Friend or Foe

Part 2

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DIGITAL IMAGES: PAUL STAFFORD

The first article in this series centred on the unicellular protozoan inhabitants of reef aquaria – namely the foraminiferans. This time we will look at some of the simplest multicellular animals that occur with regularity in reef aquaria.

Sponges (Porifera) are a relatively large group of very primitive animals that are represented by almost 5000 marine species. Not confined to tropical seas they can be found wherever a suitable substrate can be located with access to food. Substrates can include rocks, pebbles, occupied or vacant shells, coral skeleton etc.

Sponges are probably the most common hitchhikers associated with live rock. A quick scan of the live rock and invertebrate pieces at Cheshire WaterLife revealed not one piece was entirely sponge free.

So how do we recognise a sponge? Can they be confused for other organisms? Throughout this series I will attempt to give the reader the key identification points which separate the groups of organisms wherever possible. But first some more information about the sponges is necessary.

Sponges are quite specialised animals – the fact that they cannot move led early naturalists to believe that they were plants. Indeed, they superficially resemble fungi in some respects so it's understandable that people may get confused!

In simple terms, sponges are a series of water canals surrounded by tissue. Lining these canals are specialised cells called choanocytes. These possess a flagellum or small hair which, when it beats, produces a water current that draws water through special pores in the walls of the sponge (hence porifera). With the water comes food particles in the form of phytoplankton and zooplankton which the choanocytes also collect. The water then leaves the sponge through a much larger orifice called the osculum. It is this structure which provides the best clue to identifying sponges in the aquarium. Sponges come in three basic forms:

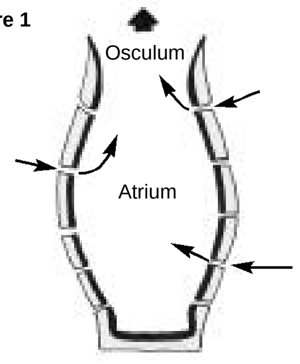
Asconoid – Figure 1
Syconoid – Figure 2
Leuconoid – Figure 3

Asconoid sponges are very simple – the main body consists of a single tube lined with choanocytes. This structure limits the size of the animal and asconoid sponges are quite small. The syconoid sponges have overcome the limitations of the simple tubular body by folding the body wall enabling much greater numbers of choanocytes to be crammed in and therefore water currents are easier to generate in larger specimens. Leuconoid sponges take this a stage further by abandoning the tubular body form in favour of a much more complex series of canals punctuated at intervals by pockets of choanocytes. This means that their body size is far less constrained and some leuconoid sponges reach over 2 metres across!

Of the many hundreds of species that can potentially occur in reef systems most are actually harmless and provide colour and interest for the aquarium. A good example is the syconoid sponge that grows all over reef aquaria. These small (<1cm) , creamy-white tubes grow and thrive in areas where there is good flow and usually away from direct lighting.

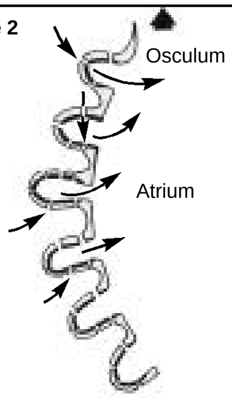
There is one group however that can be a nuisance. The so called "boring Sponges" that act like dry rot and eat away at rock surfaces are unlikely to have any direct effect on living corals although they can weaken live rock and potentially cause a rock fall in the aquarium. This is something that the aquarist must live with as the upheaval caused by checking each rock for sponge and for the aquarist to

Figure 1



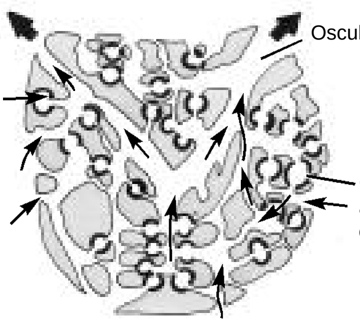
Cross section of an Asconoid sponge showing simple structure of body wall plus porogites. Inner black area shows location of choanocytes. Arrows indicate direction of water current.

Figure 2

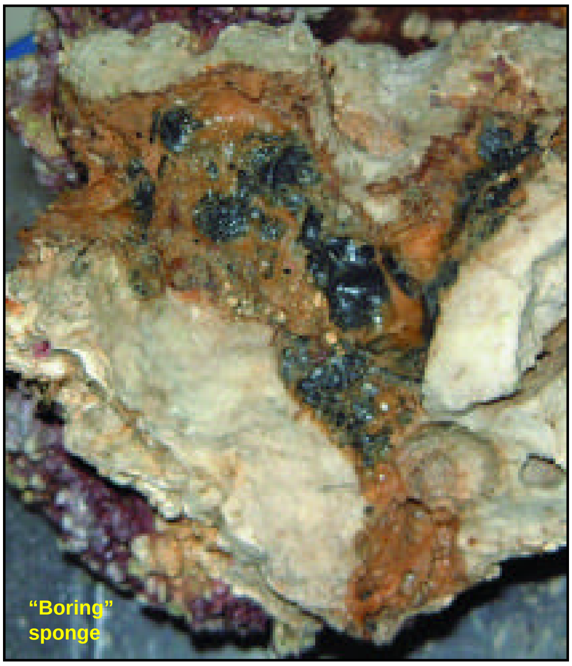


Showing the body wall folding that enables a greater number of choanocytes to be packed in than present in asconoid sponges

Figure 3



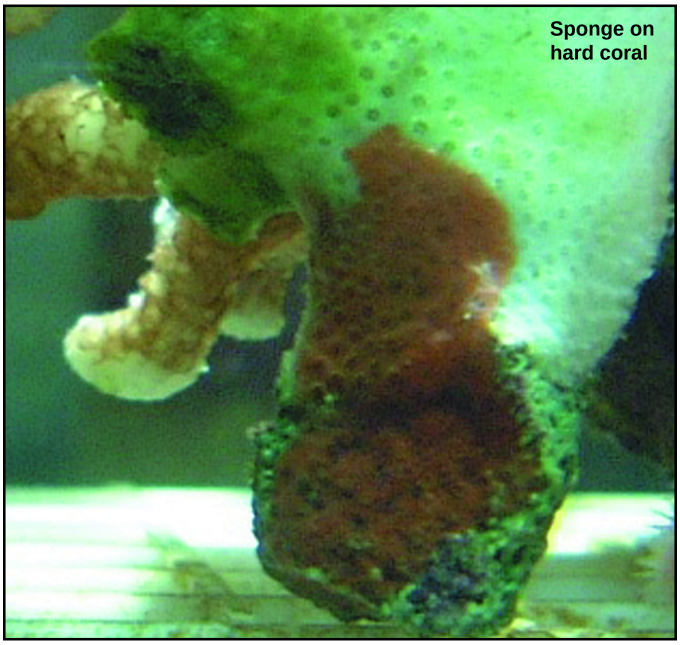
A leuconoid sponge showing great modification of asconoid + syconoid body plan


“Boring” sponge

separate boring sponges from harmless ones is probably more harmful than the sponge itself.

Another cause for concern is purchasing a specimen piece of coral that has a dead or dying sponge on it. As anyone that has cured live rock will tell you, decomposing sponge is nasty stuff and can create a great deal of pollution. Check any suspicious pieces for a white film, sometimes with gas bubbles beneath, caused by a bacterial growth on the decomposing sponge or for the odour – which is disgusting!

However, sponges occurring with specimen pieces of invertebrates can prove useful in determining the correct position of a coral and the amount of particulate food material that may have been available to it. For example, a piece of soft coral such as *Nephthyea sp*. that is imported on rock with evidence of a lot of sponge growth is likely to have been collected from an area with regular supplies of phytoplankton or zooplankton available to it. With the advent of products such as phytoplex, marine snow and plancto there is now no excuse for the aquarist not to experiment with the feeding of his/her corals. Similarly, the purchase of some specimen pieces of sponge such as the common blue tubular form will often be accompanied by information stating that the sponge will only grow in shaded areas. Given that almost 50% of the blue sponge that passes through our premises is associated with *Porites sp*. hard coral – renowned for its love of flow and light – this cannot be wholly accurate. I am not suggesting that all sponges should be kept in brilliant light but this is food for thought. Check the rock your invertebrate purchases are found upon for a valuable insight into their position on the reef.


Sponge on hard coral

The figures below show some of the species regularly appearing on live rock and invertebrate specimen pieces.

So the clues for identifying sponges are as follows:

The specimen must be sessile i.e. it doesn’t move. The exception to this rule are the yellow moon sponges which do move around to a certain extent but they have no organs of movement, relying instead on un-attaching themselves from the substrate and allowing their fate to be decided by currents. They then re-attach when they find a suitable new home.

Specimens always possess at least one osculum. In some specimens such as *Chondrilla sp*. – the so-called chicken liver sponge, any osculi can be hard to locate – but they are there.

The majority of aquarium sponges are of the leuconoid type and are also encrusting forms. They can be every colour of the rainbow.

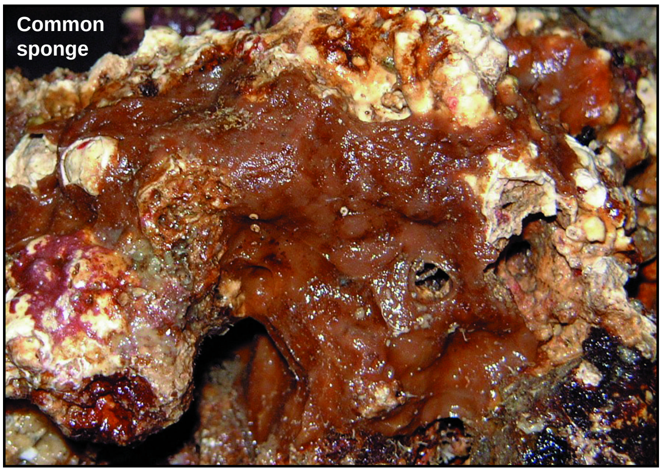
Sponges can be confused with sea squirts (Tunicates) but the latter always have paired tube-like openings in which one is significantly larger than the other. Colonial sea squirts can also resemble encrusting sponges but in the former one


Yellow Moon

can readily distinguish that the colony consists of individual members rather than the somewhat uniform unbroken appearance of sponges.

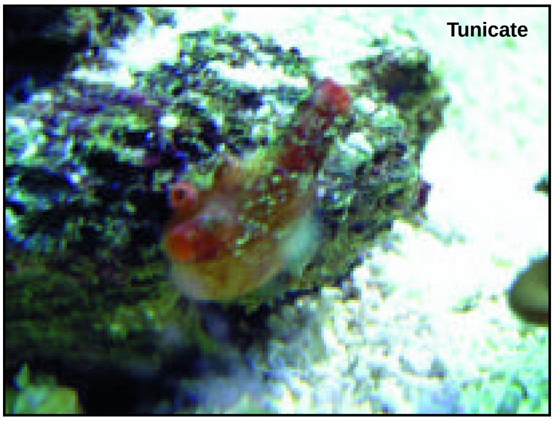
To conclude this section on sponges we can summarise by stating that they are a benign addition to marine aquaria * with the arguable exception of boring sponge species. Indeed, where they proliferate they will be removing suspended micro-particles from the aquarium water and so reducing detritus and so should be encouraged. This, coupled with their natural beauty and diversity of form makes them, for me at least, excellent and free additions to marine aquaria.

** Please note that I am referring to sponges introduced beneath corals or live rock. Many sponges that are sold as specimens can be difficult to provide the correct conditions for so please be aware of this when considering such a purchase.*


Common sponge

Flatworms

Flatworms belong to the Phylum Platyhelminthes which consists of four further subdivisions or Classes : Cestoidea , Monogenea, Trematodea and Turbellaria.


Tunicate

The former three are entirely parasitic. It is the latter Turbellarian flatworms that are of major interest in this particular series although hobbyists may experience contact with the other groups as they each contain species that are parasitic on or in fish and, of course, man.

Cestoidea – Tapeworms 3400 species
Monogenea – External parasitic flukes 1100 species
Trematoda – Internal parasitic flukes 11000 species

Of the 3000 or so turbellarian species most are free-living and marine and as with many of the groups scrutinised in this series there are good and bad representatives.

In general, turbellarian flatworms, are small to very small extremely flattened animals that are often only visible when they stray onto the aquarium glass. However, they are likely to be one of the most abundant animals in marine aquaria – particularly those containing a quantity of live sand.

The thinness of the body of these creatures cannot be overstressed. I hesitate to use the “wafer thin” cliché because they are thinner than that! Razorblade thin would be a more apt description. Think of them as a membrane with some rudimentary organs inside and you won’t be far away from the truth. Dorso-ventral flattening is necessary since they do not have a respiratory or circulatory system. Thus oxygen required by the tissues of the turbellarian must diffuse through the body wall limiting the maximum thickness a flatworm can achieve.

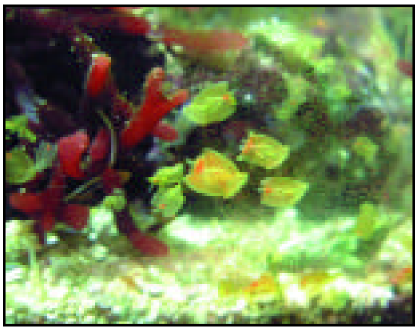
Although several species may be encountered by the aquarist, the most commonly seen form is considered a pest by all aquarists. Convolutriloba retrogemma is rusty brown in colour, with a rounded head and forked tail and is rarely witnessed over 5mm in length. It may also have a definite orange-red oval shape in the centre of the body. This flatworm is able to assimilate the zooxanthellae of damaged mushroom/disc anemones into its tissue where they provide it with nourishment – a form of symbiosis. For this reason they are often seen “sunbathing” on rocks where they lift an area of their bodies free from the substrate in order to catch as much light as possible. Light is never a commodity in short supply in reef aquaria and it is for this reason, coupled with the fact that they can reproduce asexually, that they can reach plague proportions in a very short period.

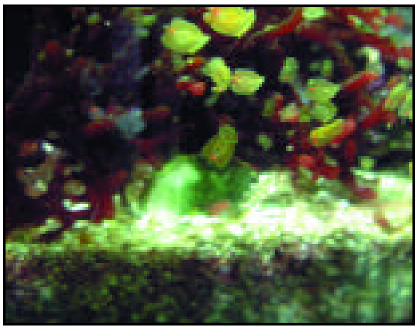
Although they do not seem to be directly harmful to reef inhabitants they can smother more delicate species as they seek the light required for nourishment.

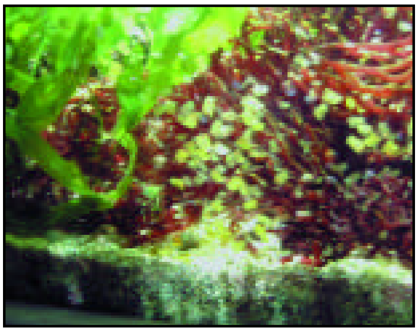
Marine Literature cites several ways of controlling these little pests including fish such as Pyjama Wrasse (*Pseudochelinus hexataenia*), Scooter Blenny (*Sychiropus sp*.) Mandarin (*Synchiropus picturatus*) and more but we have found them to be unreliable at best. Sprung 1994 cites in volume 2 of *The Reef Aquarium* the use of the nudibranch (sea slug) *Chelidoneura varians* which can consume hundreds of

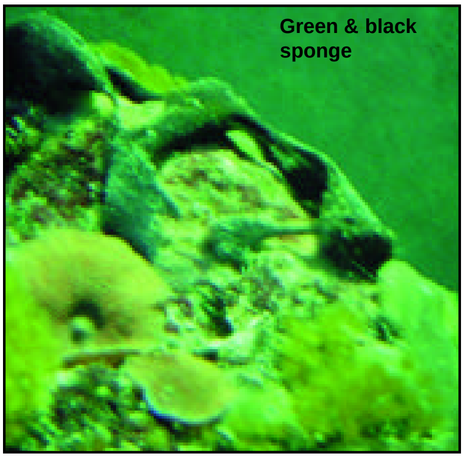
When I was a student zoologist all those years ago it was often stressed how important certain items of equipment are for the researcher or naturalist in the field. One such piece of tackle, the hand lens or magnifying glass, is of great use to marine aquarists. It can enable details of small animals to be studied and often reveals diagnostic characteristics that define a species. It also opens up a whole new “micro-world” of interest. Some of my customers have a lens on permanent standby and are able to provide me with detailed descriptions of any specimens they have been unable to identify for themselves.

Hand lenses can be purchased from most photography outlets. The ones designed for needle-workers can be very useful too as they are larger and can be used outside the aquarium with relative ease.





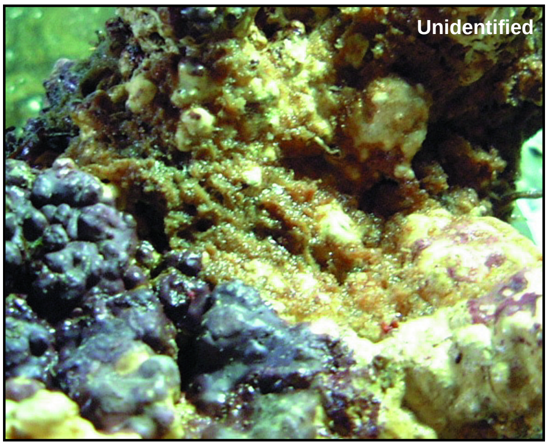



Green & black sponge

these flatworms in a day. We tried some of these and found them to be extremely short lived. Many individuals did indeed consume a lot of flatworms but we speculate that they will never be 100% effective at their removal.

Any chemical treatment for these animals is made problematic by the fact that when the flatworm dies its body tissues are released and these are toxic. Thus large-scale killing of the worms can be extremely detrimental to coral and fish health – if not lethal. Particularly vulnerable seem to be clam species (*Tridacna spp.*). So if a chemical is to be used – and there is only one that I have used to great success – I would recommend the removal by siphoning with airline hose of as many of the worms as possible before it is added.

Generally I don't like to use chemical treatments in reef aquaria. I certainly do not use antibiotics but in the case of flatworms the following treatment is the only one I have found to be successful in a number of cases. Myxazin is an anti-bacterial product from WaterLife® which is approved by them for use in marine reef aquaria. Some hobbyists may have used it to try and control protozoan infections such as Oodinium. We have found it to be very effective in the eradication of Convolutriloba. There are many opinions as to the dose rate required varying from Ω doses to double doses (half the standard recommended by Waterlife® for the treatment of bacterial infections). It is up to the aquarist which dose he or she uses and I can only pass on feedback from our customers who have reported the highest eradication rates at higher doses.


Unidentified

When the Myxazin is added the skimmer must be turned off and treatment must be on consecutive days. Keep your eye on the condition of your invertebrates – if they are going to show effects it is generally not until the second or third day of treatment when the flatworms begin to die, thus releasing their toxins into the water. It is probably a good idea to have a partial water change on hand for after the course is completed. After the treatment is over it is important that the skimmer is turned back on as this will remove most of the flatworm toxins.

Please note that the above information is a guide based on my own experiences, and those of some of my customers, with these troublesome little blighters and is not meant to be definitive. There may be invertebrates other than clams that are very sensitive to the toxins released by Convolutriloba. Another side-effect caused by the use of Myxazin is the staining of certain species of sponge – giving them an almost luminous green colour. This doesn't appear to have any detrimental effect on the sponge and will eventually disappear with time.

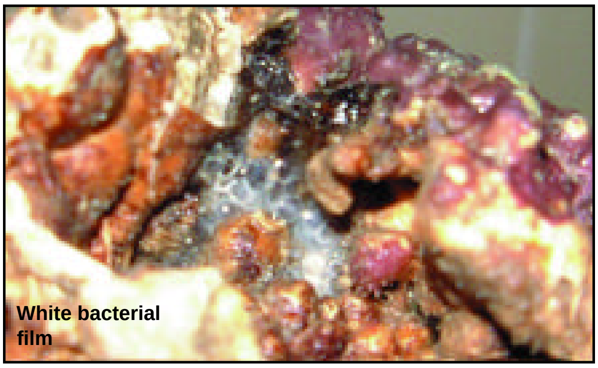
Other possible solutions to flatworm infestation include raising or lowering specific gravity and temperature but both of these have been reported with varying degrees of success and have their own inherent problems with regard to the well-being of your reef.

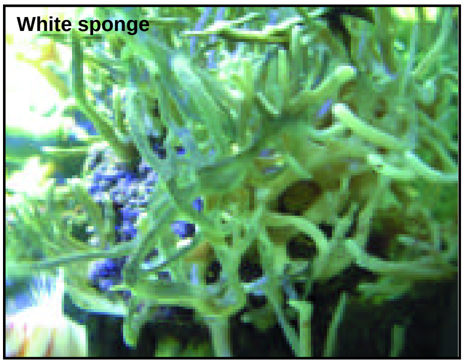
One other potential drawback with the use of Myxazin is the fact that it may very well wipe out the beneficial scavenging flatworms living on and in the rocks and sand. It is difficult to know the importance of their role in the aquarium but will they be missed? I haven't heard any cases of conditions changing significantly after Myxazin treatment so perhaps they are not a major player in the healthy reef aquarium.

There are other species of flatworm that can be parasitic on mushroom anemones and soft corals which they appear to kill by smothering them. They may not actually be feeding directly on the coral but their bodies accumulate and eventually smother the coral. Perhaps the best treatment for the removal of flatworms from individual corals is a 5-10 second dip in freshwater, whereupon the flatworms drop off and die. This could be a useful safety measure when transferring corals between aquaria.

There is one commonly encountered "good guy" flatworm which resembles the pest species in body shape and size but the outer body of the former is transparent and the inner the colour of egg yolk. These are scavengers and often proliferate in young reef aquaria, eventually decreasing in number as their food supply is exhausted.

So the flatworms can be good but are often unwelcome additions to our reef aquaria. I hope that this article has given you a little more information to base decisions on the nature of the animal life that your marine aquarium is no doubt teeming with. The entirety of the next episode in this series will centre on the Cnidarians and Ctenophores- that's corals, anemones and their relatives.


White bacterial film


White sponge

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