FAQ / Compendium

Plagues within reef tanks
part-2: Animal pest ghosts

(FAQ: **F**requently **A**sked **Q**uestions)

Welcome to the horror cabinet of saltwater aquariums!
This part of my FAQs deals with animals
that really can get on your nerves!

Mostly we look forward when we see new creatures that we haven't deliberately introduced into our pool, but appendages of live rock, corals, etc. were offshoots. Unfortunately some of these can be unpleasant for us, or multiply so rapidly that we would do nearly everything to get rid of them immediately. But this turns out not always easy. Apply the methods described here and they have to get rid of the pests a good chance, or at least greatly minimize!

Last Updated: 2015-05-03

Prologue

Information within this FAQ are partially from my own experiences. Luckily we didn't deal with all of them.
Similarly, all measures to getting rid of these pests have not been tested by myself.

Some of the material collected here is also made of gathered experience / knowledge of various aquarium e.g. from relevant forums on the Internet as well as other specialized publications.

There are different opinions/experiences on some issues. On becoming aware of new information or methods they are incorporated in the FAQ. For this reason, it is useful to look up every now and then whether a new version of this FAQ is available.
(Date of last change: bottom line of the 1st Page).

The information given below represents my own knowledge, but need not be complete or 100% accurate.

**The recommendations made in this FAQ / compendium represent the current state of knowledge of the author. For the correctness of the contents no guarantee can be given.
Any liability as a result of correct or incorrect application is rejected.**

PART 1 – Identification

1.0 What to do in cases of a suspected plague.

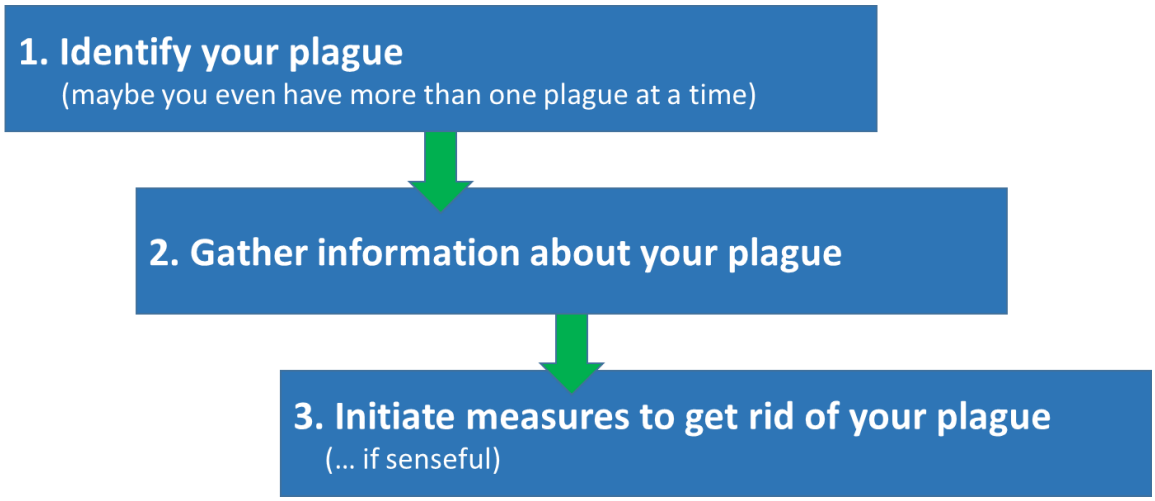
Presumably you're reading this because you have uninvited guests, or at least suspect. May be even other animals of your tank are affected.

The logical consequence: you want to **get rid of this problem as soon as possible** and doing so by as little effort as possible.

This is understandable to 100%. Unfortunately, it's not quite that simple, because:

- Your tank may need no intervention,
  but only some time to allow biological processes
- Possibly an intervention makes sense, or perhaps is even urgent,
  because doing nothing would worsen the situation
- The treatment methods are completely different
  depending on which nuisance they have to contend

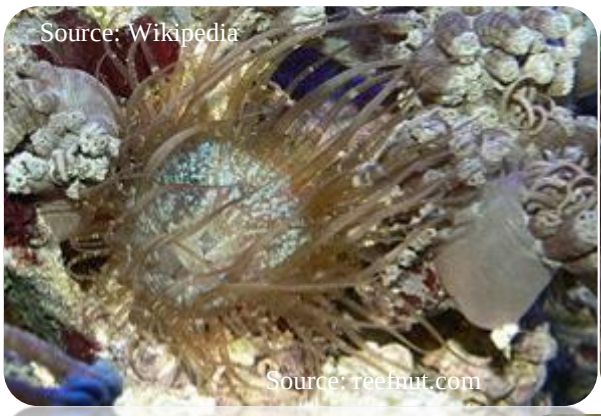
For this reason, I strongly recommend to **stick to the following procedure**
(even if it still seems so banal, or possibly prevails a certain impatience)

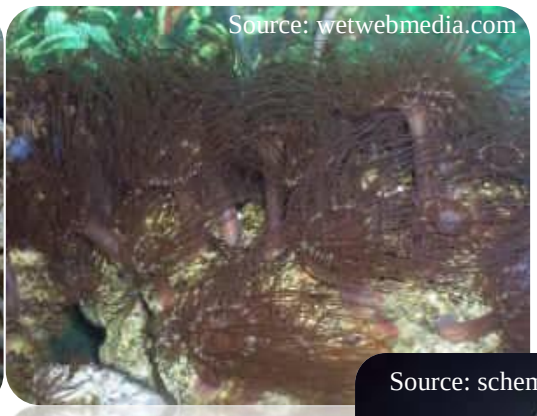


Under no circumstances we recommended to take step 3) before step 1)
(You also don't swallow antibiotics if you just have caught a cold)

Not all creatures described in the FAQ are pests in the usual sense. Some of them are often even deliberately introduced in tanks (e.g.: because they are particularly attractive or interesting). A few months later, usually when the animals have multiplied excessively or other animals harry, one wishes to have never introduced them. This category includes sometimes Algae, Xeniea, and some types of anemones.
To avoid later surprises also this ones are included in this FAQ.

1.1 Aiptasia





Source: reefnut.com

Source: Yanton/aquarists-classifieds.co.uk

Appearance:

- Smaller anemone, transparent, brownish
- Tentacles are thin and arranged to oral disc around the sides (not flat).
  Shaft compared to anemone size often relatively long
- Can attach itself to all objects
  (Reef rock, coral, glass, plastic parts, …)
- Size typically up to 5 cm, (rarely up to 20 cm)
- Very rapid multiplication rate

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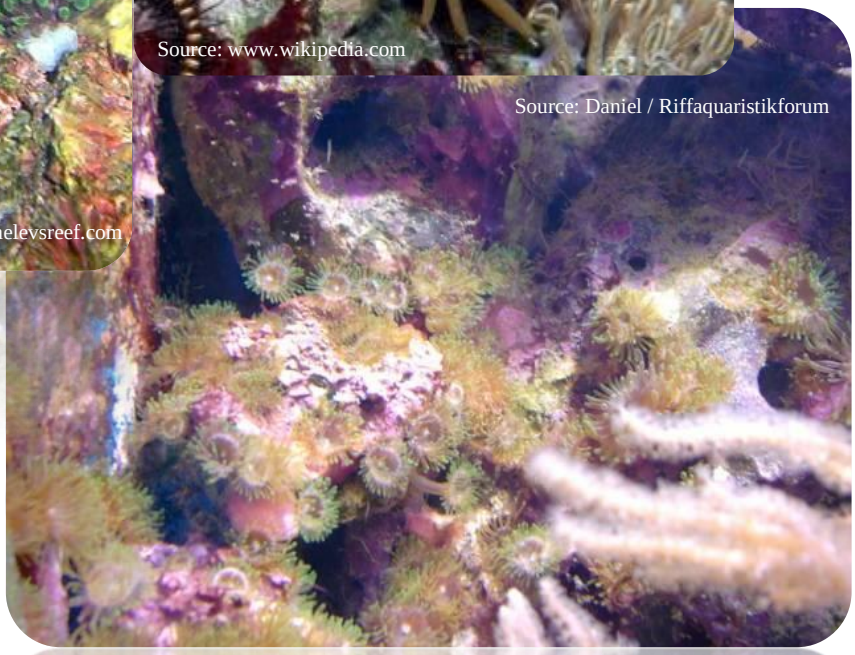
1.2 Manjanos (fire anemones)


Source: Marc Levenson - courtesy of www.melevsreef.com


Source: www.wikipedia.com


Source: Daniel / Riffaquaristikforum


Source: www.acquaportal.it

Appearance:

- Midget anemone
- Two different colored types
  yellowish/orange (very common) or, more rarely seen
  deep green
- Slightly plump tentacles arranged around the side of their oral disc
  short shaft
- Adhering to reef rock, sometimes also to corals
- Different types: Size 2 - 10 cm
- Very rapid multiplication rate, multiplies to colonies quite often

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1.3 Xenia / Pumping Xenia


Source: www.wikipedia.com


Source: www.aquahobby.com


Source: www.reef-counters.com


Source: www.fishmanservice.com

Appearance:

- (Soft) coral
- Several different colored and different growing variants
  pumping and non-pumping species
- Slightly thicker stem,
  assuming a plurality of tubes in which polyps are located
- Adhering to reef rock, glass, sometimes also to corals
- Very fast growth rate,
  partly forming huge colonies often overgrowing different species of other corals
  (see bottom photo)

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1.4 Zoanthids/Crusts and disc anemones

Appearance:

- Crusts / disc anemones displace other invertebrates by their strong nettle poisons
- In case of frequent contact / harassment: splashing a secretion
- Rapid growth, partly undesirable propagation

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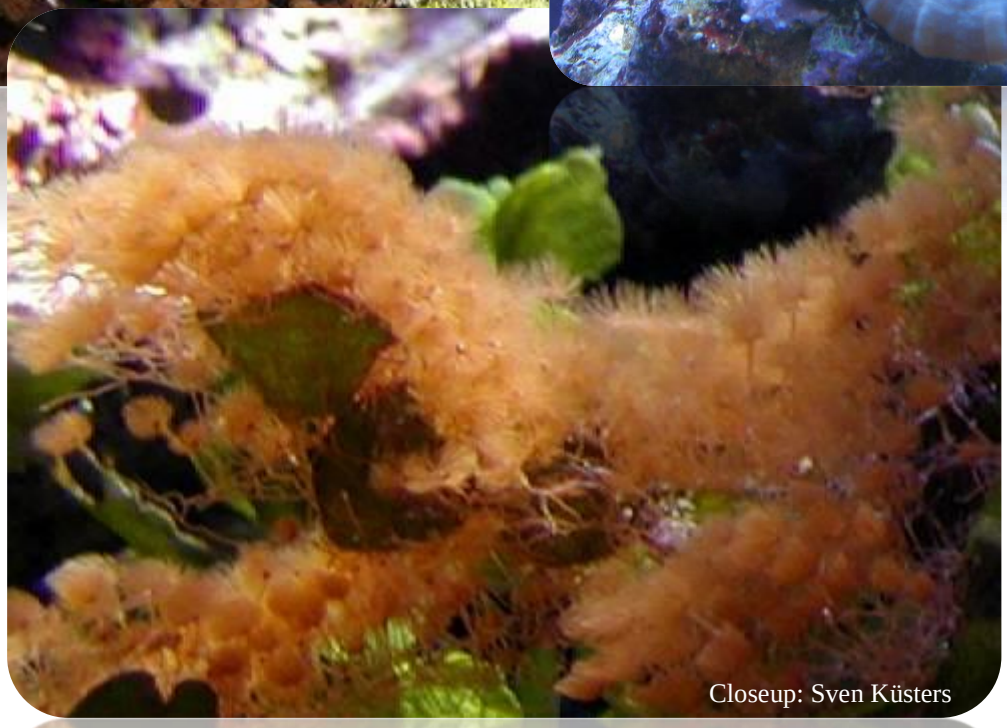
1.5 Hydropolypes

Image: Stefan Donoval
www.meerwasserlexikon.de

Image: Markus aka DoGis



Closeup: Sven Küsters

Appearance:

- Brush-shaped soft coralline polyps
- Gold brown color
- Individual polyps as well as entire colonies are highly touch-sensitive
  Polyps pull thereby together perfectly,
  then a tiny ball is still visible
  Polyps expanding after a few minutes
- Extremely fast propagation

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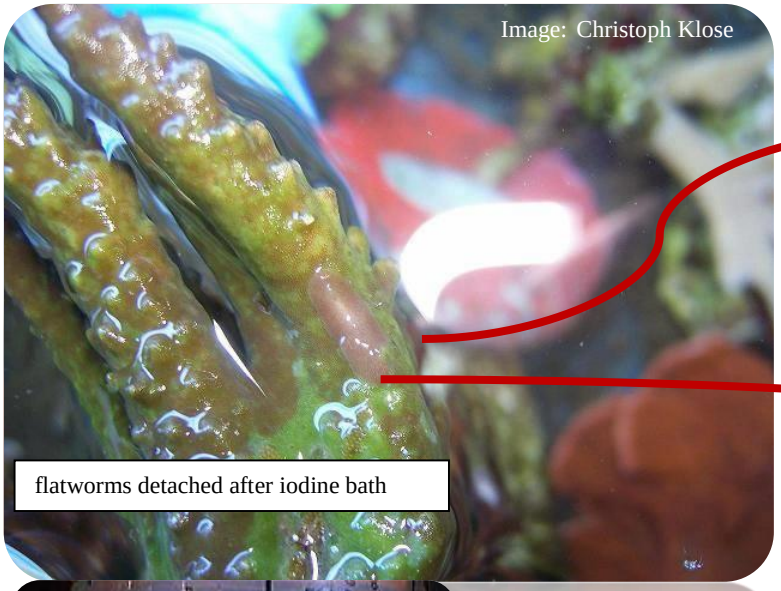
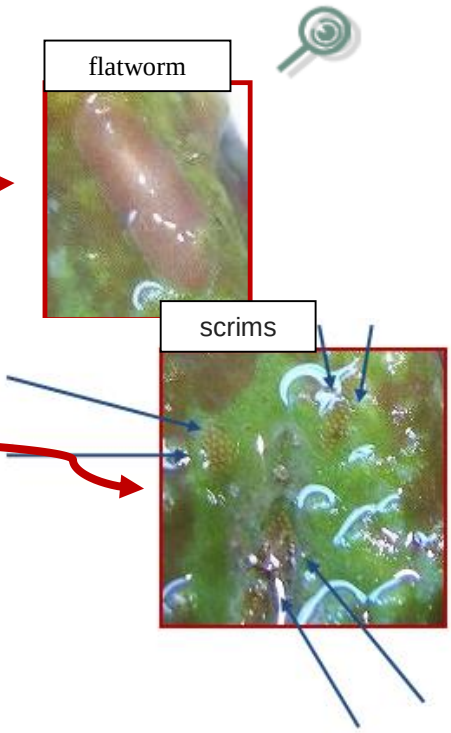
1.6 Flatworm infestation of hard corals (Acropora flatworms)





Appearance:

- Only Acropora corals are affected
  Because of their almost transparent color coral adhering flatworms are barely visible.
  Corals tissue is their food and thus they can cause massive damage.

- striking state / behavior of corals:
  - Larger areas of corals are getting brighter
    The starting point is the root of the coral, from below
- Coral tips begin to lose their original coloring
- After some time, limestone skeleton becomes visible (tissue loss) and the coral will start to die
- Algae might populate the limestone skeleton where no more tissue is available
- Flatworms multiply by their spawning packages
  These are located at the bottom of the coral (strain) at locations with no more tissue

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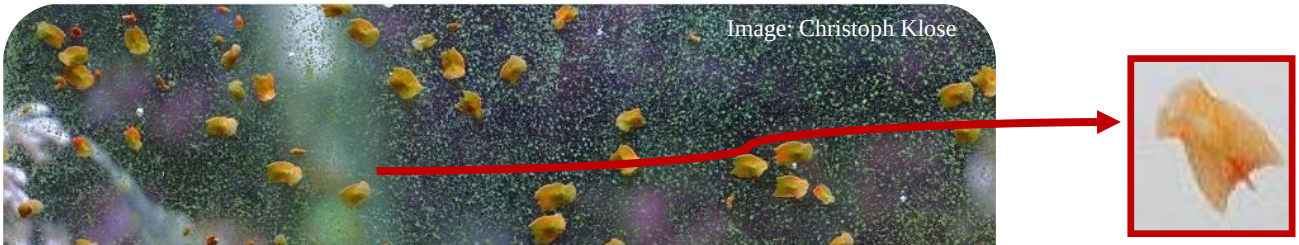
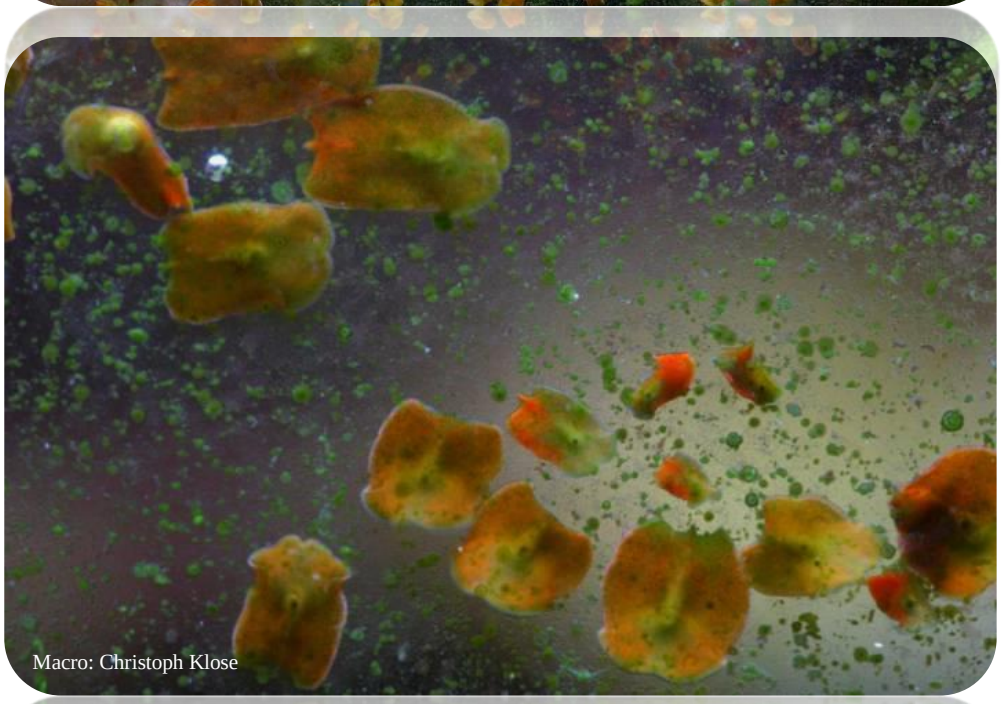
1.7 Red flatworms (Turbellaria)





Appearance:

- Parasitic infestation in the whole tank
  (Glass, sand, rock, .. later on also on corals)
- The (usually red) flatworms are rapidly spreading

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1.8 Red Bugs

Macro: http://www.ximinasphotography.com/

Appearance:

- Acropora corals are attacked by very small parasites (shell critters)
- Reducde Coloration of coral polyps and stagnating growth
  For longer-lasting, vigorous, infestation coral tissue can dissolve.
  Infested coral reduce their growth and might even die
- Size is only 0.5 mm, Yellowish body with red head
  Critter is recognizable with magnifying glass or enlarging a photo.

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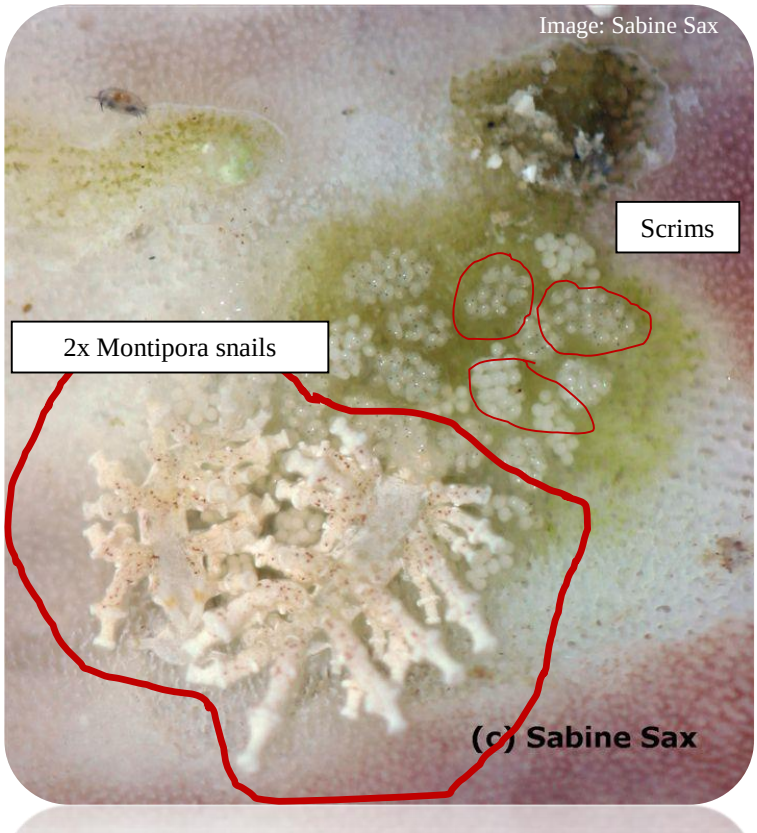
1.9 Montipora-eating thread snails



Appearance:

- Partial damage of Montipora corals
  (coral shows “white spots” where snails have eaten up the tissue)
- Affected are mainly plate-shaped growing Montipora
- These snails are visible only if you look very closely, because they almost always reside on the underside of coral. Preferably in a darkened column.
- In case of uncertainty about the infestation: splash with some water of your tank. In case of moving filaments you most likely discovered montipora snails
- Size 5-8 mm
- Rapid multiplication

1.10 Tridacna eating snails

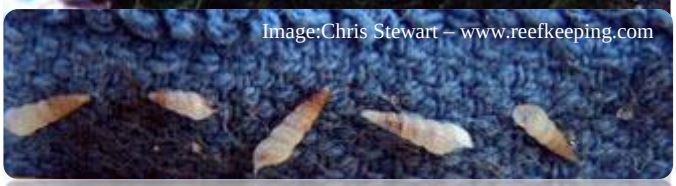


Image:Chris Stewart – www.reefkeeping.com

Image: Marc Levenson – courtesy of www.melevsreef.com

Snail sucking on the coat of a Tridacna clam

Appearance:

- Appearance of your Tridacna giant clams is getting worse and worse (Until death)
- Jacket flaps are daytime less stretched or not even visible.
- Jacket flaps having „small holes”

- Check your tank ½ hour after the lights go out (flashlight)
  In case you discover rice corn like formations (3mm wide, conical, white worm) on your Tridacna, you might have found some
  During the day, the screws are not visible

1.11 Asterina (Mini)Seesterne

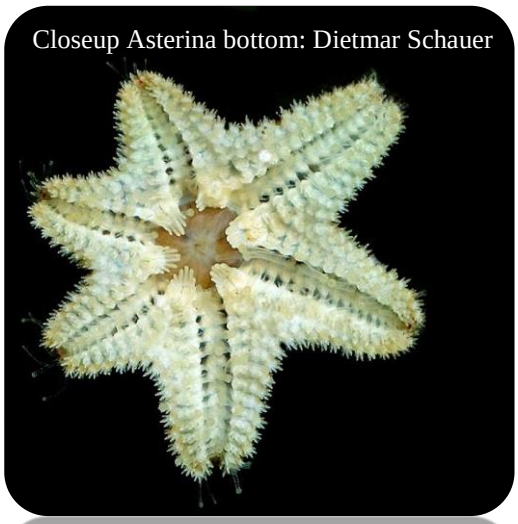

Closeup Asterina bottom: Dietmar Schauer


Image: Anthony Calfo
www.reefkeeping.com

Picture: „Pascal“ www.meerwasserfroum.com

Appearance:

- Mini starfish
- Variable number of arms (5-9) which are mostly different lengths
- White, beige or pink coloring
- Size: usually up to about 10mm (larger types also available see bottom photo)
- Located preferably on reef rock or on the aquarium pane (rare on corals)
- Rapid multiplication rate in favorable conditions

1.12 Wormsnails

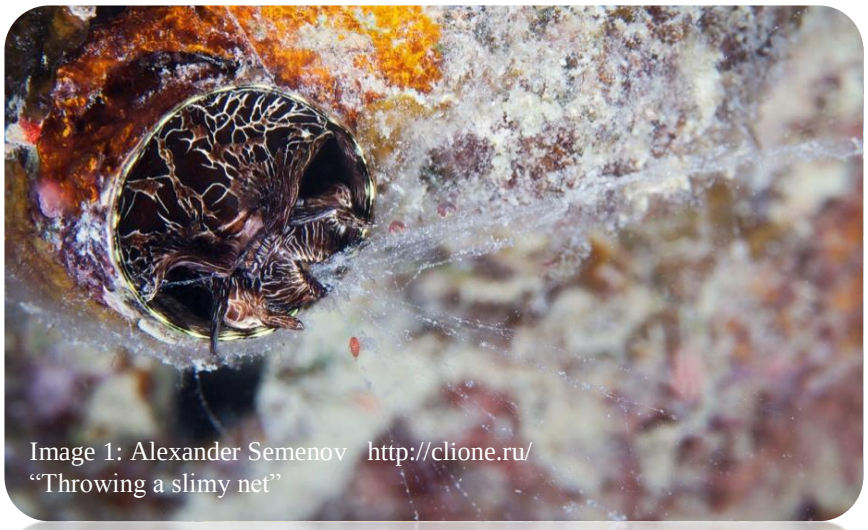
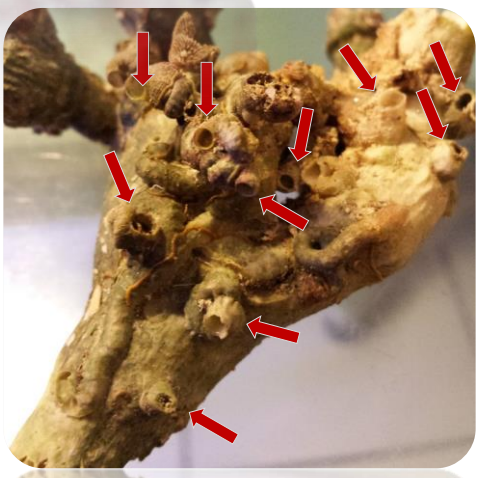
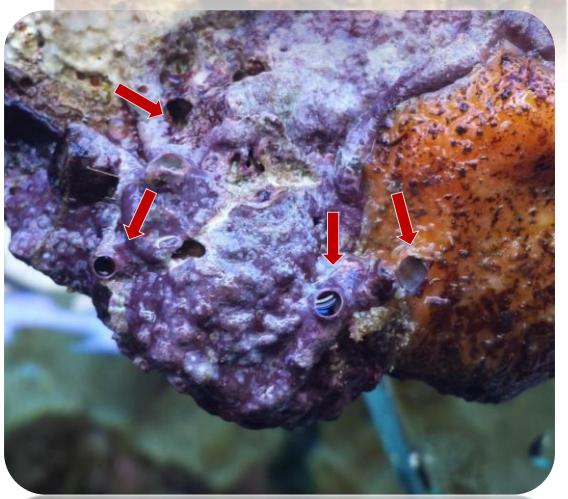


Image 1: Alexander Semenov http://clione.ru/
“Throwing a slimy net”

Images: Horst “MaHO”
www.riffaquaristikforum.de





Appearance:

- Tube or crater-like worm dwellings on reef rock,
  calcium carbonate skeletons of LPS or SPS hard corals,
  housings of hermit crabs, turbo snails,
  or stationary parts of your tank such as Flow pump housings.
- Worm snails are throwing slimy nets (image 1).

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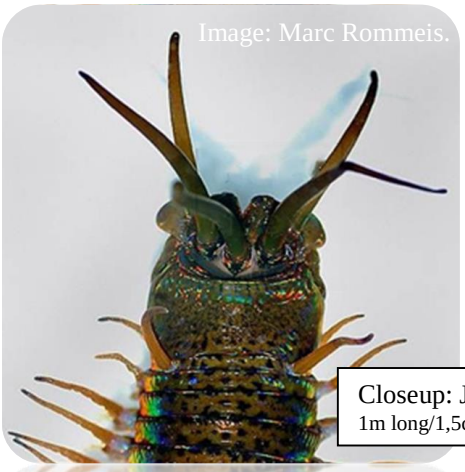
1.13 Bristle worms, jaw worms

Jaw worm



Closeup: Jaw worm
1m long/1,5cm in diameter

Fire bristleworm

Bristleworms
(standard population of reef tanks)

Appearance:

- Large group of worms of different appearance

- Very common and harmless:
  - (small) bristle worms

- Uncomfortable:
  - Fire bristle worms
  - Jaw worms

Bristleworm

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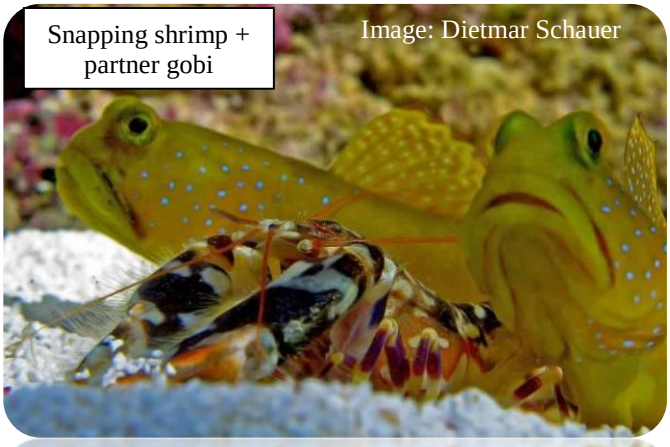
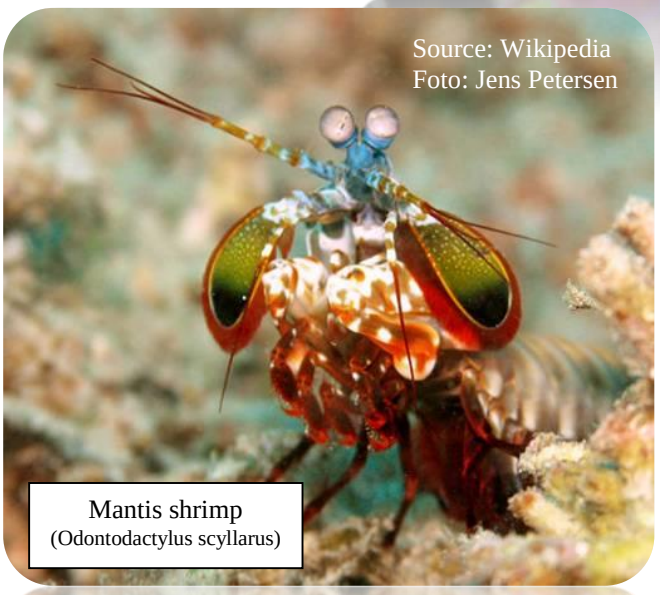
1.14 Snapping shrimp, mantis shrimp, crabs





- Crackling sounds from your tank can be observed (snapping shrimp and mantis shrimps only)

- These animals themselves often live in hiding and show up only rarely You possibly see them at feeding times

- Partially some animals, very often shrimps, are missing

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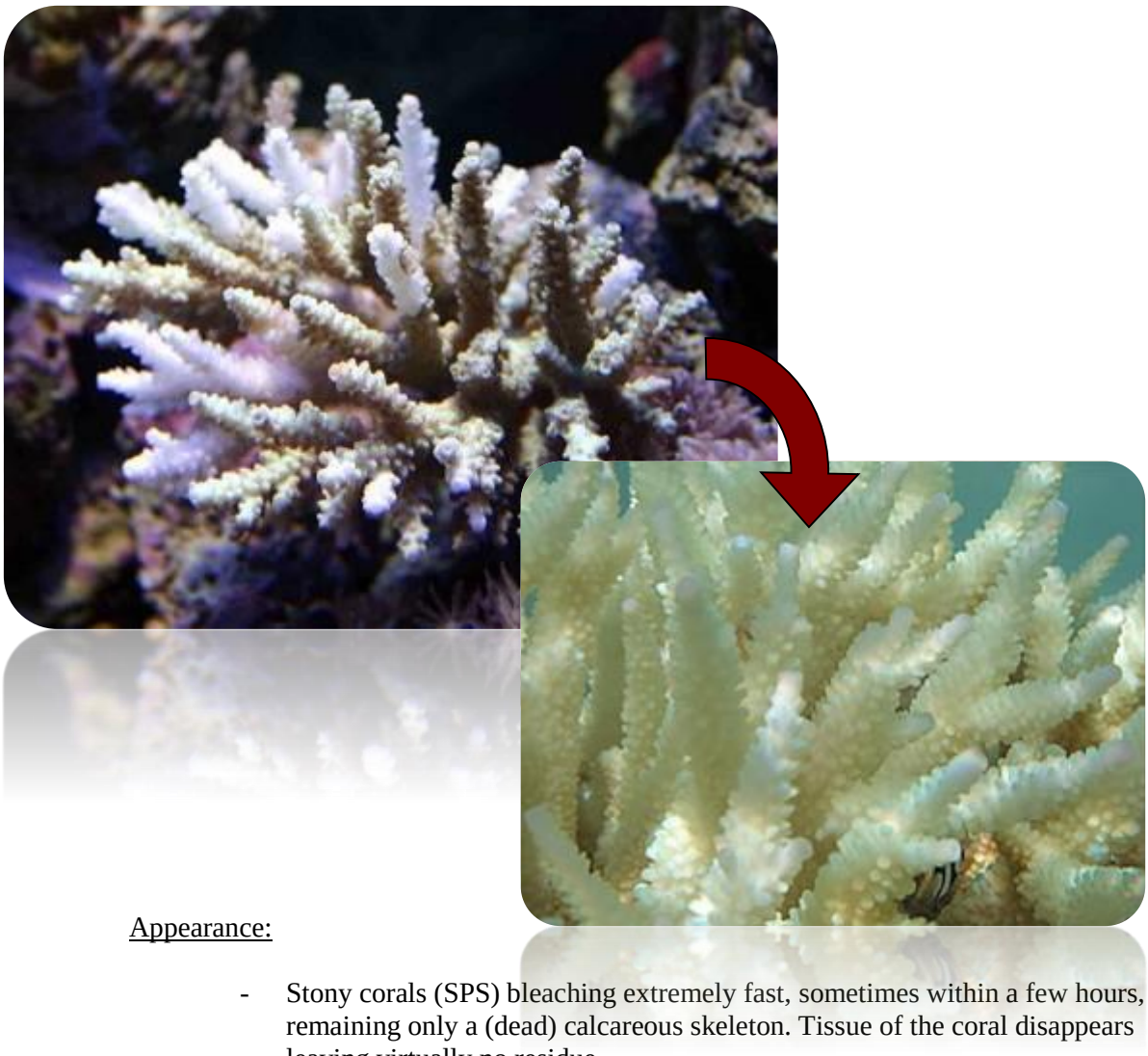
1.15 RTN of stony corals (Rapid Tissue Necrosis)



Appearance:

- Stony corals (SPS) bleaching extremely fast, sometimes within a few hours, remaining only a (dead) calcareous skeleton. Tissue of the coral disappears leaving virtually no residue.
- After some days algae attach to the dead coral
- RTN is typically starting from the bottom of coral

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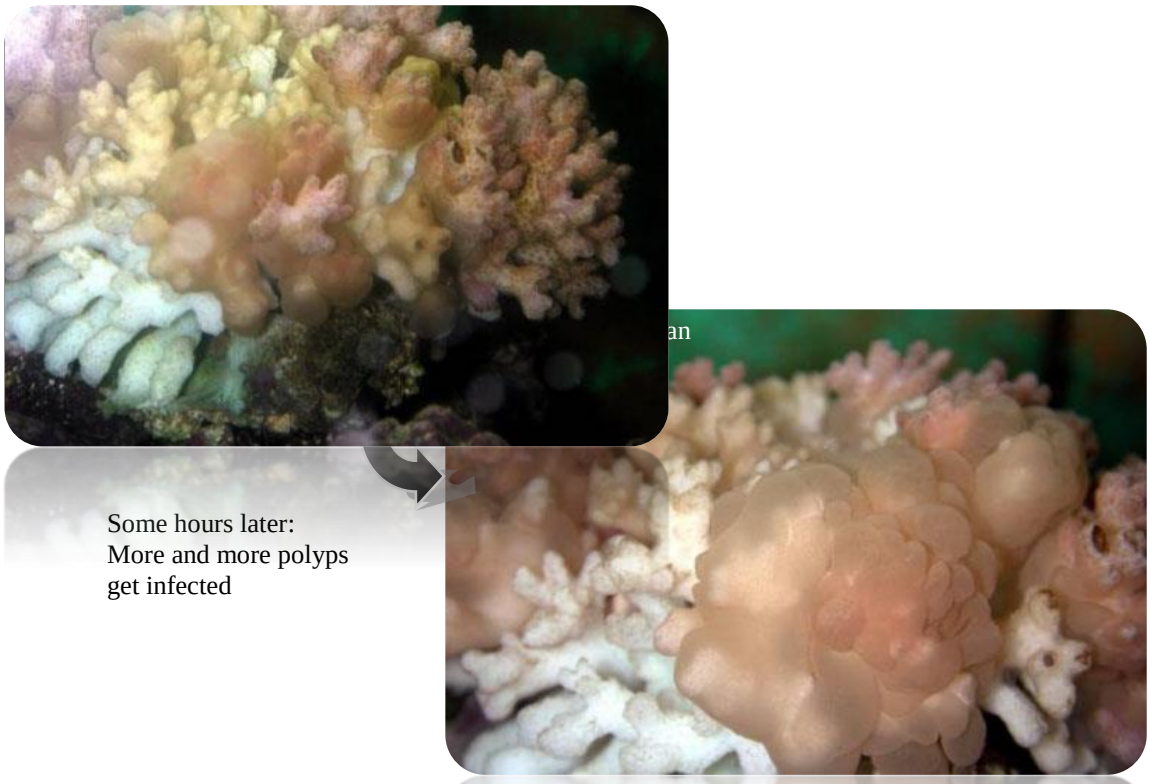
1.16 Brown Jelly



Some hours later:
More and more polyps
get infected

Image: Eric Borneman

Appearance:

- Tissue / polyps of coral is covered by a pudgy, transparent brownish slime. Sometimes even the underlying coral skeleton is visible (see images above)
- Almost all corals types may be affected, but particularly prevalent are LPS corals species (Euphyllia, bubble corals, Xenia, Goniopora, Catalaphyllia, Alveopora)
- Quite often positions where the coral was injured are starting point for BJ

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2.1 Aiptasia

Aiptasia belong to the species of anemones. They can't serve as host anemones for clownfish, among other reasons because they remain relatively small and have glass-like transparent tentacles. There are several subspecies of Aiptasia. Unfortunately aiptasia appear as appendage of live rock, corals, etc.
Aiptasia, like other anemones, can consciously change their position. The have moderate nettle poisons which are used to defend their own position to and creating more free colonization area.
They can stretch themselves and migrate to other corals. The larger and more numerous the animals, the more other invertebrates can be harmed. Likewise, the water is provided with nettle poisons. This burdened corals which are not the immediate vicinity of Aiptasia.
Aiptasia are extremely consistent, persistent and even survive for days without water. They can multiplicate themselves very fast. For this purpose, they constrict parts of their own body which then float around and become new animals and so on. They grow, unlike most anemones, even in dark places behind reef rock.
Dismembered aiptasia can form several new animals, so spreading is relatively difficult to control.
If propagation is not prevented (eg by other creatures) the can spread snowball-like.

Conclusion/risk:

Control your tank incl. piping and sump at regular intervals, especially when introducing new live rock.
React quickly is you notice Aiptasia. Even a few harmless-looking and smaller Aiptasia can develop into a serious issue.

Keeping aiptasia under control

2.1 Manjanos

Manjanos, also called fire anemones, belong to the species of anemones. They usually don't serve as host anemones for clownfish, because they remain relatively small. Nevertheless, there are some cases in which larger Manjanos be symbiotically used from clownfish.

There are several color variants whereof some even look visually attractive. In nature they are common in the Indo-Pacific, especially around Indonesia. Typically they are introduced in our tanks as appendage of live rock.

They can and do also wander in tanks. Nettle toxins are relatively strong and can harm most invertebrates.

Manjanos divide themselves to multiply in a high frequency, which can (but not necessarily) lead to a plague in reef tanks within quite short time.
Dismembered scraps of Manjanos do not reproduce. Propagation is thus mostly area located, and not spreading throughout too fast to the whole tank.

This Minianemone is extremely dominant and has killed and/or overgrown entire coral population in some tanks.

Conclusion/risk:

These mini-anemones are cared by some aquarists because perceived as attractive.
If this is desired, a consistent control is strongly recommended, as the can develop to a plague quite easily!

I personally recommend to kill/remove each Manjano to avoid later problems.

2.3 Xenia / pumping xenia

Xenia are tube corals. They occur in all oceans, and form part of huge colonies. Some types polypes have a pumping motion, presumably to get enough food even at a lack of flow/current. Some species (eg Xenia umbellata in light pink or even red) are very attractive which is why they are also regular guest in many reef aquariums.

Xenia multiply by pinching off their polyps, which float until having found a new colonization area and then fix up. They multiply rapidly and have developed as veritable plagues already for lots of aquarists.

Xenia nettle hardly, but overgrow other invertebrates or settle in the midst of other corals.
They form bigger colonies.

Conclusion/risk:

Xenia are quite attractive and an optical enrichment for reef tanks. However, they can spread rapidly and become a plague.

In case you plan to care Xenia, you should also plan regular intervention advisable to avoid excessive propagation.

Keeping Xenia under control

2.4 Zoanthids/Crusts and disc anemones

This anemones can be extremely colorful and beautiful. Both species, like other anemones, also can "hike around" in your tank, but do so only rarely.

They feed on plankton and their symbiotic algae (zooxanthellae) and are relatively undemanding, and care is therefore relatively easy. Nevertheless they can reproduce themselves quickly and displace other invertebrates through nettle poisons.

Two species of anemones (Protopalythoa- and Playthoa species, especially the popular green anemones) possess a potent neurotoxin called Palytoxin, which can be squirted in case of danger/defense.

This poison is harmful for other animals and can also hit the aquarist by cleaning / removal work. The spectrum of the reported complaints is, depending on the dose of venom. Typical symptoms: nausea, vomiting, cold like symptoms, chills, to paralysis on the muscular system. A certain minimum level of knowledge is sufficient to maintain these animals without any problems. Removal of these animals, however should be made carefully

Conclusion/risk:

Disc anemones are beautiful and rewarding.
Either choose an appropriate, separated stand at a sufficient distance to sensitive corals and other reef rock, or cut down rampant colonies.

Some Crusts contain extremely strong neurotoxins. Caution is advised whilst working in tanks with these animals (danger of injury!).

Keeping Zooanthids/crusts under control

2.5 Hydropolypes

This species can be found worldwide in all oceans, primarily in shallow waters and lagoons. In our aquariums, fortunately very rare, they come as an appendage of living stones. They are largely insensitive to changes in water parameters or toxins.

Hydropolyps feed exclusively on their symbiotic algae (metabolites). Strong lighting promotes their already extreme propagation speed.

Individual polyps build up a network and quickly become large colonies. They thereby form a ground braid felt-like structure. Larger colonies are grown later in the height and lace pieces from their selves. They then drive through your tank, settling on other areas and multiplying again.

They virtually overgrow all coral species and cause damage by light deprivation. Also polyps have a medium strong nettle poison with which they can defend themselves against other corals.

Conclusion/risk:

Luckily Hydropolypes are quite seldom found in our tanks.

This species has an enormous propagation speed.
Once within your tank and without immediate and correct measures, they will become an issue for you.

Act fast and very consequent!

Getting rid of Hydropolypes

2.6 Acropora swirl worms

They belong to the family of flatworms and there are various different kinds. Often they are introduced as parasites on live rock or coral offshoots.

Glueing there eggs to hard corals, Acropora swirl worms achieve a high reproduction rate.
These flatworms are parasitic consuming tissues of SPS corals. Usually only acroporas are affected

Due to their small size and inconspicuous coloring, coral flatworms adhering to coals are difficult to see. Preferably, they sit on the lower branches, but also in other places offering food.

Conclusion/risk:

Flatworms are parasites and serve no positive purpose in saltwater aquariums.

In case you see any flatworms you should remove them immediately.

Introducing new stony corals, they should be carefully examined and treated with an iodine bath in case of infest.

Get rid of Acropora flatworms

2.7 Red flatworms (Turbellaria)

They can often be found in sweat/saltwater and are of simple design not even having an own respiratory System, but breath over their total body surface. For this reason they occure only in oxygen-rich zones of the water. Two types are quite common:
- slightly larger species frequently found on corals
- a smaller one which is seen quite often on life rock and coralline algae

They reproduce vegetatively with partially rapid reproduction rate. Propagation by division takes place every 4 days. This is the reason for some rapidly growing plagues in our tanks.

Turbellarians feed on diatoms, unicellular algae, dinoflagellates, rotifers and micro-organisms. Absence of this algae means reduced food source and thus slower reproduction rate.

Turbellarians feel well in well-lit places because they need light for their symbiotic algae. Use this for easier hunting/catching.

Turbellarians contains toxins highly poisonous for fish. They release them whilst dying, as a reddish brown liquid, to the surrounding water. The higher the number of dead turbellarians, the higher the risk for other animals within your tank.

Conclusion/risk:

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

They can become a veritable plague and thus should be eradicated as soon as possible.

Get rid of Turbellaria

2.8 Red Bugs

Red bugs (Stegastes acroporanus) belong to the group of copepods and are very small, fled like parasites. They feed exclusively on tissue, as well as coral mucus of Acropora corals. They infest preferably coral with a smooth surface, rarely corals with longer polypes.
Sie krallen sich auf der Oberfläche der Acroporen fest um nicht von der Strömung weggespült zu werden und sind dort fast nicht zu entfernen.

Other SPS types as Montipora, Pocillopora and Seriatopora are not affected. Presumably they can't move and cling good enough on this species.

Red Bugs, through the flow, can drives themselves from one coral to another.

Red bugs are found quite frequently in USA and are rare in Europe. I attribute this to swapping of corals between not particularly well-kept tanks.

Conclusion/risk:

Once a tank is infected, it can be obtained "red bug free" only with relatively high effort.

Check your freshly purchased "smooth surface Acroporas" before introducing them into your tank, especially if they come from the US.

Get rid of Red Bugs

2.9 Montipora eating snails / thread worms

These parasitic creatures have a white, sometimes beige, coloring with light gray spots.
Infection / feeding sites were several Montipora species, stylishly shaped growing as well as plate-growing, observed.

For feeding this thread worms are crawling on top of the coral and eat from their tissues.
Otherwise they keep preferably on the shadow side of coral, often near columns in your life rock. This also protects them from other predators.

Spawning usually occurs at the transition to already eroded parts to healthy tissue, sometimes in other places in the reef rock. They multiply rapidly, within a few days.

Conclusion/risk:

These animals are fortunately relatively rare.
A plague, however, can only be removed with relatively high effort.
The best tactic is to avoid the introduction of these animals. Buy corresponding corals only with trusted merchants (good dealers carry out preventive measures in their pools).

Get rid of Monti eating snails

2.10 Tridacna eating snails

These parasites occur naturally relatively rare. Presumably, their required conditions in the aquarium are better fulfilled than in wide coral reefs.

The snails hide during the day under/around the mussel or the surrounding areas. They probably do that in order to protect themselves from attackers. If it gets dark they become active and climb on the conch shell up. They then pierce the shell with a sort of sting in the jacket flaps to their fluid aspirate and thus to feed themselves. The shell attempts by closing, which is only of partial success because they can't close completely tight.

Depending on how many of these parasites attack and depending on the size of the mussel, Tridacna's can die in a few days to a few months.

The snails reproduce on tray packages of which you can store 2-3 pieces up to 400 eggs every day. The egg packages are gelatinous and are stored on the mussel itself or to the substrate in the immediate vicinity.

Conclusion/risk:

Especially tanks where a Tridacna/giant clam is used for the first time, should be observed. Do that at night, about half an hour after switching off the lighting.
If these parasites are determined, you should act quickly. Otherwise these snails are likely to weaken or even kill your clam.

Get rid of Tridacna eating snails

2.11 Asterina (Mini starfish)

Asterina sea stars are found in all oceans. There are various subtypes. This mini starfish are represented in almost all tanks and are introduced with live rock or as an appendage of coral offshoots. They usually occur only sporadically. Sometimes however, they proliferate and become a nuisance.

They usually feed on algae and coralline algae. If there is a proliferation they, presumably due to lack of food supply, use other food sources such as the tissue of hard corals.

Conclusion/risk:

Asterina sea stars are completely harmless in most cases.

An intervention is necessary only if the population is rampant.

Get rid of Asterina starfish

2.12 Worm snails

Worm snails (Serpulorbis sp) are filter feeders and are usually introduced as an appendage of coral or live rock in our aquariums. They are found in many tanks and mostly they behave inconspicuously.

They consist of a calcareous tube and the worm itself which is located therein. In addition, there is a "dummy plug" with which the worm can protect their tube from predators.

Worm snails cast "sticky mucus nets" providing them with nutrients from the open water. They also feed on detritus and very fine / dust feed within the water.

The problem, in addition to visual impairment due to the unsightly trawls is especially the exerted thereby stress for corals.

Conclusion/risk:

Worm snails are quite common. Normally you don’t even notice, because they adhere mainly to the skeletons of LPS or SPS.
Unpleasant are especially their mucus nets.

They usually multiply rather slow and can be tolerated. With increasing / high population density, which often occurs in nutrient-rich tanks, an intervention is strongly recommended.

Get rid of worm snails

2.13 Bristleworms, Jaw Bristleworms

Bristle worms are found in all oceans and there are many subgenres (Family Polychaeta). I personally don't know only one saltwater aquarium where there are no bristle worms. They are primarily nocturnal. There are 2 types of bristle worms:

- Free Floating Bristleworms
  they feeed by detritus, carrion or even predatory attacks

- Fixed Bristleworms
  the digg the gravel or porous soft reef rock and
  feed mainly by plankton or tissues of invertebrates

Bristle worms are a popular food for some fish. Due to their unpleasant bristles they are "difficult to digest" and thus not an option for all fish. Touching unconsciously into your tank and getting in contact with a bristleworm, is relatively painful (itching, pain, ...). Particularly painful is the touch of the so-called. Fire bristle worm.
Most bristle worms are algae eaters. Smaller species are usually harmless in our aquariums, even when they occur in large quantities. If the animals get too big they satisfy their appetite even with corals. There have been found up to 2m large specimens in MW aquariums. Large animals are, due to their food demand, almost always to predators.

It is only a persistent rumor that Bristleworms eat Tridacna mussels. They usually do not do this! but discarding the remains when the shell is deceased before.

There are 2 unpleasant contemporaries among bristleworms:

- "Fire bristle worms" are ~30 cm long and finger thick. They attack predators by up its bristles / spikes and are very painful if contacted. They can be predators themselves and eat coral, starfish, shrimp and even fish. Since having nothing to fear from enemies, they are also diurnal.
- "Jaw worms" feed parasitically on invertebrates. They bite through soft coral tissue and feed on them also. They can be aggressive and use their jaws to keep enemies away

Conclusion/risk: Normal (smaller) Bristleworms
Fire bristle worms, Jaw worms

Bristle worms are harmless generally and even useful inhabitants of a reef aquarium. Leave them in your tank unless the very unlikely case happens that they get too many.

If the animals are too big they should be removed as they then begin to rob.
If you find either a fire or a jaw bristle worm in your tank,
you should remove it!

Get rid of bristleworms

2.14 Alpheidae, mantis shrimp and more

Depending on the type / class and stocking in your pool, these animals can be risky to add OR uncritically. A general inclusion in good / evil is not possible.

Common / normal crabs: They range from 100% harmless algae eaters, to strong robbers. The shape of the ends / tips of the scissors are often shed light on the risk potential of crabs:

- lace Scissorhands — tendency to be predatory
- round scissor ends — tendency not to be predatory

Alpheidae can quickly trigger a strong jet of water with one of their two scissors. The speed is so high that a so-called “Cavitation bubble” forms, which collapses back into itself with relatively loud “bang”. By the resulting pressure smaller prey or attackers are paralyzed. Alpheidae often live together with symbiotical gobies and can be well kept in reef tank.

Mantis shrimp are aggressive hunters and lurk in crevices of life rock or in the sand for prey. They are primarily nocturnal. There are several different types of inconspicuous brown to neon colored and from a few cm in size small to 30 cm. There are 2 main types of mantis shrimp. "Smashers" kill their prey with club-like claws with which it can strike very quickly, "Javelins" impale their prey. Also here a cavitation bubble arises generating a popping noise. The eyes of this species are sitting on stalks, and almost have a 360° view. These animals are very interesting, highly intelligent and very fast.

Coral crabs are usually completely harmless quite small (~ 1cm) and live in association with stony corals (SPS). Also, only Acropora, Stylophora, Pocillopora and Seriatopora are colonized. To avoid being washed away they „click“ firmly with their hook claws into coral branches. Crabs are defending "their" coral against predators such as Flatworms, in nature even against large crownof thorn seastars. In return, they feed on adhering to the coral impurities, algae or coral mucus and thereby clean the coral. In rare cases, if the food supply is too low, coral crabs feed by eating coral tissue.

Most types of carbs rebuild their scissors after losing it, e.g. in a fight

The decision whether you perceive a cCrab as nuisance, depends on many things. If being unsure you might decide against removing a crab. Another option would be to store in a separate tank/asylum in your sump, or disclosure the animal from others.

2.15 RTN on stoney corals/SPS (Rapid Tissue Necrosis)

RTN literally means "rapid tissue necrosis" or "rapid destruction of tissue". The tissue formed on the coral skeleton, breaks down and is subsequently washed away by the flow.

RTN can transform a tank occupied with SPS within a few hours to a few days into a graveyard from snow-white calcium carbonate skeletons!

The causative agent of RTN are the so-called. Helicostoma protozoa. These are present in almost every coral, but usually unproblematic. They multiply once a coral is weakened by certain circumstances. The stronger the grievances the higher the probability of occurrence of RTN.

Optimize the conditions for coral to RTN in terms of prophylaxis to prevent or to cure occurred RTN. Things to optimize:

- Water temperature not too high
- Nutrient concentration (N3, PO4) not too high
- Sufficient flow at all corals
- Clean water, no settling particles on corals
- Sufficiently strong lighting matching the correct light spectrum

Anfällig für RTN sind vor allem neu zugesetzte Korallen und große SPS Stöcke, da im Inneren der Korallenäste geringere bis keine Strömung vorhanden ist.

Especially susceptible to RTN are newly added corals and large SPCs. because of less available fow inside the coral branches.

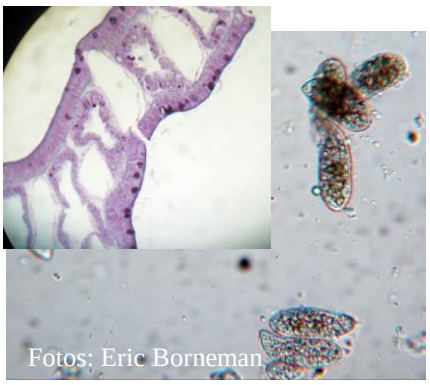
Conclusion/risk: 

RTN is the result of suboptimal conditions.

Immediate response is needed in order to save at least some of the corals can.

Stop RTN

2.16 Brown Jelly



The ciliate *Heliocostoma nonatum* is often called to be the reason for Brown Jelly infection. Although they are present in the jelly-type mass, it is questionable whether they really have to do with the outbreak of this Plague, or whether they simply participate only on the circumstances. Recent studies with high-magnification microscopes show that the affected tissue vibrios are also available. These come in the course of harmful Brown Jelly infection definitely likely in question than those referred to ciliates. Further details are not yet known.

If the corals have “injured tissue”, or are for a different reason in poor condition, the gel-like "Brown Jelly" mass is deposited. The slimy coverings feed on the tissue and the zooxanthellae of corals, remaining dead coral skeletons.

Brown Jelly often spreads from a position with mechanical injury agoThe corals are severely damaged by Brown Jelly and may die in a short time.
Brown Jelly pathogens can be washed away by the flow and transferred to other corals. This further weakens the same coral or even other corals are infected.

Conclusion/risk:

Brown Jelly hits tanks with corals being held at sub-optimal conditions OR if LPS are weakened by mechanical injuries.

Infection of the corals can quickly kill corals. The pathogen can also spread to other corals by your tanks flow.

Fast and consistent action is needed to prevent the spread.

Stop Brown Jelly

Part 3 – Getting rid of pests or bringing pests under control

3.1 Keeping Aiptasia under control

There are virtually no tanks that are permanently free of Aiptasia. No matter which method is used to eliminate, there is the risk that Aiptasia are shooting of spores prior to their death, in order to reproduce. These adhere to various objects and are thus introduced sooner or later also into your tank. Due to the high proliferation rate and the modesty of Aiptasia, consistent action is asked.

All known methods only prevent the spread. A complete elimination of Aiptasia is virtually impossible in the long run. By far the best method against Aiptasia is to put predators into the pool which can remain there permanently. The sooner begun, the better.

Predators of Aiptasia

Predators can only temporarily destroy (eat) Aiptasia. Spores of already eaten Aiptasia will grow into new Aiptasia. If the predator leaves the tank/dies, Aiptasia will spread permanently again.

Predators should be added in an early phase of your tank, to prevent massive plagues. Even high costs normally pay off.

Lysmata wurdemanni, Lysmata rathbunae (shrimp)

Usually, though not always, are good Aiptasia eaters which feed overnight.
Depending on the infestation, 1-3 shrimp per 100 liters of tank volume recommended.
These animals are highly recommended because they are no food specialists. They are inconspicuous, may be used and may remain permanently in the basin, even in small pools. It must be ensured only that no predators for this shrimp are part of your tank.

Chelmon rostratus (butterflyfish)

In most cases the eat aiptasia, but unfortunately, also all tube worms
Sensitive fish! Tested at your dealer if feeding on normal food before buying.
This fish should only be kept in well retracted aquarium with stand> 1 year because of needed mirco-fauna.

Chaetodon kleini (Klein‘s Falterfisch)

Very good aiptasia eater. Unfortunately this fish also feeds on to many other invertebrates, such as, tube worms, LPS, anemones, sea fans and shells (eg. Tridacna clams). That's why it is only of limited use.

Acreirychthys tomentosus

With fondness feeds on Aiptasia, Manjanos and pumping Xenia.
The fish is not picky about his food and eats also anemones, some LPS, soft corals, tube worms, bristle worms and sometimes SPS.
Likewise assaults were reported on lumpfish. This animal normally can be only a guest on time in your reef aquarium

Some aquarists claim these animals have only feed on offered food, not on invertebrates. It is probably that some subspecies have been kept. Ensure that you get “the real stuff” when buying (for example, by seeing that it feeds on Aiptasia).

Pomacanthus Navarchus (Angelfish)

In most cases eating Aiptasoa, but unfortunately also polyps of stony corals (LPS), anemones and tube worms.

Berghia verrucicornis (Aiptasia eating snail)

These animals are relatively difficult to obtain and also quite expensive, for example.
Depending on the infestation, 10-30 snails per 100 liters of tank volume are recommended. Bestis, if animals are separately propagated /grown before inserting in your tank. This worm is an absolute food specialist and dies if no more glass roses are available.This means, you should remove them from your tank (to your dealer or other aquarists ?) if the killed most aiptasia. Within a few months, however Aiptasia will regrow. The problem starts again if you don’t act differently.

When using predators you should generally consider borne in mind housing conditions and tank size

For all predators, except verrucicornis Berghia, it should be ensured that they are not too well fed otherwise. This increases the chances that they will eat Aiptasia.

Aiptasia are almost never completely eradicated by predators. The predators should therefore continue to remain in the basin.

In general you should counteract the spread and use predators in case of huge amounts of aiptasia.

- Check your tank regularly for Aiptasia
- Respond quickly in cases of infestation
- Choose a destruction method not leading to even stronger multiplication / propagation
- In extreme cases, reduce feeding temporary, especially with Micro-feed
  (Powdered food, CyclopsEeeze, phytoplankton, ...)
- Depending on the infestation, location or other circumstances,
  a mix of several treatments is recommended

It isn't advisable to scratch, scrape or mechanical destroy Aiptasia as they are very persistent to mechanical damage. Even more glass roses can grow from remaining parts, resulting in even stronger/amplified spreading in case of unprofessional removal attempts.

Methods for temporary removal of Aiptasia
Aiptasia, once within our tank, can only temporarily be destroyed. The use of the methods described below must therefore be repeated from time to time.

a) „Calciumhydroxid–mash" method
(Link)

Conclusion	Application:	++	easy, also for beginners
	Effectiveness:	+	good

b) „Syringe" method
Inject either concentrated hydrochloric acid (25 - 33%) or sodium hydroxide (32%) directly through the oral disc into the animal (shank). Aiptasia will dissolve completely.
You need a little practice. The injection must be done quickly and accurately, otherwise you risk that part of the aiptasia survives and continues to multiply.

Conclusion	Application:	o	needs some expertise, handle with care
	Effectiveness:	++	very good (if used professionally)

Note: Be sure to use protective equipment when handling concentrated acids / alkalis.
Alkalis / acids are to be kept strictly secured and protected from access by children.

Note: For both methods, it must be regarded that the chemicals used will increase / decrease the pH and thus might stress your life stock. The following reference values should be observed in approximately:

- Sodium hydroxide (32%): up to 5 ml per 100L tank-water per day
- Concentrated hydrochloric acid (33%): up to 5 ml per 100L tank-water per day
- Calcium hydroxide: up to 3 ml mash per 100L tank-water per day

By simultaneous application of sodium hydroxide / hydrochloric acid, more Aiptasia can be destroyed each day, as acid / base neutralize each other in about.

Commercially available remedies:

Commercially also special products for destroying aiptasia are offered. This presumably based on the identical methods as described above

Similar means: „ Calciumhydroxid–mash“:
- Joes Juice (US manfufacturer)
- DeletriX (J&H Aquaristik)

Viscous porridge, most likely Calciumhydroxid
Dosing/conclusion see „ *Calciumhydroxid–mash* “ (as above)

Similar means „*Syringe Method*“:
- Elimi-Aiptas (Tropic Marin) or
- Aiptasienkill (Welke)

These remedies are fluid. Probably is sodium hydroxide (Elimi Aiptas, Aiptasienkill) and concentrated hydrochloric acid (Deletrix).
Dosing/conclusion see „*Syringe Method*“ (as above)

c) „boiling water“ method
- Heat water to boil -
- raise syringe with boiling water
- add as directly as possible (no cooling) injecting directly into the mouth plate of aiptasia.
- In case of larger basins / many Aiptasia -> remove live rock from the water during use
- Then suck the contracted weakened aiptasia with a hose or another syringe and discard it
- This method results in partial damage of live rock which is, settled quickly by bacteria again

Conclusion	Application:	o	Quite simple, but needs 3 working steps
	Effectiveness:	o	average

d) „Sealing “ method
- Irritate aiptasia with any obstacle to irritate, until it contracts
- Then seal this area with coral glue or reef-mortar

Hint: Works properly only for not too porous life rock.

Conclusion	Application:	++	Simple
	Effectiveness:	o / +	average to fine (depending on the position)

e) „ Sucking“ method

- Suck individual Aiptasia and then dispose water & Aiptasia.
- Use: a) Thin tubes as well as used for water changes, or
  b) Big syringe (~50ml) with hose attachment

Comclusion:	Application:	++	Simple
	Effectiveness:	o	Average, as re-multiplying of aiptasia is typically the case

f) „Chiselling“ method

Another method is chipping Aiptasia, or pry at airy/soft overhangs with a screwdriver. However, no glass roses should be cut through.
Especially effective when new live rock is inserted in your tank, where aiptasia is discovered.
Heavily infested stones shouldn’t be used or removed from your tank.

Conclusion:	Application:	-	a bit complicated sometimes
	Effectiveness:	++	very good

g) „Plant pot„ method

- Place a small plant pot “upside down” over the aiptasia
  (hole in the bottom points to the top)
- Aiptasia will wander inside the flower pot along the opening (light deprivation).
- take the pot out of the tank and dispose,
  as soon as the aiptasia has left the substrate / reef rock with its foot
- Rinse the pot well with freshwater

Conclusion:	Application:	o	a bit tricky, especially if discovering more aiptasia
	Effectiveness:	+	good

3.2 Keeping Manjanos under control

Manjanos often multiply after snowball. The greater the amount of Manjanos in your tank, the more consistently you should carry out the removal.

Unlike Aiptasia, Manjanos do not/very rarely, multiply from scraps/debris.
Therefore, the methods of mechanical removal is better purposeful

Suitable methods for removal of Manjanos

a) Mechanical removal

Individual Manjanos can be "pried" with fingers, spatulas, or other objects and then disposed of.
By preliminarily molding with fresh water, they can be peeled off more easily.
residues adhering to stones can be brushed away with a toothbrush.
Turning off your flow pump during treatment, prevents from moving of fragments.

Similarly, heavily infested areas of reef rock removed by chipping, or be completely removed.

Conclusion:	Application:	o	a bit tricky, especially for hard to reach areas
	Effectiveness:	++	very good

b) „Calciumhydroxid–mash“ method
(Link)

As Joe’s Juice is most likely pre mixed Calciumhydroxid–mash, it can also be used.

Conclusion:	Application:	+	simple, also for beginners
	Effectiveness:	+	good

Unfortunately, there are no reliable predators of Manjanos. Yet most often they are eaten by Acreirychthys tomentosus. sometimes by butterfly fish and angelfish. Likewise Berghia go verrucicornis (Aiptasia-eating slug) and Lysmata wurdemanni, Lysmata rathbunae (Wurdemanni / Rathbunae shrimp) also feed sometimes on Manjanos.

When using predators you should generally consider borne in mind housing conditions and tank size

If these animals eat Manjanos they should stay permanently in your tank since Manjanos probably can’t be eradicated.

3.3 Keeping Xenia under control

Xenia isn't a pest in the usual sense. They are almost always introduced deliberately into our tanks.
You should stick to the following procedure to avoid any nasty surprises.

3.3.a Keep Xenia population stranglehold

- Xenia should always be fixed on obstacles, so they are not washed away (Smaller stone, conch shell, ...)
- Place this at locations with "no contact with reef rock, other invertebrates or glass" (eg in the sand).
- There should always be a distance of min. 5 cm to other objects or animals in all directions.
- Regard growth of small colonies. The larger the object, the greater the colony will be later on.
  Rule of thumb: Xenia in all directions grow up to 10 cm on the subject.
- Check Xenia population each 2 weeks and thin out:
  - Generously remove and dispose all motile, constricted polyps.
  - Remove Xenia attached to other substrate or floating around (use
-
- Gegenstand mit den Xenien an einer Stelle anbringen die keinen Kontakt zum Riffgestein, anderen Wirbellosen oder Glas hat (z.B. im Sand).
  Der Abstand Xenien zu anderen Gegenständen oder Tieren sollte in alle Richtungen min. 5 cm betragen.
  Dabei ist auch das Wachstum der evtl. noch kleinen Kolonie zu beachten. Je größer der Gegenstand, desto größer wird die Kolonie werden. Faustregel: Xenien wachsen in alle Richtungen bis zu 10 cm über den Gegenstand hinaus.

- Xenien-Bestand in regelmäßigen Abständen von ca. 2 Wochen kontrollieren und auslichten:
  - Dabei großzügig alle frei beweglichen, abgeschnürten Polypen Entfernen
    und anschließend Entsorgen.
  - An anderem Substrat festgewachsene oder angespülte Xenien ebenso entfernen.
    Use spatula, toothbrush etc.

3.3.b Destroy unwanted Xenia-colonies

Unlike Aiptasia or Manjanos, Xenia can be cut by mechanical injury.

Remove new growing and small colonies BEFORE they grow into large and maybe uncontrollable colonies.

There are various suitable methods:

- Pull / peel of the polyps
- Scrape or chisel out (spatula, brush, screwdriver, ...)
- Spray with concentrated hydrochloric acid or use calcium hydroxide mash.
  Remove slimy leftovers.
  (Hint: Skimmers typically work stronger during this time)

3.4 Keeping Zoanthids/crusts under control

When working on Zoanthids of the genera **Protopalythoa** and **Palythoa caution is advised**. Spilled toxins can cause symptoms of poisoning. This applies ONLY to those specific anemones.

For safety reasons, especially when working on colonies of these animals and outside your tank, to destroy/reduce larger colonies, use goggles and respirator! Otherwise you risk that strong poison gets in contact with your eyes, mucous membranes and so on. Finely dispersed particles can enter your lungs through the air. Use alkali resistant protective gloves to work with these animal. This prevents that the poison gets in your bloodstream through mechanical injuries.

New life rock with crusts / disc anemones should generally be placed in a way, that these animals do not stand close to other invertebrates or “hard to reach” areas of your reef. Optimal is a separate stone, with the option “to be necessarily/temporarily removed from your tank” (island solution). No other rocks/animals should ne “overgrown” unintentionally.

Zoanthids/crusts can be maintained at excessive propagation follows in check:

- Depending on the location
  - peel off from substrate (scrapers, screwdrivers) or
  - Chip animals together with the substrate / life rock (chisel, screwdriver)
  - Remove smaller animals or remaining residues with a toothbrush
- Subsequently increased skimming

- For easier handling, the substrate with adhering animals can be taken out of the water.

The use of predators is usually not advisable because they would indiscriminately eat all Zoanthids and other invertebrates.

3.5 Getting rid of Hydropolypes

Even in the presence of only individual polyps there is a very high risk, to get a massive plague long term. You should therefore remove these pests immediately!

There are several methods to reduce the number of polyps (mechanical removal by plucking off, brushing, vacuuming, spraying, boiling water ...).
The experience of several aquarists, however, shows that in the long run polyps will grow. Steady reduction of polyps is cumbersome and complicated and therefore can not be recommended.

Light deprivation leads only to slower propagation, but not to eradicate polyps. This is true even if it stops over several weeks. Covering as with aluminum foil is not recommended.

Currently there is no method known, to exterminate Hydropolypes certainly.

You should therefore definitely avoid adding any substrate with adhering hydro polyps. Likewise you shouldn't add animals / invertebrates from infested tanks into your tank (risk of self-infection).

Infested stones should be very quickly removed from your tank. You should even remodell your whole reef, as expenses/workload is clearly preferable compared with a potential hydro ploype plague.

Freßfeinde

Rhynchocinetes durbanensis (Durban dancing shrimp)

It is reported that they eat hydro polyps. More accurate information is not available to me.
However, this shrimp is also a predaor of disc anemones, anemones and some soft / stolonifera such as Reminders. The use in reef aquariums is therefore be critical.

Centropyge loriculus (Flame angelfish,)

Some specimens eat polyps.

Pygoplites diacanthus (Royal Angelfish)

Hard to nourishing fish. Only partly reef aquarium proof;
Besides leather and soft corals eats also LPS,SPS and Tridacna clams, (Haupt. Newly added animals).l.

Salmacis Bicolor (Two colors urchinsurchins)

Some animals should eat hydro polypes, but are sub-optimal for reef tanks as they are eating also soft corals.

When using predators you should generally consider borne in mind housing conditions and tank size

3.6 Getting rid of Acropora swirl worms / preventing new infections

a) Treating affected corals

Remove coral from your tank and make a iodine bath in a suitably large container.

Hints:

Remove all coral branches with are dead or have clear signs of disintegration. Only healthy fragments with remaining tissue should be maintained.

The egg clutches of flatworms are not killed by the treatment. Remove manually through scraping (a suitable tool is a small scalpel).
As often not any scrim is detected/removed, repeating the iodine bath is recommended after a few days. This kills also juveniles flatworms hatching from of eggs.

b) Prevention of new-onset coral

In case you are unsure whether new corals are affected, they can be treated with a iodine bath BEFORE putting them into your tank. However, one must be aware that this can be critical to already fragile animals.

c) Using **predators**

Platyglossus Marginatus/Halichoeres Marginatus is eating acropora swirl worms.

As always when using predators you should consider borne in mind housing conditions and tank size. P./H. Marginatus will grow up to 18 cm and thus can be used only in big tanks.

3.7 Getting rid of red flatworms (Turbellarians)

There are several ways to get rid turbellarians. I recommend to start with more benign methods (methods A & simultaneously b, maybe also c). You should evade to d/e) only when not being successful.

Method e) is indeed a 100% guarantee of success against the turbellarians but various pools killed their tanks with NOT ACCURATELY using this method.

a) **Reduce Silicates to → 0 mg/l**
Hint: Silicates in your tank will automatically lead to diatoms, as they need silicates for their shells. Diatoms in turn serve as food for turbellarians. If enough food is available, turbellarians multiply rapidly.

Ensure 2 things:
1.) Silicate in your tank should be **bound** and removed by use of **silicate-absorbers**.
By the way, almost all phosphate adsorbers bind silicates and can thus be used also.
2.) Make sure that your starting water is, and remains, silicate free (Link)

b) **Regularly remove turbellarians from your tank**

Use a thin tube and the "light traps method":
- completely darken your tank (no light, or evening)
- place a flat object (eg a saucer) to an appropriate location in your tank and put some sand on it
- Illuminate this point with a strong/focused source of light
→ turbellarians movers will move to that spot
- Remove turbellarians by vacuuming, or by removing the object (turn your flwo pump off!).

c) Using **predators**
Chelidonura varians (ca 25.-€)

This worm is a food specialist and feeds exclusively on flatworms. If no appropriate food is available, it dies. They should therefore only be used in tanks with heavy infestation.

Sometimes and depending on other food offered, also **Pseudocheilinus hexataenia** and some **Pterosynchiropus splendidus/picturatus** (LSD/Mandarines) eat Turbellaria.

picture: Peter Huber
www.korallenriff.de

As always when using predators you should consider borne in mind housing conditions and tank size.

a) **Treatment with „Flat control“ & Co**

For some time there is a lighter chemical mace against flatworms.
It is reported that it acts against many, but not all types of flatworms.

The dosage should be strictly according to instructions of use. Don't use active charcoal, ozone adsorber, zeolites etc during treatment. The agent should biodegrade in the pool after a few days. Side effects on corals and invertebrates should be kept very limited.

Also for treatment with these agents, it is highly recommended to remove as many flatworms as possible before. This prevent unnecessary risk of releasing toxins into the water.

b) **Treatment using "Concurat"** (Usage: Link)

Concurat acts 100% against Turbellarians, but is also a risky cure.

 Dosing EXACTLY according instructions is a must.

Besides risks through the drug itself, quickly dying turbellariens release their toxins. You need to reduce the population heavily before you start the cure.

Reported side effects:

- Destruction of various other animals /micro organisms / micro-fauna with appropriate other side effects like rising nutrient levels. Tank biology usually has to develop again after treatment.

- Negative changes to SPS, reported by several aquarists (others reported this was absolutely not a problem, I expect this to be a problem of a raised nutrient level)

- Fish are affected by the drug, at least in part, probably due to the toxins from dying turbellarians.

3.8 Getting rid of Red-Bugs

There are some predators of Red Bugs.
This can be used as prophylaxis, but usually is not enough to fight a massive Red-bug infection.

- Pterosynchiropus picturatus / Pterosynchiropus splendidus (Mandarin fish)
- Pseudocheilinus hexataenia (six-stripe-wrasse)
  Corythoichthys haematopterus (Liegende Seenadel)

Treatment with the „Interceptor“

Yo need the drug “Interceptor” from Novartis which needs prescription. It can be obtained from the veterinarian, and in some countries can be purchase by internet. The most important part of Interceptor is milbemycin oxime. It is normally used to treat internal parasites in dogs and cats, but is also operative with crabs / crustaceans.

Attention this drug also affects/kills crabs, shrimp, amphipods, copepods.

Treatment option-1: Treat infested coral in a quarantine tank.

Recommended before individual/new corals with Red-bug infestation should to be introduced to your tank.

Treatment option-2: Treat infested corals in your tank

Applicable once you already have red-bugs infested corals in your tank

Instruction/Dosing Interceptor

1.) Determine the water volume to be treated as precisely as possible
(If treated inside your tank, also water in the circulation/piping/Skimmer/sump etc is taken into account)

2.) Determine proper dosage of the drug and possible fine Grind the medicament.

Caution: The dosage must be as closely as possible

Select appropriate type from the 4 different types of tablets.

INTERCEPTOR [milbemycin oxime]	Colour packaging	For dogs with weigth..	1 Tablet for xx Liter water volume
2,3 mg	braun	1-4 kg	145 Liter
5,75 mg	grün	4-11 kg	360 Liter
11,5 mg	gelb	11-23kg	720 Liter
23,0 mg	weiß	23-45kg	1440 Liter

- Larger tablets are slightly cheaper
- Smaller ones may be dosed more accurately

ntermediate quantities can be produced by
a) using parts of the tablet or
b) weighing the down-grinded powder or
c) mixing / diluting the powder with tank water,
so that it can be dosed e.g .: with a syringe

4.) Stop Filters / Adsorber s
(Skimmer, silicate / phosphate absorbers, carbon, ozone, UV clarifier)

5.) Remove any crabs and shrimp located in your tank.

6.) Place weighed amount of drug into the pool.
Given previously well dissolve in pool water or osmosis water.
Caution: drug is poorly soluble, mix well.

7.) Treat for ≥6 hours

8.) Immediately thereafter, perform a 25% water change, turn filter systems on
and begin to filter out the drug with activated carbon

9.) 24 hours later, perform a 25% water change, erneuter Wasserwechsel von 25%, Aktivkohle erneut austauschen

10.) Repeat steps 1. – 9.) for ad minimum another 2 times

1. Treatment: Kill adult red-bugs
2. Treatment: Kill after hatching red-bugs
3. Treatment: for safety, possible further Hatching red-bugs

The reproduction cycle of the Red-bugs is not yet known.
Tested and fine is a Treatments over 7 days in total

The treatment steps 8) + 9) can be omitted in a quarantine tank for treatment.
The water of the quarantine tank must then be disposed / refilled each time.

After the first treatment, usually some (already dead) red bugs are still sticking to the corals. This is normal. You can remov by blowing with flow pumps.

Other important details:

- There must be a treatment of the entire system.
- Otherwise, red bugs can survive in the open water (or ind disconnected filters) or grow from larvae.
- All system components of the basin which contains water must be treated as well, or you have to discard this water (Refuges, skimmer, etc.)
- Side effect: Mysis, small shrimps and crabs are usually killed as well.
- The treatment is relatively new. The results have been very good. No other side effects are known so far.

3.9 Getting rid of Montipora eating snails

a) Treating affected corals

Remove snails visible on the corals before.
Remove coral from your tank then and cure by doing a iodine bath in an appropriately large container.

Remove already infected / eroded parts of the corals as generous as possible. The coral is already severely damaged at this points, and often snail eggs are also removed by doing so.

Additional hints:

Egg-nests are not killed by the treatment.
If Egg-nests can't be easily removed, scrape them off (eg by a small scalpel).

As you almost always do not discover all scrim, it is recommended to do multiple repetitions of the iodine baths after some days. This kills also growing juvenile snails and stops the plague.

b) Prevention of new-onset corals

Examine new Montipora corals for any contamination.
Iodine baths are not too useful because:
- Adhesive egg masses are not killed
- Already ailing corals are subjected to further stress

It is better to not use contaminated corals

c) Predators

Halichores Cryssus (Canaria wrasse) likes to eat Montipora eating snails.
It can either be used prophylactic (to prevent a plague) or as fighting against an existing plague.
However, the fish only eats the worm, not the egg masses.
Sometimes not all infested areas can be accessed and thus not all areas can be cleaned.

As always when using predators you should consider borne in mind housing conditions and tank size.

3.10 Getting rid of Tridacna eating snails

There would be most probably several predators of these parasites.
Unfortunately, they are nocturnal, so this method does not work.

The removal of this worm is somewhat complicated.
However, with a little patience you will reliably kill them. :

- Wait for the correct Time: 30 minutes after all lights in the tank and also room are off
- Illuminate the clam with a flashlight - to see the parasites.
  The snails crumble the hard shell of the clam and begin to suck on the clam itself.
- Access your tank to remove parasites/worm with tweezers and dispose them.
- The treatment can be repeated after about ½ hour to hunt escaped snails still on the same day, as they will again make their way too the desired source of food.

- Repeat the treatment for several days.

Hint:

a) usually not all snails can be removed in one day , because the animals also flee and hide.

b) hatching snails must be removed as they are still juveniles and BEFORE they can post new egg packets again and thus reproduce further.

-

3.11 Getting rid of Asterina (mini) starfish

This starfish can easily be taken off from glass and reef rock. If this is done every now and then, this is fully ok to prevent a possible plague.
Has the population once grown overhand, collection and removal might be some effort.

Hymenocera elegans and **Hymenocera picta** (both Harlekin-shrimps) are very effective predators of starfish. Already one of these, very attractive, shrimp is enough to clean up even many Asterinas.

2 things need to be considered when inserting Harlequin Shrimp:

- They feed not only on Asterin, but mercilessly attack also other, larger starfish species. Digging starfish are even attacked in the sand. They also eat the suction feet of sea urchins, sometimes sea urchins itself.

  Starfish and sea urchins thus MUST be removed before inserting!

- They are food specialists. If there are no more starfish available shrimps are starving.
  Once the animals cleaned up with the Asterinas, they should either deliberately feed (for example, with frozen starfish) or given to other aquarists with an Asterina Plague.

Keep these beautiful animals from deplorable starvation!

Harlekin-shrimp
Eating starfish

There is also another starfish of the genus Asterina, which likes to eat smaller starfish: **Asterina gibbosum** (pentagon starfish). Though not comparable to the speed of a Harlekin shrimp, this guys unfortunately also feed on anemones, disc anemones and stolonifera,

3.12 Removing worm snails

There are several methods to remove this stuff, which can also be combined:

- Mechanical removal
  (Meaningful for easily accessible places and at skeletons of stony-corals)

- Closeing their tubes with coral glue or super glue

- Killing with calcium hydroxide mash, concentrated hydrochloric acid, etc.

If you recognize rapidly proliferating population, this is often due to excessive use of very fine / dust feed → Stp this.

Predators

Parrotfish.
Unfortunately this animals are poorly maintainable in reef aquariums as they feed also heavily on corals.

3.12 Removal of Bristleworms

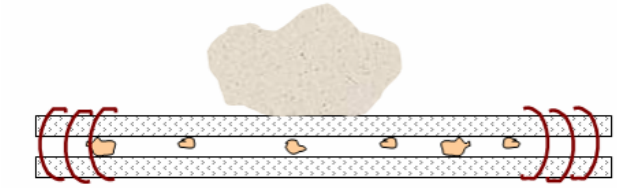
Don’t touch with bare hands. Contact is unpleasant, and especially painful for fire bristleworms and Jaw bristleworms.

Do Not tug/tear at bristle worms, because it can lead to tearing. From each section new bristleworm might form.

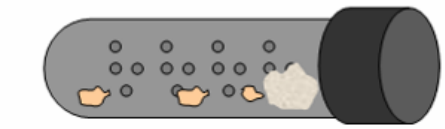
Reduction of bristleworms
(for smaller bristleworms)

Too big population can be reduced by putting up bristleworm baits.
Install the baits before turning off your lights in the evening.
Remove them when switching on the lights again.

Bait type-1: pieces of clam meat or larger Mysis are sandwiched between 2 thin slices of styrofoam (not too thick, because of lift!). These discs are e.g. fixed by rubber. The bait is either weighted with a stone, or covered with sand.



Bait type-2. A mutually closed plastic tube is provided with holes. Suitable are e.g. Film containers, tablet tubes, etc.. The diameter of the holes is, depending on size of Bristleworms 4-8 mm. Different sized holes will catch different sizes of bristle worms. The holes should not be too large, as smaller bristle worms can flee otherwise. To make the bait stay under water, put a small stones into it. Fill with pieces of clam or Mysis.



For larger bristle worms, more heavy weapons have to be deployed. The best measure is to take the affected stone outside of your tank and remove the worm there. Sometimes only disassembling your whole reef leads to success.

Predators

Several wrasses are good eaters of bristle worms

- Halichoeres iridis / Biochoeres iridis
- Halichoeres lapillus / Macropharyngodon lapillus
- Halichoeres leucoxanthus / Biochoeres leucoxanthus
- Halichoeres timorensis
- Anampses femininus
- Anampses melanurus
- Coris frerei
- Allocoris formosa
- Bodianus mesothorax
- Bodianus anthioides
- Macropharyngodon bipartitus
- Macropharyngodon choati

Hint: These animals also eat snails and sometimes shrimp

Other predators among fish are

- Valenciennea coeruleopunctata
- Canthigaster coronata
- Ostracion cubicus

and

- Stenopus hispidus
- Stenopus pyrsonotus
- Buccinulum corneum
- Lambis crocata / Lambis scorpius

As always in fish and other predators husbandry, tank size is
to be considered and possible rivalries with other inmates have to be checked

3.13 Removing crabs, crustacean etc

Crabs are very resistant. They even survive for several days out of water, spraying with fresh water, hot water, etc..

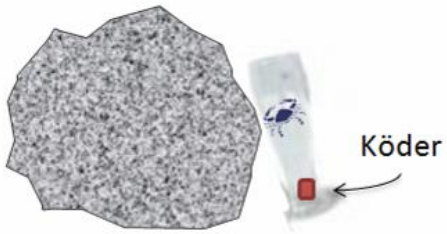
Discover crabs in your tank in complete darkness. Often they are relatively shy and disappear even if they are illuminated only with a flashlight. However they do not react to red light!

When trying to capture mantis shrimp, caution is advised. These animals can injure even humans. Almost perfect instructions, refer to Timmy Grohrock's Homepage

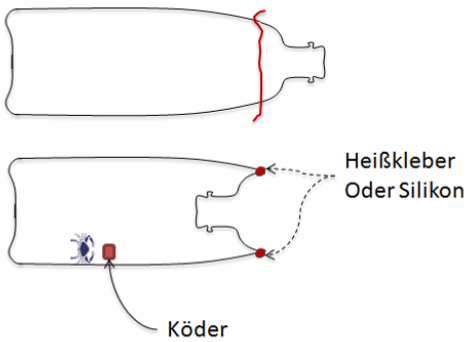
Catch crabs by a crab-case

Crab trap 1: - Place a tall glass at a slight angle and with the opening upwards, to a place in the close to the crab shelter in the reef.
- Put some interesting food in the glass (shrimp, fish-stint, ..) and fix a heavy part to it so it can't flow away

.



Crab trap 2: - Cut a pla
Glue both parts together with hot melt glue or Silikon as shown in the sketch.
(even better is to drill through and fix with cable ties to secure together.)
This makes it easier to remove animals.



- Put some interesting food in the glass (shrimp, fish-stint, ..)Anyhow, success of this traps is uncertain. Usually it takes several days until crabs enter the trap in order to get the desired food. However, other residents (for example hermit crabs) could also get caught which must then be freed.

Being permanently unsuccessful, removing the stone/part of the reef containing the crab from your tank is another option. The main advantage is that the crab can no longer flee to other stones and you can more easily catch it. Try to lure the crab with an appropriate instrument under the cave or press against it. If also that does nothing, chip off the affected part of the stone with a hammer and chisel. The last option is to remove the stone (including the crab) from your tank.

Please, always check if you can't keep this animals within your sump, or another reefer will take it.
Discarding should only be the (last) emergency option!

3.14 Stopping RTN

The destruction of tissue can kill corals partially very fast. The following procedure is recommended in order to save parts of RTN affected coral sticks:

Step 1: Produce **optimal conditions, supporting coral at healing process**.

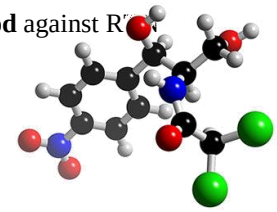
- Water temperature 24 - 26 °C
- Low nutrient levels (N_3, PO_4), evtl. durch Wasserwechsel
- Ensure that the coral would collect
  a) sufficient but not excessive water flow
  b) sufficient light at correct light spectrum (change HQI/T5 ≥ 1 year old)
- Ensure that the coral is not verne puzzled by other animals.
  (No direct contact with other corals, as well as no contact by battle tentacles of other corals)

Step 2: **Remove dead coral fragments**

- Generously clip/break of already dead parts of the coral itself, even within still healthy tissue
  (Infected tissue must not affect not-infected tissue !)
- Re-Settle/glue remaining fragments at appropriate locations in your tank/quarantine tank.

Step 3: In case this does not work either, a last chance is to do a iodine bad with the already RTN infected coral

Only if you have a massive infection you should consider using the **Chloramphenicol-Method** against RTN by Dr. Bingman.



This would need the antibiotics **Chloramphenicol** *1), **Lugol's (iodine-) solution**, and a **bleach** (e.g. Clorox)

*1) only available on prescription

1. Preparation: 30 minute iodine bath in a thinned solution from saltwater/iodine.
This kills lots of bacteria, minimizing the risk of a antibiotic resistance.

Dosing: 0,5 ml Lugol's solution on 1 Liter salt water

2. Treatment: Bathe coral for 2-3 days in a separate tank in Chloramphenicol.
Exchange/re-new the Chloramphenicol-bath each 24 hours

Dosing: 10 to 50 mg Chloramphenicol on 1 Liter salt water

3. Aftercare: Before putting the coral in your main tank
repeat step-1 in order to kill surviving Micro-organism

It must necessarily be carried out all 3 treatment steps. Otherwise,
there is not only the risk of reinfection by now (Chloramphenicol)-resistant RTN pathogens,
but also a high risk to get even more (chloramphenicol)-resistant microorganisms into your tank.
The consequence could be much worse than originally occurred RTN!

The chloramphenicol-bath must not be simply poured down the drain after use. This might cause chloramphenicol resistant microorganisms spread in the sewers. It must be rendered harmless before by bleach (as Clorox).

Chloramphenicol is classified as potentially carcinogenic.
Processing only with gloves and mouth guard, secure funds from misuse and keep away from children.

3.15 Stopping Brown Jelly

First of all, you should do everything to prevent Brown Jelly through preventive actions:

- Providing optimum conditions for rearing of your corals
  - salinity at the right level and kept constant
  - Temperature within optimal range (24..26°C)
  - Good water flow being not “too strong”
  - Good source of light
  - low, but not 0 nutrient levels
  - Ca,Alk, Mg Levels within optimal range.

- prevent weakening of coral by battle tentacles from other corals or attacks from predators

- Prevention of mechanical injuries of coral,
  which are often the starting point for Brown Jelly

Treatment of diseased corals.

- Turn of flow pumps in your tank for a short period of time.
  This stops the distribution of the pathogens within your tank.

- Minimize distribution of coverings within your tank (risk of infection further corals)!
  Carefully and thoroughly vacuum gelatinous brown coverings and dispose them.
  Adhering BJ pads can be solved by gentle brushing.

- Clip/nip off infested areas of the corals generously and discard them. They can’t be saved anyhow.

- Treated corals should be maintained/cared at good water parameters.
  Turn on flow again.

- In case of follow-up infection → repeat treatment

Using an Antibiotics cure is another, but questioned, methode to save BJ-affected corals.

Antibiotics would be Chloramphenicol, Metronidazol or Dimetridazol. Duration of treatment 30 min.

Treatment must be outside the main tank, and only in a suitable quarantine tank. Professional treatment of corals after antibiotics-cure, including a proper disposal of antibiotic contaminated water is strongly recommended.

Iodine baths are literally without any use for BJ.

Sweat water baths, are also no good choice, as they weaken the already ailing corals.

Unfortunately there are no predators against BJ.

Appendix

A1: Calziumhydroxid–mesh method

- Mix 1 heaping big spoon of Calziumhydroxide witht ~10ml water.
  (eg..: AquaMedic Kalkwasserpowder)
- Heat up, in the microwave for ca. 30 secs, avoiding boiling
- Fill the resulting liquid slurry into a plastic syringe.
  Remove the syringe plunger eases this working step.
- Inject the slurry from about 1 cm distance and completely cover the animal to be killed.
- Turn off flow if possible. This eases the process.

A2: Ways to keep your output water silicate free

Up to mid-sized tanks, use of a **reverse osmosis unit** with additional **ultra pure water unit** is a reasonably cost-effective solution for clean water. The reverse osmosis system alone already removes almost all unwanted trace elements of the source water, but NOT silicate (which is only removes about 10-20%). They are completely "bound" in the ultrapure water unit, namely the fact that the water is forced through a so-called "mixed bed resin". This is a consumable and has to be changed from time to time and depending on the amount of silicate bound. Once it is time for changing, usually diatoms occur in your tank.

Note: In some areas, the output water is completely free of silicates, however, in other not, or not always. Several waterworks temporarily and consciously add silicates in winter to preserve the water pipes. You should consider using an ultrapure water unit once you are not 100% sure.

For smaller aquariums it might be the better option to "purchase distilled water" instead establishing a osmosis unit.

For further details, see my water-parameter-FAQ

A3: iodine bath for corals

Corals have to be removed from the tank, in a suitably large container to be able to undergo an iodine bath.

- Mix iodine bath from **Betaisodona solution** *1) and **tank water** (saltwater)

4 ml Betaisodona	for **1 Liter** saltwater

*1) Betaisodona solution (liquid) available at drugstores or Online shops,
30ml/4.-€ or 500ml/20.-€

Warning: Do not inhale vapors. Otherwise risk for flu-like symptoms!

- Put the coral into the iodine bath and invert it for a period of ~4 minutes.
- Weakened parasites will from off the coral and can then be disposed
- free coral from the adhering iodine radicals
(Clean by flow pump OR rinse in a second container by shaking in saltwater)

- Place coral within your tank after treatment

A4: Extermination of (red) flat worms / Turbellarians with Concurat

- At first, necessarily and consecutively over several days, aspirate as much as possible turbellarians!
- Operate it to this Tips.
  Reason: Some turbellarians contain toxins that they release when dying as a brown-red liquid to the water.
  
  Attention: If this step is omitted/disregarded there is a high risk that your tanks animals suffer/die from toxins!
- temporarily disable all filters / adsorbers (skimmer, no activated coal, no UV clarification, etc)
  Also ozon should be shut down already some days prior to treatment if used.
- Flow pumps in the tank should not be turned off in order to distribute the medication
- Dose the Concurat L
  (Manufacturer Bayer, PZN 1821667, available at your veterinarian by prescription)
  Dosage: 7,5 g Concurat for 1000Liter Beckenwasser
  previously solve determined amount in tap water and then add to your tank.
  (Rule of thumb: 10g Concurat / 1L tap water)
- Also not/poorly reachable parts of your reef must be reached now, in order to distribute the medication!
  (eg by manually disadjusting your flowpumps)
- Duration of treatment: 20 - 30 Minutes.
  Observe your fish during the treatment, because they might act negatively to the toxins of dying turbellarians, and possibly also on the composition itself.
  Immediately cancel medication (filter out Concurat) if any problems become visible, by using activated carbon!

- Filter Concurat Subsequently from your tank by carbon filtration with good and fresh activated carbon.
  Turn on skimmer/filter and adsorber on again.
  Your skimmer will work stronger for the next hours, because of the dead biomass that is removed.

- Repeat identical treatment after 7-10 days to kill also baby turbellarians hatching form eggs!

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Christoph Klose	Pictures, corrections to content	
Sabine Sax	Pictures, corrections to content	
Robert Baur	Acropora Strudelwürmer...! Was tun?	www.Korallenriff.de
Peter Huber	Erfolgreiche Bekämpfung von Planaria	www.marin.de
Harald Mülder	Turbellarien im Korallenriffaquarium (Teil 1 und 2) Brown Jelly, die moderne Geisel der Korallenpfleger	www.Korallenriff.de
Daniel Knop	RTN-Behandlung mit/ohne Antibiotikum	
Dustin Dorton	Interceptor treatment of red-bugs	(ORA = Oceans Reefs and aquariums)
Gregory T.Ho	Macro-pictures of red-bugs	www.ximinasphotography.com
DATZ	Calciumhydroxidbrei-Methode	www.datz.de
Michael Mrutzek	Jodbad für Korallen	www.meerersaquaristik.de
Eric Borneman	Mything the point	

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