metabolic products). Strong lighting promotes their already extreme spreading speed.

Individual hydropolyphs build a mesh of felt-like structure and quickly become large colonies. Colonies that become larger then grow in height and lace off parts. These then drift through our aquariums to attach themselves elsewhere and continue to multiply.

In the process, they overgrow virtually all coral species and damage them by depriving them of light.

Hydropolyps also have a moderately strong stinging venom with which they can defend themselves against other corals.

Conclusion/Risk:

Hydropolyps are fortunately rare in aquariums. They have an enormous reproduction rate and, once introduced and not taken care of, become a severe plague.

Remove them immediately and absolutely consequently!

... Get rid of hydropolys

The risk of catching a massive plague in the long run, even if only single polyps are present, is very high.



There are some methods to reduce the number of hydropolyps (mechanical removal by plucking, brushing, suction, spraying, boiling water...). However,

the experience of various aquarists shows that in the long run hydropolyps will grow again. Continuous reduction of hydropolyps is annoying and time-consuming and can therefore not be recommended.



Light deprivation leads to slower spread, but not to eradication. This is true even if it lasts for several weeks. Covering your aquarium (e.g. with aluminum foil) is not recommended.

I am not aware of any method to safely eradicate hydropolyps



As a prophylactic measure, you should absolutely avoid introducing substrate into the aquarium to which hydropolyps adhere. Also you should not introduce animals/invertebrates from aquariums infested with hydropolyps into your aquarium (risk of self-infection).



Stones affected by hydropolyps **should be removed from the aquarium as soon as possible.** Do not shy away from dismantling/remodeling your reef. The effort for this is clearly preferable compared to a potential plague of hydropolyps.

Feeder enemies

Rhynchocinetes durbanensis (Durban dancing shrimp)

It is reported that they eat among others hydropolyps, but I do not have more detailed information. However, this shrimp is also a predator of disk anemones, crustose anemones and some soft/tubular corals such as xenia.

The use in reef aquariums is therefore possibly critical.

Centropyge loriculus (flame dwarf angelfish, flame duke)

Some specimens eat hydroployps.

Goes, only in rare cases, to invertebrates/coral.

Pygoplites diacanthus (peacock angelfish)

Hard to keep fish. Only conditionally suitable for reef aquariums, since it should go beside leather and soft corals also to LPS and SPS and Tridacna clams.

Salmacis Bicolor (Bicolor sea urchin)

Some specimens go to hydropolyps.

Only conditionally suitable for reef aquariums, also eats soft/tubular corals.



Consider husbandry conditions and necessary aquarium size

2.6 Acropora Eddy worms

They belong to the family of flat/swirl worms and there are various species. They are often introduced into marine aquariums as parasites on live rock or coral scions.

These worms have a high reproduction rate and reproduce via eggs which they like to attach to stony corals, but sometimes also to reef rocks.

These whirl worms are parasites and eat among other things tissue of small polyped stony corals (SPS). Usually only Acroporas are affected

Due to their small size and inconspicuous coloration, the whirl worms attached to corals are often difficult to recognize. They prefer to sit on the lower branches, but also in other places in the aquarium where there is something to feed on.

Conclusion/Risk:



Eddy worms are parasites and serve no positive purpose in marine aquariums.

They can cause massive damage to hard corals and should be removed at all costs.

If the origin of new stony corals

is unclear, you should examine them well for infestation, or treat them preventively with a quarantine bath.

... Acropora Get rid of flatworms / prevent infestation

Treatment of infested corals

Remove the corals from the aquarium and subject them to a quarantine <u>bath</u> or <u>iodine bath</u> in a suitably sized container.



Remove coral branches that already have strong signs of dissolution or are dead. Only maintain healthy fragments that still contain tissue.



The egg clutches of the flatworms are not killed by the treatment. \rightarrow Manual scraping/removal (suitable tool: e.g. small scalpel): Since often not all clutches can be discovered/removed, it is recommended to repeat the quarantine bath after a few days. This will also destroy flatworms (juveniles) growing from egg clutches.

Prophylaxis for newly added corals

If you are not sure whether new corals are infested, you should subject them to a <u>quarantine</u> <u>bath</u> or <u>iodine bath</u> BEFORE you put them in the aquarium. Be aware that this can be critical for already affected animals.

Use of predators

Splendor rainbowfish **Platyglossus Marginatus/Halichoeres Marginatus** eat flatworms in most cases.



Consider husbandry conditions, aquarium size, and possible rivalries with other aquarium occupants.

P./H. Marginatus grows up to 18 cm and is only recommended for large aquariums.

2.7 Red Turbellariae (Turbellariae)

Red whirlworms, also called Turbellaria, belong to the group of flatworms/ whirlworms. Unfortunately, they are relatively common.

Turbellaria are very simple animals that do not even have their own respiratory organ, but breathe over their entire body surface. Therefore they are only found in oxygen rich zones in the water. 2 body shapes are especially common: slightly larger round ones that often live on/in corals, and slightly smaller angular ones that often live on rocks, calcareous red algae.

Reproduction is vegetative with sometimes rapid multiplication rate. Reproduction by division takes place every 4 days. This can lead to real turbellaria plagues, especially in aquariums.

Turbellarians feed on diatoms, unicellular algae, dinoflagellates, crustaceans/radia and microorganisms. In the absence of a food source, they reproduce less prolifically.

Turbellarians always try to stay in well-lit areas, as they need light for their symbiotic algae. This can be taken advantage of when trapping/collecting.

Turbellaria contain highly toxic toxins, which they fortunately only release into the surrounding water when they die (reddish brown liquid). This toxin is highly toxic, especially for fish. The higher the number of dying Turbellaria, the higher the danger for the aquarium occupants.

Conclusion/Risk:



Turbellaria are parasites and serve no positive purpose in marine aquariums.

They can become a real nuisance and should be eradicated as soon as possible.

Caution is advised, because dying Turbellaria give off toxins.

... Get rid of red whirl worms (Turbellaria)

There are several ways to get rid of Turbellaria. It is recommended to start with more harmless methods (methods a & b at the same time) and to switch to c) only in case of non-success.

Method d) is a 100% guarantor for success, but several aquariums have been destroyed with this method. This method is therefore only to be used in an emergency, and under EXACT observance of the instructions.

a) Reduce the silicate content in the aquarium (\rightarrow 0 mg/l)

Reason: If silicates are present in the aquarium, diatoms will also form, because they need silicates to build up their shell. Diatoms in turn serve as food for the Turbellaria. If there is enough food available, they will multiply.

- **Bind** silicate in the aquarium by using **silicate adsorbers** and then remove them. (Phosphate adsorbers also bind silicates and can also be used)

- Make sure your **source water** is **silicate** free and stay .

Continue to Keep aquarium silicate free

b) Suck off Turbellaria regularly

Use a thin hose for this purpose.

Particularly effective is the use of the light trap method:

- Completely darken the aquarium (no incidence of light, or in the evening)
- Put a flat object (e.g. saucer) on the substrate at a suitable point, with sand on it
- Illuminate this point of the substrate in a concentrated manner
 - ightarrow Turbellaria will move there
- Remove the Turbellaria by suction, or by removing the object (switch off the current flow before removing).

Doing so, you limit the plague without the use of medication or predators.

c) Use of predators

Chelidonura varians (variable head snail, ca 25.-€) This snail is a food specialist and feeds exclusively on flatworms. If no more food is available, it dies. Therefore, use only in aquariums with heavy infestation.



There are also reports that Pseudocheilinus hexataenia (Sixstriped wrasse) and some Pterosynchiropus splendidus/picturatus (LSD/Mandarin fish) eat Turbellaria. However, these animals only sporadically go to these parasites, probably also depending on the other food supply.



Consider husbandry conditions, aquarium size and any rivalries with other aquarium occupants.

d) Treatment with "Flat control"

There has lighter chemical weapon against flatworms. It is reported to be effective against many, but not all, species of flatworms.

Dosage according to instructions. Refrain from filtering with carbon, ozone, adsorbers, zeolites, etc. during treatment. The agent is said to biodegrade after a few days. Side effects on corals and lower animals are said to be very limited. Also when treating with these agents, it is advisable to suck off as many flatworms as possible beforehand, so that toxins are not unnecessarily released into the water.

e) Treatment with Concurat

Concurat is absolutely reliable against Turbellaria. However, the treatment represents an intervention with risks and should therefore only be considered as a "**last measure in case of a massive Turbellaria plague**".

Further to the Concurat application

Dosage EXACTLY as prescribed is an absolute MUST.



Besides the risks from the drug itself, dying turbellarians also release toxins. Turbellaria also release toxins. Previous

Aspiration of as many turbellariae as possible reduces this risk.

Reported side effects:

- Fish are at least partially affected by the drug, probably mainly by the toxins released when the Turbellaria die. Some deaths have already been described.
- Some aquarists reported negative changes in SPS, even death. For others, there were no problems
- Destruction of various other animals/bottom dwellers/micro-fauna with corresponding after-effects. Aquarium biology usually has to develop again after treatment.

2.8 Red Bugs

Red bugs (Tegastes acroporanus) are small, flea-like parasites from the copepod group. They feed exclusively on the tissue and coral mucus of Acropora corals. They prefer to attack corals with smooth surfaces, rarely those with longer polyps. They cling to the surface of the acropores to avoid being washed away by the current and are difficult to spot.

Other SPS species, like Montipora, Pocillopora as well as Seriatopora are not affected, presumably they can move/cling on them worse.

Red Bugs can be driven from one coral to another by the current.

Red bugs are rare in Europe, but quite common in the USA. I attribute this to the spread/exchange of corals between poorly maintained aquariums.

Conclusion/Risk:



In Central Europe, these animals practically do not occur. In the USA, however, they are frequent.

Infected aquariums can only be made Red-bug-free with relatively great effort.

Newly purchased Acropora corals, especially if they come from the USA, should be examined for the presence of these parasites.

... Get rid of Red bugs

Predators: They can be used as prophylaxis, but are usually not sufficient to eliminate a massive Red-bug infestation.

- Pterosynchiropus picturatus / Pterosynchiropus splendidus (Mandarinfishes)
- Pseudocheilinus hexataenia (Six-striped wrasse)
 Corythoichthys haematopterus (recumbent pipefish)

Treatment with the drug Interceptor

The prescription drug *Interceptor* from Novartis is needed for this. It can be obtained from a veterinarian, but in some countries it can also be ordered via the Internet. The most important ingredient is *milbemycin oxime*. It is normally used to treat internal parasites in dogs and cats, but is also effective on crabs/crustaceans.

Warning: Lethal also for crabs, shrimps, amphipods, copepods.



<u>Treatment option-1:</u> Treat infested corals in quarantine aquariums.

To be applied before individual, new corals are to be inserted which have a Red-bug infestation.

<u>Treatment option-2:</u> Treat infested corals in the aquarium

To be used when corals infested with red-bugs are already in the aquarium

Application Description/Dosage Interceptor

1.) Determine the volume of water to be treated as accurately as possible To do this, all water in the circuit must be taken into account:

Main aquarium or quarantine aquarium, piping, technical aquarium, skimmer, filter, etc.

2.) Determine correct dosage of the drug and crush as finely as possible.

Attention: The dosage must be as accurate as possible

To do this, select the appropriate from 4 different types of tablets

INTERCEPTOR	Packing color	for dogs with	1 tablet for water volume	
[milbemycin oxime]		weight		
2.3 mg	brown	1-4 kg	145 liters	
5.75 mg	green	4-11 kg	360 liters	
11.5 mg	yellow	11-23kg	720 liters	
23.0 mg	white	23-45kg	1440 liters	

- Larger tablets are slightly cheaper

- Smaller tablets can be dosed more accurately

Intermediate quantities can be produced by

- a) dividing the tablets or
- b) Weighing the ground powder or

c) mixing/diluting the powder with aquarium water in order to be able to dose it partially afterwards (e.g.: by syringe).

4.) Switch off all filters / adsorbers (skimmer, silicate/phosphate adsorber, carbon, ozone, UV clarifier).

5.) Remove any crabs and shrimp that may be in the aquarium.

- 6.) Add a balanced amount of the drug to the aquarium.
 - To do this, dissolve well in aquarium water or osmosis water beforehand.

(drug is hardly soluble, mix well).

7.) Treatment duration 6 hours

8.) Immediately thereafter perform 25% water changes, turn on filtration systems and begin to

filter out the drug with as much activated carbon as possible.

9.) 24 hours later, renewed water change of 25% + replace activated carbon again.

10.) Repeat steps 1.) - 10.) at least 2 more times.

1st treatment: kills adult Red-bugs

2nd treatment: kills post-hatching Red-bugs

3. treatment: for safety, possibly further hatching Red-bugs

The reproduction cycle of Red-bugs is currently unknown.

Tested and found good time between treatments: 7 days.

Treatment steps 8.) + 9.) can be omitted when treating in the quarantine aquarium. The water of the quarantine aquarium must then be disposed of/refilled in each case.

After the first treatment there are usually still (already dead) red-bugs attached to the corals. This is completely normal, they can be removed by blowing with flow pumps.

More details:

- The entire system must be treated.
 Otherwise red-bugs
 could survive in the free water (e.g. of a disconnected filter) or grow back from larvae.
 All system parts of the aquarium that contain water must either be treated or the water must be removed from them
 (refugia, skimmer aquariums, etc.).
- Side effect: Mysis, small shrimps and crabs are usually killed as well.
- The treatment method is relatively new. The results so far are very good, but it can neither be excluded that individual aquariums become reinfected with Red Bugs, nor that after some time further side effects occur.

2.9 Montipora feeding thread snails

These parasites have a white, sometimes beige, coloration with light gray spots. Infestations/eating sites occur on several Montipora species (style growing as well as plate growing).

To feed, these thread snails crawl onto the top of the coral and eat its tissue. Otherwise they prefer to stay on the side of the coral away from the light, often near crevices. Hereby they probably protect themselves from predators.

Egg-laying usually occurs at the transition of already eaten away areas to healthy tissue, sometimes also at other places in the reef rock. They reproduce rapidly, within a few days.

Conclusion/Risk:



Fortunately, these animals are found relatively rarely. However, a plague can only be eliminated with relatively high effort.

The best tactic is to avoid an introduction of the animals. Buy corals only from trustworthy dealers (good dealers carry out preventive measures in their aquariums) or trustworthy private persons.

... get rid of Montipora eating thread snails

Treatment of infested corals

Collect visible snails on the coral beforehand.

Then remove corals from aquariums and subject a suitably sized container to a <u>quarantine</u> <u>bath</u> or <u>iodine bath</u>.

Fragment/remove already infested/eroded areas as generously as possible. The coral is heavily damaged at this point anyway. This usually also removes egg clutches.

Additional Notes:

The egg clutches of the thread snails are not killed by the treatment. If they cannot be fragmented off, they should be removed by scraping (e.g. with a small scalpel).



Since usually not all clutches are discovered/removed, it is recommended to repeat the quarantine bath several times after a few days. This will kill also growing up snails.

Prophylaxis for newly inserted corals

Examine new Montipora canes for possible infestation. Treat infested corals as described above.

A general quarantine bath is not very useful:

- adhering egg clutches will not be killed off
- already affected animals are subjected to further stress

Predators

Halichores cryssus (canary wrasse) is a good predator.

It can be used prophylactically (to prevent a plague) or as a control.

However, the fish will only eat the snails themselves, not the egg clutches. Also, depending on the conditions of the aquarium / coral, sometimes not all infested areas are reached by him.



Consider husbandry conditions, aquarium size, and possible rivalries with other aquarium occupants.

2.10 Tridacna feeding snails

These parasites rarely occur in nature. Presumably, the conditions necessary for them are better met in the aquarium than in extensive coral reefs.

The snails usually hide under the shell or in its vicinity during the day. Probably they do this to protect themselves from attackers. When it gets dark they become active and climb up the shell of the clam. Then the clam is pierced with a kind of sting into the mantle lobes to suck out their liquid. The clam tries to partially protect itself from this by closing, but it does not succeed reliably because it cannot close completely tight.

Depending on how many of these parasites are on the way and how big the clam is, clams can die in a few days to months.

The snails reproduce by depositing egg packets of which they can lay 2-3 pieces with up to 400 eggs every day. The egg packets are gelatinous and are deposited on the clam itself or on the substrate in the immediate vicinity.



Especially aquariums in which Tridacnas are used for the first time should be observed in this regard. (At night, approx. ¹/₂ hour after switching off the lighting).

Act quickly if you notice infestation with these parasites. Otherwise, the snails will most likely harass your clam so much that it will die.

... get rid of Tridacna/Monster clam eating snails

There would probably be various predators of these parasites. Unfortunately, these fritillaries are nocturnal, which is why this method does not work.

The removal of these snails is somewhat laborious.

However, with a little patience and the following method, you can reliably get rid of them:

- 1. Wait for the right time: approx. 30 minutes after switching off the aquarium lighting and the lighting in the room.
- 2. Shine flashlight or similar on infested clam to identify parasites on shells of clam.
- 3. Remove parasites/snails from aquarium with tweezers and discard.
- 4. The treatment can be repeated after about ½ hour to catch snails that have already fled. This is because they start feeding again.
- 5. Repeat treatment consistently on several days in a row
 - WHY: a) Usually not all snails can be removed in one day, as also flee and hide.
 - b) Also snails hatching from the egg packets must be removed, before they start to produce new egg packages.

2.11 Asterina (Mini starfish)

Asterina starfish are found in all oceans of the world in various subspecies. These mini starfish are present in almost all marine aquariums and are introduced with live rock or as appendages of coral offshoots. Mostly they occur only sporadically. Sometimes they multiply strongly.

They normally feed on algae and calcareous red algae. If there is a mass reproduction, they also help themselves to other food sources such as the tissue of stony corals, presumably due to a lack of food supply.

Conclusion/Risk:



Asterina starfish are completely harmless in most cases.

Intervention is only necessary if the population becomes very overpopulated.

... Asterina Get rid of (mini) starfishes

These starfish can be easily collected from discs and reef rocks. However, once the population has gained the upper hand, collection/removal is laborious.

Predators

The harlequin shrimp *Hymenocera elegans* and *Hymenocera picta* are very effective predators. Usually one of these attractive shrimp is enough to clean up with Asterinas.

Harlequin shrimp mercilessly attack even larger starfish.
 Burrowing starfish are even attacked in the sand.
 They also eat the suction feet of sea urchins, sometimes even sea urchins themselves.

Remove starfish and sea urchins before insertion!

• Harlequin shrimp are food specialists. If there are no starfish left, the shrimp will starve. If the animals have cleaned up with the Asterinas you should feed them selectively (e.g. with frozen starfish) or pass them on to another aquarist or the dealer.

Save these beautiful animals from miserable starvation!



The pentagon starfish *Asterina gibbosum* eats Mini Asterinas just as consistently, though not with the speed of a harlequin shrimp.

However, it also goes after crustose anemones, disk anemones and tube corals.

2.12 Worm snails

Worm snails (Serpulorbis sp) are filter feeders and are usually introduced into our aquariums as appendages of corals or live rock. They can be found in many aquariums and usually behave inconspicuously.

They consist of a lime tube and the snail itself which is inside. In addition, there is a "plug" with which the snail can protect itself from predators in your tube.

Worm snails cast "sticky slime nets" with the help of which they supply themselves with nutrients from the open water. They also feed on detritus and fine/dusty food in the water.

Problematic, besides the visual impairment by the unsightly slime nets, is above all the stress exerted on corals.

Conclusion/Risk:



Worm snails are present in a relatively large number of aquariums. They are not noticed negatively by many aquarists because they attach themselves to skeletons of LPS or SPS and are not detected.

Unattractive are mainly their slime nets.

Usually they reproduce rather slowly and can be tolerated. In case of increasing/high population density, which often occurs in nutrient-rich aquariums, intervention is strongly recommended.

... Remove worm slugs

There are a few methods of removal that you can also combine well:

- Mechanical removal of the tubes + snail (useful especially in easily accessible places as well as on skeletons of stony corals)
- Brick up the tubes with coral glue or superglue
- Kill worm slugs with calcium hydroxide slurry, concentrated hydrochloric acid, etc.

With rapidly reproducing populations, excessive use of fines/dust feed is often involved \rightarrow Suspend feeding.

Predators

Only in reef aquariums poorly maintainable genera of parrotfish.

2.13 Bristle worms, pine bristle worms

Bristle worms are found in all oceans and there are many subgenera. I am not aware of any marine aquarium that does not host any bristleworms. They are mainly nocturnal. There are 2 species of bristle worms:

- Free-swimming bristleworms:
 Feeding is by detritus, eating carrion, or even predatory attacks.
- Fixed bristle worms: Burrow tunnels in the substrate or porous, soft reef rock. Feed on plankton or invertebrate tissue.

Bristle worms are a desirable food for some fish. Due to their unpleasant bristles, however, they are "hard-to-digest food" and thus not edible for all fish. If you unconsciously reach into the aquarium and accidentally catch a bristle worm, this is relatively painful (itching, pain, ...). Especially painful is the touch of the so-called fire bristle worm.

Most bristle worms are algae eaters. Smaller species are usually harmless in the aquarium, even if they occur in larger numbers. However, if the animals become too large, they will satisfy their appetite even on corals. Specimens up to 2m in size have been found in MW aquariums. Large animals almost always become predators due to their food requirements. Bristle worms do not eat Tridacna clams, but only recycle the remains of dead animals.

However, there are 2 unpleasant contemporaries among the bristle worms:

- "Fire bristle worms" are relatively large (30cm, finger thick) and very painful on contact. It attacks predators by erecting its bristles/spines. It is predatory and eats corals as well as starfish, shrimp and even fish. Since it has no enemies to fear, it is the only bristle worm that is also diurnal.
- "Jawworms" feed parasitically on invertebrates. Among other things, they bite through soft coral tissue and also feed on it. They are relatively aggressive and also use their jaws to fend off enemies.

Conclusion/Risk:

Normal (smaller) bristle worms.





Bristle worms are usually harmless, even useful inhabitants of a reef aquarium. As long as they do not get out of hand you should leave them in the aquarium.

If the animals become too large, they should be removed as they then begin to predate. If you find a fire bristle worm or jaw worm in your aquarium you should remove it.

... Remove bristle worms



Do not touch bristle worms with the bare hand. Touching is unpleasant, and especially in the case of fine bristle worms and jaw worms, very painful.



Avoid tugging too violently on bristle worms, as it may cause tearing. From each part another bristle worm can develop

Reduction of the population by baited traps (for smaller bristle worms).

Too high a population can be reduced by placing **bristle worm baits.** The baits are placed in the aquarium before turning off the lights and removed the next morning when the lights are turned on.

<u>Bait 1:</u> Pieces of mussels or larger mysis are clamped between 2 thin slices of styrofoam (not too thick, buoyancy!). Fix discs together e.g. by rubber band. The bait is either weighted with a stone or covered with sand.



<u>Bait 2.</u> a plastic tube closed on both sides is provided with holes. Tablet tubes are suitable, for example. The diameter of the holes is between 4 and 8 mm, depending on the size of the bristle worms. Different sized holes will catch different sized bristle worms. The holes should not be too big for smaller bristle worms, otherwise they will flee. You can also put a small stone in the hole to weigh it down. They are also fed with pieces of mussels or mysis.



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For **larger bristle worms**, you will need to bring out the big guns. The best measure is to remove the affected stone from the reef structure and remove the worm outside the aquarium.

Sometimes only cleaning out the entire aquarium helps to catch the worm.

Feeder enemies

Various wrasses are good bristle worm eaters, including.

- Halichoeres iridis / Biochoeres iridis (Yellow-headed Junker).
- Halichoeres lapillus / Macropharyngodon lapillus
- Halichoeres leucoxanthus / Biochoeres leucoxanthus (Indian canary wrasse)
- Halichoeres timorensis (Timor's wrasse)
- Anampses femininus (Blue-tailed Junker)
- Anampses melanurus (White spotted wrasse)
- Coris frerei Allocoris formosa (Indian Clown-Junker)
- Bodianus mesothorax
- Bodianus anthioides (pig wrasse)
- Macropharyngodon bipartitus (largetooth wrasse)
- Macropharyngodon choati (Choatis wrasse)

The The

> These animals also eat snails and sometimes shrimp!

More fish

- Valenciennea coeruleopunctata (Red-spotted goby)
- Canthigaster coronata (crown pufferfish)
- Ostracion cubicus (common boxfish)

Other predators

- Stenopus hispidus (scissor shrimp)
- Stenopus pyrsonotus (ghost scissor shrimp)
- Buccinulum corneum (mistakenly also called Babylonia zeylanica)
- Lambis crocata / Lambis scorpius (winged snails)

Consider husbandry conditions, aquarium size and any rivalries with other aquarium occupants.

2.14 Firecrackers, mantis shrimp and others

Depending on species/genus and stocking in your aquarium these animals can be completely uncritical up to risky. A general classification into good/bad is not possible.

Common/normal crabs: range from harmless algae eaters to strong predators. The shape of the ends/tips of the claws often provides information about the risk potential of the crabs: - pointed claw ends tendency to be predatory

- rounded claw ends

tendency to be predatory Tendency non-predatory

Crackling crabs can trigger a sharp water jet with one of their two scissors at lightning speed. The speed is so high that a so-called cavitation bubble is formed, which collapses again with a relatively loud bang. The resulting pressure paralyzes smaller prey or attackers. Crabs often live together with symbiotic gobies and can be well maintained in reef aquariums.

Mantis shrimp are aggressive hunters and lurk in crevices of the reef rock or in the sand for prey. They are mainly nocturnal. There are several different species ranging from inconspicuous brown to neon colored and from a few cm small to 30 cm large. There are 2 main species of mantis shrimp. "Butterflies" slay their prey with club-like claws with which they can strike extremely fast, "Spearers" impale their prey. Again, this creates a cavitation bubble that produces a popping sound. The eyes of this species sit on stalks, giving them almost 360° all-around vision. These animals are extremely interesting, highly intelligent and very fast.

Coral crabs are usually small (~1cm) mostly completely harmless and live in association with your stony corals (SPS). Even of these, only the genera Acropora, Stylophora, Pocillopora and Seriatopora are colonized. To avoid being washed away, they latch onto the branches with their hooked claws. The crab defends "their" coral against predators like flatworms, in nature even against large crown of thorns. In turn, they feed on impurities, algae or coral slime adhering to the coral, thereby also cleaning the coral. In rarer cases, when the food supply is too low, coral crabs also eat the tissue of the coral.

Incidentally, in most cancers, lost claws can grow back.



Whether we perceive crabs as pests depends on many things. Accordingly also whether you should decide "in case of doubt for the accused" and let the animal first or remove it immediately from the aquarium. If you decide for the latter, an asylum in the technical aquarium or passing the animal on to another aquarist is a good possibility.

... crabs, and remove crabs



Crabs/crabs are very resistant. They survive even several days out of water, splashing with fresh water, hot water, etc.



Crayfish/crabs are best searched for in the aquarium in complete darkness. Most are relatively shy and will disappear when shined on with a flashlight. If you use red light for this purpose, you can prevent this.

Be careful when catching mantis shrimp! These animals can also hurt people properly.

Catching crabs with traps

- <u>Crab trap 1:</u> Place a beer glass at a slight angle, with the opening facing upwards, in a place near the crab dwelling in the reef.
 - Put a bait (shrimps, fish smelt, mussel heart, ...) into the glass. which is best clamped to a small stone so that it is not washed away.



- <u>Crab trap 2:</u> Cut a plastic beverage bottle into 2 parts (sketch-1).
 - Rearrange and glue parts with hot melt glue or silicone (sketch-2) Even better: Drill several holes in both parts and fix with cable ties. to each other (animals removable, trap reusable).



- Put bait in the trap (shrimp, fish smelt, mussel heart, ...)
- Weigh down with stone or fix in place in your aquarium

The success of crab traps is not assured. It usually takes a few days until crabs enter the trap and take the bait. Other aquarium inhabitants can also get into the crab trap, which you then have to free (e.g. hermit crabs).

If you have no success with the trap in the long run \rightarrow remove the stone with the crab/crab from the aquarium. The main advantage is that the crab can no longer escape into other stones, and you can reach the stone from all sides. Try to lure or push the crab out of the cave with a suitable instrument.

If this does not help \rightarrow chisel off the affected part of the stone with a hammer and chisel. The last method is to dispose of the stone including the crab.

Check if you could host the crab in an asylum or your technical tank. If this is not the case, other aquarists often gladly accept these animals. Disposing the animal should be more the exception than the rule.

2.15 RTN on stony corals

RTN literally means "rapid tissue necrosis". The coral tissue formed on the coral skeleton decomposes and is subsequently washed away, by water current.

RTN can turn an aquarium populated with SPS into a graveyard of snow-white calcareous skeletons within a few hours to a few days!

The pathogen of RTN are the so called Helicostoma protozoa. These are present on almost every coral, but normally unproblematic. They multiply as soon as the coral is weakened by certain circumstances. The more severe the grievances the higher the probability of RTN occurrence.

Optimize the conditions for the coral to prevent RTN in the sense of prophylaxis or to cure RTN that has occurred:

- Water temperature not too high
- Nutrient concentration (N_3 , PO_4) not too high but not 0!
- Sufficient current on all corals
- Clean water, no settling particles on corals
- Sufficiently strong and suitable lighting in terms of light spectrum

Most susceptible to RTN are newly added corals and large SPS canes, as there is little to no current inside the coral branches.

Conclusion/Risk:



RTN is the result of suboptimal husbandry conditions.

Immediate reaction is required to be able to save at least parts of infested corals.

... Stop RTN

Tissue decay can be very rapid in some cases. To save parts of larger coral canes with RTN already in place, the following procedure is recommended:

Step 1: Establish good conditions /support the coral to heal.

- Water temperature in the favorable range (24 26 °C)
- Achieve low nutrient values (N₃, PO₄), possibly by water change. Immediate feeding with Amino-Acids in case of 0 mg/l!
- Sufficient but not too strong current
- Make sure the coral gets enough light and the light spectrum is ok (replace old bulbs, ≥ 1 year)
- Ensure that the coral is not entangled by other animals Besides direct contact with other corals, as well as contact by fighting tentacles, entanglement of distant corals by water flow should also be excluded (e.g. by carbon filtration)

Step 2: Removal of dead coral fragments

- Pinch off/break off already dead parts of the coral Remove generously dead parts in still healthy tissue. (infected tissue infects not yet infected tissue)
- Resettle remaining fragments in suitable places in the aquarium or guarantine aquarium. Ensure that the conditions for the coral to recover are optimal (low nutrients, clean water, reasonable current, plenty/good light).
- Dispose of dead parts -

If the tissue decay still cannot be stopped, you can still subject the coral to a guarantine bath or iodine bath.

Chloramphenicol treatment according to Dr. Bingman (antibiotics).

You will need the prescription antibiotic **chloramphenicol** *1), **Lugol's (iodine) solution** and a **bleaching agent** (e.g. Clorox).

Treat in a sep	parate aquarium, never in the aqua	rium itself.	
<u>1. pre-treatment:</u>	30 minute iodine bath in a dilute salt water/iodine solution. This kills many bacteria \rightarrow minimizing the risk of resistance.		
Dosage:	0.5 ml Lugol's solution	to 1 liter of salt water	
2 <u>. main treatment:</u>	Coral bath in chloramphenicol for 2-3 days Restart/replace chloramphenicol bath after 1 day.		
Dosage:	10 to 50 mg chloramphenicol	per 1 liter saltwater.	
<u>3. after-treatment:</u>	Before resetting, bath the coral again in a diluted salt water/iodine solution to kill any surviving microorganisms. Dosage analogous to 1./pre-treatment		

All 3 treatment steps must be performed consistently.



Otherwise, there is not only the risk of reinfection by now (chloramphenicol)-resistant RTN pathogens, but also a high risk of introducing further (chloramphenicol)-resistant microorganisms into the aquarium. The consequence of this could be significantly worse than the RTN that originally occurred.



Do not dispose of the chloramphenicol bath directly after use, but first render it harmless using bleach. Otherwise, chloramphenicol-resistant microorganisms could spread in the sewage system.



Chloramphenicol is classified as potentially carcinogenic. Handle only with gloves and face mask. Secure agent from misuse and keep away from children.

2.16 Brown Jelly

An infection with the ciliates *Heliocostoma nonatum* is often cited as the reason for Brown Jelly. Although these are present in the jelly mass, it is questionable whether they really have anything to do with the outbreak/progression of the plague, or whether these simply participate from the circumstances. Current investigations with high magnification microscopes show that *vibrions are* also present in the infested tissue. In any case, these are more likely to be responsible for the harmful course of



the brown jelly infection than the aforementioned ciliates. More precise details are not known at present.

If corals are injured at the tissue, or are in poor condition for some other reason, the gelatinous mass known as "brown jelly" accumulates there.

The slimy deposits feed on the tissue and zooxanthellae of the coral. Dead coral skeletons are left behind.

Brown Jelly often spreads from the site of mechanical injury. The corals are massively damaged by Brown Jelly and can die in a short time.

The Brown Jelly pathogens in the slime can be washed away by current and transferred to other corals. This will infect other areas of the same coral or other corals.

Conclusion/Risk:



Brown Jelly occurs primarily when corals are kept in suboptimal conditions.

The infection of the coral tissue can quickly ruin even large coral canes. The pathogen can also spread to other corals via current.

Quick and consistent action is called for to prevent spread.

... stop "Brown Jelly"

First, you should do all you can to prevent Brown Jelly by taking preventive measures:

- Providing optimal conditions for keeping coral anemones
- Correct and constant salinity
- Temperature in the optimal range
- Suitable not too strong and not too direct current flow
- Good lighting
- Low nutrient water (but not 0 mg/l) + supply of the main/trace elements.
- Prevent weakening of the coral due to entanglement of other animals or predator attacks
- Prevention of mechanical injuries of corals, as these are often the starting point for brown jelly

Treatment of infested corals

- Switch off the water flow in the aquarium.
 This prevents the distribution of the pathogen in the aquarium during treatment.
- Careful and thorough aspiration of the gel-like brown coatings.
 Adhering coatings can be loosened e.g. by brushing.
 As little as possible of the deposits should be distributed in the aquarium (risk of infection of other corals).
- Dispose of vacuumed material incl. aquarium water consistently.
- Generously fragment the infested part of the coral (break off, cut off, ...) and dispose. Infested areas can no longer be saved!
- Turn on the current again.
- Maintain treated corals healthy with good parameters.
- If a new infestation occurs, repeat treatment immediately.



Carrying out a <u>chloramphenicol treatment according to Dr. Bingman</u> is another, albeit controversial, method to save corals infested with brown jelly.



lodine baths on infested coral are virtually ineffective for Brown Jelly.



Freshwater baths are not recommended for coral that is already damaged, and are not very effective.



There are no predators that can effectively contain Brown Jelly.

Appendix

A1: calcium hydroxide slurry method

- Mix 1 heaped tablespoon of calcium hydroxide with ~10ml of water.
 (e.g.: Kalkwasserpowder).
- Heat mixture in the microwave for approx. 30 sec, do not bring to the boil
- Fill the resulting viscous paste into a plastic syringe. This is particularly easy if the syringe plunger is removed for filling and then pushed back in again.
- Inject the pest with it from a distance of about 1 cm and cover with the slurry. (aiptasia usually do not even contract in the process).
- If possible, turn off the current in the aquarium during treatment. This makes it easier to place the slurry.
 - It will also not be washed away/will not affect other animals.

A2: Ways to keep the source water silicate free.

For up to medium-sized aquariums, a **reverse osmosis system** with a downstream **ultrapure water filter** is a reasonably cost-effective and clean solution in terms of water quality. The reverse osmosis system alone removes almost all undesirable trace elements from the source water, but not silicate. This is removed only to about 10-20%. Only in the ultrapure water filter, the silicates are completely bound/removed from the otherwise already very clean water, and this by the fact that the water is pressed through a so-called mixed bed resin. The mixed bed resin is a consumable material and must be disposed of from time to time and replaced by a new one, depending on the amount of silicate in the domestic water. The time for this can be recognized when diatoms appear again in the aquarium after some time.

Note: In some areas the source water is completely silicate-free, in others however not or not always. Various waterworks, for example, sometimes deliberately add silicates to the water in order to preserve the water pipes.

If you are sure that your water is silicate-free all year round, the ultrapure water filter can be dispensed with. The water supplier should be able to provide information on this.

For smaller aquariums, it may be advisable to purchase clean source water instead of making it yourself. Ensure with the (aquarium) retailer that it has been produced using one of the appropriate water treatment methods described above, or buy distilled water from the hardware store or similar.

Further details: see Compendium -1: perfect water parameters in your reef aquarium



A3: Purchasable quarantine baths

> Treat corals in a separate container, never in the aquarium!

Only for corals Not for the treatment of fish, shrimps, mussels, sea urchins!

"The Dip" is a high quality quarantine concentrate for LPS and SPS without iodine, oils or aggressive/oxidative ingredients.

It is recommended for acclimation of all new LPS/SPS corals, but can also be used for treatment of diseased animals.



Fauna Marin "The dip " 250ml approx. 20€

Preparation

- Vessel-1: Mix quarantine bath *1)
 15 ml "The Dip" to **1 liter** aquarium/salt water
- Vessel-2: Prepare the same amount of rinsing solution (aquarium/salt water) *1)
- *1) Choose sufficient size depending on coral

Application

- Place the coral in Vessel-1 for max. 5 minutes and swirl in it (quarantine bath)
- Swirl/rinse coral in Vessel-2 (salt water)
- Put back coral into the aquarium
- Dispose of quarantine bath and rinsing solution

A4: Do-It-Yourself Quarantine: Iodine Bath

Treat corals in a separate container, never in the aquarium!

Do not inhale vapors. Otherwise risk of cold-like symptoms!

- Mix iodine bath from Betaisodona solution *1) and aquarium water (salt water)
 4 ml Betaisodona to 1 liter of salt/aquarium water
 - *1) Betaisodona solution (liquid): available in pharmacies or online shops 30ml / 4.-€ or 500ml / 20.-€

Application

- Place the coral in the iodine bath for 4 minutes and swirl it.
 (This causes weakened parasites to fall off the coral and can then be disposed of together with the iodine bath)
- Remove any iodine residues from the coral
 → Rinse off in the aquarium with flow pump or shake in separate container with salt water
- Return coral to the aquarium
- Dispose iodine bath

A5: Destruction of whirl worms (Turbellaria) with "Concurat".

First, be sure to vacuum as much Turbellaria as possible on several days in a row.
 Use the following tips for this, as some Turbellaria contain toxins, which they release into the water as brown-red liquid when they die.

Attention: If this step is omitted, or not cleanly observed there is a high risk that subsequently animals die due to released toxins.

- Temporarily deactivate all filters/adsorbers (switch off skimmer, no carbon, no adsorbers, no UV clarification, no ozone, switch off ozonators a few days before treatment).
- Continue to operate flow pumps in the aquarium to distribute medication
- Dosage of the preparation Concurat L (manufacturer Bayer, PZN 1821667, purchase via veterinarian as prescription)
 Dosage: Dosage: 7.5 g Concurat per 1000 liters of aquarium water. Dissolve Concurat in water (10g Concurat/1L) and add to the aquarium
- Deliberately backwash all parts of the reef now to distribute the medication
- Duration of treatment: 20 30 minutes.
 Observe your fish, as they react to dying Turbellarias releasing toxins
 In case of problems: Immediate emergency stop of the treatment
- Filter out medication after treatment or emergency stop
 → Carbon filtration with fresh activated carbon
- Switch on the skimmers, filters and adsorbers The skimmer will now skim extra much to remove dead biomass from the aquarium
- Repeat treatment after 7-10 days to kill young turbellarias hatched from eggs

Imprint Sources & personal data

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DATZ	Calcium hydroxide slurry method		www.datz.de
Michael Mrutzek	lodine bath for corals	www.r	<u>meerersaquaristik.de</u>
Eric Borneman	Mything the point		

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Threads/opinions of various forum posts: meerwasserforum.info | reef2reef.com | reefcentral.com | www.riffaquaristikforum.de



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