Friend or Foe

Part 5

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DIGITAL IMAGES BY THE AUTHOR

In the previous *Friend or Foe* article we began looking at the Molluscs that are frequently imported along with live rock and corals with particular attention being given to the gastropods – i.e. slugs and snails. This article will continue that theme as there are so many different species worthy of a mention that 3000 words wasn't enough! Finally, we will look at the other molluscan group regularly encountered in reef aquaria – the Bivalves. These include the popular clams and scallops.

Order : **Allogastropoda**
Family : **Architectonicidae**
Common name : **Box snails or sundials.**

The chequered box snail (*Heliacus sp.*) is one of the easiest molluscan pest species to spot and identify. The shell has a flattened spire with obvious whorls. This shape, coupled with the fact that this snail is generally to be found snugly ensconced in the polyps that it is feeding on is a dead giveaway for this species. Figure 21 shows an individual removed from a colony of button polyps (*Zoanthus sp.*) . This specimen was around 7mm in diameter. There are other species of box and sundial snail that have the same basic shape as *Heliacus sp.*. They share its taste for invertebrates too; some feed on hard and soft corals. For this reason any snail with this shell shape should be removed from the aquarium.

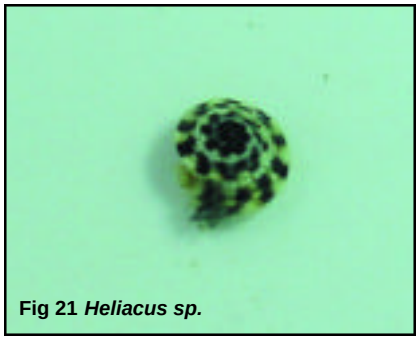


Fig 21 ***Heliacus sp.***

Order : **Mesogastropoda**
Sub-order : **Ptenoglossa**
Family : **Thycidae**
Common name : **None**

If you can spot this snail then you really do have excellent vision. The fascinating *Thyca crystallina* lives as a parasite on starfish from the Genus *Linckia* (Blue starfish – see figure 22).

The snail actually looks like one half of a cockle shell and the fact that its brilliant blue colouration almost exactly mirrors that of its host means it can be very difficult to locate even when you are looking for it! The animal feeds exclusively on the starfish so I have to recommend its removal. However, long term observation has noted that the animal seems to cause little harm to its host so an argument could be made for leaving it alone. After all, many will never be spotted on seemingly healthy starfish anyway!

Sub-order : **Ptenoglossa**
Family : **Epitoniidae**
Common name : **Wentletraps**

Unfortunately, at the time of this article going to press I do not have any images of this snail available. Wentletraps are potentially very serious predators of hard corals in particular and may arrive in association with the corals upon which they feed. There are several species in this family some of which are adapted to feed exclusively on one coral species and their coloration and shell shape reflects this.

Fig 22 ***Linckia sp.*** **(Blue starfish)**

Fig 23a *Tubastrea sp.* (Sun Coral)

Epitonium billeeanum is a wentletrap species that feeds exclusively on sun coral (*Tubastrea coccinea*) (Figure 23a). Consequently, the shell and mantle of these snails is bright orange making them difficult to spot. Removal of every snail is essential for the long-term health of the coral species.

Order : **Neogastropoda**
Super-family : **Muricacea**
Common names :
Murex shells and rock shells

This grouping of snails includes some very bad species indeed. Murex snails have typically very ornate shells, some to a very spectacular extent – they were even used as combs in some areas of the world. Muricacea have specialised radulae which are capable of boring into shells.They do this by secreting acids which break down the calcium carbonate thus giving access to the soft tissue beneath. This opens up all manner of feeding opportunities including clams and other bivalve molluscs, barnacles, corals and even other gastropods. One family, Chicoreus, is especially dangerous as they predate the ornamental Tridacnid clams and are a major problem in culturing facilities. Fortunately, murex are rare although I have found them in association with Fijian live rock. They can be incredibly difficult to see as the many projecting spines on the shell can become broken and encrusted with algae. Figure 23 shows a rock shell – another predatory muricid that was imported on a piece of soft coral.

Fig 23 Rock Snail

Some Muricid snails are wreaking havoc on the reefs of the world. *Drupella cornus* is a coral eating muricid from Western Australian waters. For an unknown reason, not thought to be a natural population fluctuation, this snail has reached plague proportions and its predation is ultimately leading to large-scale die-off of much of the Ningaloo Reef, a popular diving resort where manta rays and whale sharks can be seen. Drupella snails reach about 5cm in length and adult specimens are usually covered in heavy growth of coralline algae making their clusters around the base of hard corals difficult to spot, indeed they are usually located by evidence of their feeding behaviour (white scars on the coral) rather than sightings of the animal itself.

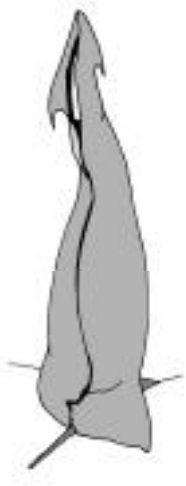
The Ningaloo reef situation reflects the potential problems an aquarist can experience when their aquarium is struck by a pest species with no natural controls on its population. Vigilance is the key!

Order : **Neogastropoda**
Superfamily : **Conacea**
Common name : **Cone shells**

Cone shells will be familiar to many people if only for the fact that they have beautiful conical shells often sold in the sea-shell trade. However, this beauty hides the fact that this family contains some of the most specialised predators in the gastropod assemblage. The radular teeth used by limpets and turbo snails for scraping algae have evolved into very dangerous looking harpoon-like teeth (Figure 26).

Many cone shells have a venom gland attached to this tooth which is located at the end of the highly manoeuvrable proboscis. Upon locating prey the cone snail sneaks up to the unsuspecting animal, usually a fish, and fires the harpoon into the flesh. The venom acts quickly but a fast swimming fish in a state of shock can still move relatively great distances in a short time compared to a snail and so many species remain attached to the “harpoon” and are

Fig 26



dragged along with the dying prey. (Other species prey on snails and do not "hold onto" the harpoon once it has been discharged.) Once the fish is completely immobile the cone shell devours it. Some cone shells have been known to take quite large fish this way. I have seen film of 8-10cm specimens consuming a lionfish which gives you some idea of the flexibility of this animal's mouth and stomach.

Most cone shells are harmless to humans but some have venom so powerful it can kill humans. Fortunately it is extremely unlikely that you will ever come across one – I have found two in five years! If you suspect that a cone shell is present in your aquarium then you should remove it with the utmost care, preferably with forceps.

Sub-class Heterobranchia
Order : Allogastropoda
Family: Pyramidellidae

The snails of concern to aquarists are small to very small (less than 4mm) gastropods with a very high spire to the shell. As with many of the molluscs discussed in this article good eyesight and close scrutiny of specimen pieces is essential to spot these little snails which prey on clams of the genus *Tridacna*. The worst effected clams tend to be *T.crocea, T.maxima* and *T.squamosa* due to the fact that they possess projections of the shell called scutes where the pyramid snails conceal themselves during the day. At night they migrate to the edge of the clam's mantle and extend their proboscis and begin sucking the juices from the tissue contained therein. Infestation with pyramid snails can be a reason for clams remaining closed or not expanding fully. Large numbers can see off the clam altogether. So what exactly are you looking for? Well, to the naked eye these gastropods look like small grains of rice lodged in and amongst the scutes of the clam; only close examination with the naked eye, or preferably with a hand lens, reveals small whorls like a cerith snail in miniature. Before you introduce the clam it is always worth checking the scutes and also underneath at the base of the clam. To prevent any damage to the clam when removing them a cocktail stick is handy to prise them out or soft paintbrushes can work well for the more delicate areas.

Order : Nudibranchia
Family Opistobranchia
Common name: Sea slugs

Nudibranchs are amongst some of the most commonly encountered molluscan hitch-hikers associated with live rock and corals. They are basically a shell-less gastropod resembling in basic body pattern the slugs we find in our gardens. However the degree of elaboration of this basic pattern is amazing and many species exhibit incredible colouration.

The word Nudibranch literally translates as "Naked gills" and most species do indeed have very conspicuous gill filaments on the dorsal surface of the body. Nudibranchs have evolved a variety of defences to compensate for the lack of a shell. These include acid and toxin secretions. Some species are able to assimilate the toxins and defence mechanisms of their prey into their tissues. Others that prey on hydroids and corals are able to relocate the immature nematocysts (stinging cells, such as those possessed by anemones) of their prey into extensions of the mantle called cerata. Here they mature and defend the slug against predators.

Elaboration of the cerata in several species has meant that they can mimic the prey upon which they feed. Some species of Aeolid nudibranch resemble star polyps. The most troublesome family, the Tritonidae are so well disguised that they are difficult to notice even when you know what you are looking for!

In certain species the cerata can be shed leaving a potential predator with some seemingly tasty morsels upon which to feed – but they get a nasty shock. One example of this is a species that feeds on button polyps.

Another potential problem with certain species of nudibranch is the fact that they have a larval stage that only begins its development when it comes into contact with the coral upon which it feeds. This presents the possibility that larval stages may be present just waiting in your aquarium for the introduction of their food!

Despite the beauty of these creatures the vast majority encountered are unwanted pests and should be removed from the aquarium whenever a definite sighting is made. There are some techniques that can be used to "drive" the slugs out of hiding which I will outline later but first, let's have a look at the rogues gallery.

Order Nudibranchea
Sub-order : Aeolidcea
Family : Tergipedidae
Species : Phestilla lugubris

Although first in the list I have only ever encountered two individuals of this species but it is so incredibly well disguised that it is worthy of first billing! This nudibranch feeds exclusively on *Porites* hard coral. Many people will have small colonies of this coral as it is commonly associated with live rock. However, the two instances that I have experienced with them they have been located on "plume rock" where the *Porites* hard coral is surrounding multicoloured tubeworms (Figure 25).

I was inspecting a piece of newly acquired *Porites*, noting the diversity of life other than the tubeworms present when I spotted a slightly discoloured oval patch of polyps. I looked closer and saw that the "polyps" didn't have the usual fine tentacles and wondered whether this was a mutation or area of damage. Then it dawned on me – this was a very well concealed nudibranch. Unfortunately, I no longer have a specimen available to photograph but it is essential to check every

Fig 25 *Porites sp.* hard coral with associated tube worms

piece of *Porites* for this slug as it feeds on their polyps. Removal is best attempted by prising the slug from the coral with a cocktail stick taking care not to damage healthy polyps.

Order : **Nudibranchia**
Suborder: **Dendrotonacea**
Species : Probably Tritonopsilla alba
Common name : **White nudibranch**

This is my least favourite marine animal bar none! Undoubtedly beautiful and yet an extremely persistent and well disguised coral-eating sea slug (Figure 26 & 27). The colour can vary from white to pink to orange depending on the coral being predated. The white form is a very common import associated with *Cladiella sp*. soft corals (Figure 28) . Even large (40mm) specimens can remain undetected in an aquarium since they feed almost exclusively at night. Symptoms include white powdery deposits at the base of the coral. Gradual erosion can be witnessed also at the base of the coral, sometimes so severe that the coral becomes detached from its rock. *Tritonopsilla sp*. are particularly problematic as they have the ability to reproduce asexually and so infest a tank rapidly. As with many of the gastropod molluscs once the problem has been identified, removal is fairly easy although these animals are incredibly well disguised when they surround the base of the coral during the daylight hours bearing a strong resemblance to white the flesh of the coral.

Fig 26
***Tritonopsilla sp.* Pink / Orange form**

Fig 27 *Tritonopsilla sp.* White form

Two techniques have been recommended in the literature for "flushing out" nudibranchs from their hiding places although both may be stressful for other aquarium inhabitants. The first involves turning off all pumps providing flow in the aquarium (not any biological filter pumps). The subsequent drop in dissolved oxygen concentration is said to disturb the nudibranchs and set them on the move. Once visible they can be removed with tweezers.

The second technique is arguably the most stressful for reef residents and involves the saturation of the aquarium with tiny air bubbles facilitated by a wooden air-stone or venturi powered pump. The bubbles irritate the nudibranchs and they are forced from their hiding places where the tweezers will again be used to remove them.

I have not tried either of these techniques myself, instead relying on careful checking of specimens prior to introduction and then close observation afterwards. But there are so many well-disguised species that some are liable to slip through the net. Observation at night under blue actinic or torchlight is often the best time to see these pests. Be extremely careful when attempting either of the techniques outlined above.

Fig 28 *Cladiella sp.*

Miscellaneous Nudibranchs

I hope that it will be clear to you now that any nudibranchs should be removed from the aquarium. (Please do not mistake the common *Stomatella varia* (Figure 10) for a predatory nudibranch as you will be removing a very useful creature from the aquarium!).

Fig 10
***Stomatella sp.* Not a nudibranch**

Figures 29 & 30 show some more species that commonly occur. Many corals are vulnerable to nudibranchs but the most commonly infested are button polyps (*Zoanthus spp*. and *Protopalythoa spp*.), clove star polyps (Anthelia spp.) and several species of soft coral. Be warned – the nudibranch in figure 30 is very difficult to spot!

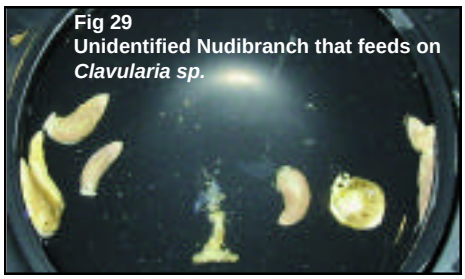


Fig 29
Unidentified Nudibranch that feeds on *Clavularia sp.*

Fig 30 This image shows a nudibranch and illustrates very well just how difficult they can be to locate

Class : Bivalvia / Lamellibranchia

The bivalves are a group of marine and freshwater living molluscs defined by having a shell that is divided into two parts and usually hinged – for example the clam *Tridacna squamosa* and the humble but tasty mussel (*Mytilus edulis*).
Most bivalves have converted their gills into a means of trapping and processing food. The gill area already has its own pumping system in the form of the microscopic cilia that create a current of water that flows over the surface of the gill. The bivalves, having enlarged the gill surface, are enabling them to process larger volumes of water and filter out particulate matter such as phytoplankton and zooplankton. If you want to see the enlarged gill surface in the flesh then look at a flame scallop or related animal. Their shells really gape showing the net-like gill structure quite clearly. (Figure 31)

Many reef aquarists will lust after the beautiful Tridacnid clams (Figure 32) but these are exclusively purchased on their own and are mainly derived from culturing facilities. However, there are many different bivalves that can arrive on both live rock and specimen pieces and all can be thought of as interesting and harmless additions to the aquarium. In the days of Florida live rock many pieces would arrive covered in 6-10cm long mussels that would survive the curing process and provide an interesting display. Unfortunately these days are long gone and now the commonest bivalves are small specimens of approximately 2-5cm.


Fig 31 Bivalve mollusc showing paired and much enlarged gills

One group of bivalves deserves more than a passing mention here and that is the so-called boring clams of the family Pholadacea which contains the common U.K. species the piddock. Use of the word “boring” is not to suggest that they are uninteresting or dull but that they are capable of burrowing into rock and even invertebrates. These are very common imports; they seem to survive the curing process in live rock and also are commonly found on the base rock beneath corals and polyps. (Figure 33). Their boring action should not cause too much alarm to the aquarist but it is worthy of a mention as if the animal begins moving through a coral it can move much more quickly than through rock and so suddenly it may just “pop-out” of a coral leaving a neat round hole! Figure 34 shows some live rock that has evidence of boring clam activity.

Many other species of bivalve mollusc are to be found in reef aquaria. Some have been in situ on the rock for so long that years of coralline algal growth and colonisation by encrusting organisms means that the shell itself is almost completely obscured. In these cases it is often the presence of the protruding mantle that gives away their position. This will usually react to movement around it by disappearing as the shell closes. It is very likely that your reef aquarium contains some of these miscellaneous shellfish and they are to be welcomed. Many do not even seem to need supplementary feeding – relying perhaps on fish waste and detritus for their sustenance although they would probably relish the prospect of the occasional feeding with Plancto or other such food.


Fig 32 *Tridacna sp.* clams


Fig 33 Boring clam (about 1cm long)

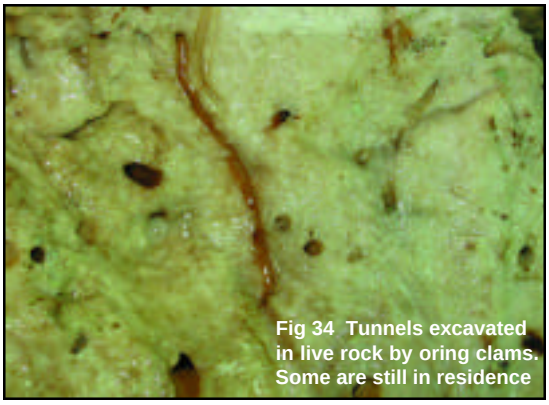


Fig 34 Tunnels excavated in live rock by oring clams. Some are still in residence

I hope you have enjoyed this foray into the world of the mollusc. I have tried to cover the main species that you are likely to find in your reef aquarium. My only regret is that I have not been able to provide images and descriptions of all the species I have come across in the last five years – there are many. And yes, I’m going to say it one more time – your own vigilance is the key to discovering the true nature of the molluscs in your aquarium – just think about the number of species that can potentially arrive by accident and keep your eyes open.

I have also particularly enjoyed identifying the beneficial species that are to be found in aquaria. My research has also uncovered several species, not included here, that could be of great use to the aquarist such as scavengers, algal grazers and sand-shifting species. Maybe some time in the future aquarists will be able to acquire these species and so achieve an even greater balance in their aquarium.