



# The Sea Star



Newsletter of the Utah -Wasatch Marine Aquarium Society

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## Inside this Issue

- 1 [June 7 Meeting](#)
- 1 [Upcoming Events](#)
- 2 [Thanks](#)
- 2 [Coral Propagation Results](#)
- 2 [May meeting recap](#)
- 4 [Herbivores Versus Carnivores](#)
- 6 [Observations](#)

## Welcome New Members

**Brad & Becky Adams**

**Art Olsen**

## June 7<sup>th</sup> Meeting

Randy Olsen of Mountain Shadows Marine has graciously accepted the invitation to visit with us in June. Randy started his aquarium maintenance company a few years ago and is now opening a “high end” retail marine aquarium store in Centerville. Check out [www.msmaquatics.com](http://www.msmaquatics.com).

Trained in the medical field, Randy has a unique perspective on the hobby and the health of marine organisms. His business is doing so well that he is looking for additional help. If you want to work in aquarium maintenance or a retail fish shop, or you know someone that does, please contact Randy.

We again plan to do some propagation of the popular and hardy Woods Polyps (*Anthelia Glauca*) during the upcoming meeting.

Elections for WMAS officers will also be held.

Nominated at the May meeting were:

**President:** Mark Peterson

**Vice President:** Danh Ngo, Adam Blundell

**Treasurer:** Rick Malin

**Librarian:** Suzy Applegarth, Danh Ngo

**Secretary:** Steve Lopez

**Webmaster:** Jake Pehrson

**Council:** Tim Weidauer, Joe Jones, Jim Perry, Bob Larkin, Cindy Jones

## Upcoming Events

### July 13<sup>th</sup>

Our annual Barbecue will be held at SeaBase near Grantsville.  
**Note that this is a Friday.**

### August 2<sup>nd</sup>

We will do more coral propagation

### September 15<sup>th</sup>

Julian Sprung and the Reef Aquarium Tour all in one Saturday!

## Thanks

Thanks for items donated to the raffle in our last meeting. Bird World & Pet Village donated an Omniflife™ Skimmer and Fish-4-U donated a bag of CaribSea™ Aragonite.

Thanks again to the all the retail stores and wholesale distributors. On behalf of all hobbyists, the Wasatch Marine Aquarium Society thanks you for providing livestock and supplies.

When visiting one of our local stores, you will find that a sincere word of thanks to the store employee helping you each time results in a good relationship between you and the store. Let them know that you are a WMAS Member!

## Coral Propagation Results

Many times during our meetings we conduct a coral propagation exercise. This is a chance for members to get a frag (fragment or piece) of coral, take it home and raise it up to a new coral in their own tanks. This is one of the great benefits of our club, since we can share corals with each other, saving money and ensuring the survival of these animals.



*This small sarcophyton is the results of our April propagation, after just 6 weeks!*

But what happens when we take these coral frags home? I'd like to share my personal experience.

In March, we propagated a candy-cane coral by cutting the polyps radially, using super-glue to

attach the coral fragment to a chunk of rock. While still very tiny, I am happy to report that my frag is growing well.

In April we propagated sarcophyton leather coral. We cut pieces from the top part of the mushroom-like structure and used rubber bands to attach them to a rock. My piece started as a little chunk of flat flesh, which I wedged under the rubber band in a crevice in the rock. After a couple weeks the coral had attached to the rock, and the rubber band actually went right through the middle of the flesh, and appeared to irritate the coral. I cut the rubber band and pulled it off, and the resulting hole grew closed in about 2 days. After less than two months, this piece has grown so much that it now has clearly recognizable structure, again resembling the mushroom shape, with polyps that extend out of the top of the mushroom during daylight.



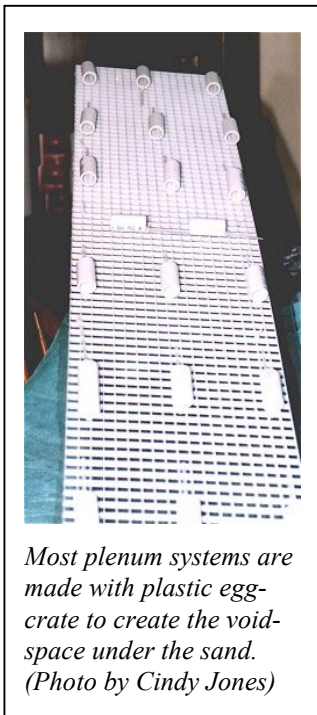
*I was able to propagate this coral using the same technique.*

I was so excited by this that I cut a piece from an unidentified green finger leather species in my aquarium, again using the same technique. It has begun to grow well, actually forming two separate corals as the rubber band worked its way down through the coral flesh.

## May Meeting – Bob Goemans

The May meeting was a great one. We were lucky to have Bob Goemans visit and share some of his experience with us. Bob presented his

views on most everything, but especially the subject of plenum sand-bed systems. Bob has long been an outspoken advocate of the plenum system, also called the “Jaubert method” after Dr. Jean Jaubert, who first published an article describing the approach he used at the Monaco Aquarium. It is also worth noting that the original pioneer in natural systems, Lee Chin Eng, successfully kept a marine tank over 30 years ago using a rudimentary version of this same idea. His tank bottom had a dead space, covered with some larger, flat rocks, upon which several inches of coral sand were placed. The dead space in his system is similar to modern plenum systems. The plenum system is also sometimes called the NNR (Natural Nitrate Reduction) system as well, a term which was first used in print by Bob Goemans. Bob has spent years experimenting with plenum and sand systems, and even publishes a monthly column, “Sand Mail” in FAMA magazine.



*Most plenum systems are made with plastic egg-crate to create the void-space under the sand.  
(Photo by Cindy Jones)*

The basic idea of the plenum is to leave a dead space below the sand bed instead of having just deep sand all the way to the bottom. Proponents, such as Bob, say the plenum area acts as a temporary storage area for organic nutrients, which can then be decomposed through mineralization to inert gases such as nitrogen and nitrous oxide, which leave the aquarium as bubbles.

During his presentation, Bob described what happens in the various layers of the plenum system; the aerobic layer on top, the anoxic (reduced oxygen) layer below, and the plenum area itself. The idea is that as nutrients in the aquarium diffuse deeper in the sand, they reach bacteria in the anoxic layer. These bacteria thrive in areas of reduced oxygen (anoxic), but not completely oxygen-free (anaerobic) areas. These bacteria break down nitrates and other nutrients into their most basic forms which then bubble

out of the aquarium as harmless gasses.

The benefit of the plenum over a simple deep sand bed is that it provides more area of reduced oxygen for these bacteria, and eliminates a completely oxygen free (anaerobic) area reported to form deep under a simple sand bed. Thus, the plenum eliminates the anaerobic bacteria that can

produce dangerous gases such as sulfur dioxide, while improving the capability to eliminate wastes from the water.

Also, when the nutrient load exceeds the short-term capacity of the bacteria, the excess nutrients are stored in the plenum until bacteria can process these wastes. Bob described how the electrical charge of the nutrients and the sand bed ensures that these excess nutrients are pushed by diffusion down to the plenum and held there because of the electrical charge difference, and eliminated by the bacteria above the plenum at a later time.

Bob shined some light on several dark myths of the plenum, clearing up some points of confusion or possible failure for some people:

**There is no need for artificial circulation in the plenum.**

You should not force water into or out of the plenum with powerheads or pumps. This will defeat the purpose by adding oxygenated water into the plenum area.

**You should keep the plenum area dark.** Some people have their plenum visible from under the aquarium, letting light reach the plenum area. Bob advocates blocking the light from the plenum completely.

**You should vacuum your sand.** The idea that you should not disturb your sand layers, and should never vacuum your sand is false. Bob finds that vacuuming detritus from areas of the sand where it tends to accumulate is an essential method of waste export in the system. He does not go down into the sand more than about an inch and he does this vacuuming monthly.

The plenum system is not a panacea, nor a

license to ignore good husbandry. While it can help reduce your nitrates naturally, you still need to be aware of your biological load, and minimize import and while maximizing export of nutrients.

**If it isn't broke, don't fix it.** As much as Bob advocates the plenum, he is a stronger supporter of sticking with what already works. For example, when at my house I asked Bob his opinion about adding a plenum to my 650 gallon reef. Bob asked what my nitrate levels were, and when I told him zero, he replied that he certainly would NOT add a plenum to the system. "Hey, its working great as it is, why mess with it?"

Patience is often a difficult thing for us as reefkeepers. After hearing Bob speak, you may get the impulse to tear your whole tank down and put a plenum in. Bob's advice is that a plenum is a great help to reducing nitrates in a system, but he recommends waiting until you start your next tank or move your existing one. Drastic change (such as tearing down your tank) has serious implications in the reef aquarium. It can take a very long time for the system to once again become stable.

Bob showed slides of several of his beautiful aquaria, including a new aquarium where the plenum exists only in the sump below, leaving the display space more available for animals above. He also spoke of a book he will soon release, discussing the details and the biochemistry behind the plenum system he advocates with so much enthusiasm. We greatly appreciate Bob's visit, and look forward to reading more details about the plenum systems in his new book. Bob was not only very experienced and helpful, he is a genuinely nice guy that was fun to hang around with, as many club members experienced as we stopped at Village Inn after the club meeting.

## Herbivores Versus Carnivores

*By Mark Peterson*

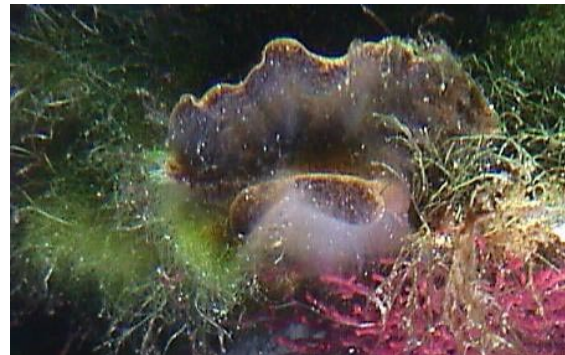
Do you know what your fish and inverts like to eat? I mean, do you know their natural food preferences? Are they herbivores, carnivores or

omnivores? Do they eat everything you throw into the tank or are they picky eaters?

Our aquariums offer limited food choices, unlike the Utah restaurant whose slogan is "The choice is yours, at Chuck-A-Rama". Have you ever had a Scooter Blenny or Mandarin that became thinner and thinner, eventually disappearing? Have you put a Tang in your tank, with the intention of reducing unwanted algae only to see the algae increase?

These experiences are the consequence of the eating habits of the all of the aquarium occupants. The Scooter Blenny may have died because it and its tank mates exhausted its food supply - tiny invertebrates living in the rock. It just didn't learn to eat prepared foods and it died of starvation.

In the wild a Tang may fill it's belly with delicious micro and macro algae, but in the aquarium it starts to rely on the flake or frozen food provided from above! It can ignore the algae, which it was supposed to eat, which may have been one of the reasons for it's existence in the aquarium! It may not eat that kind of algae in the wild, but in the absence of it's favorite food, it will eat the next best tasty morsel. If the tasty morsels, such as frozen and dry prepared foods, are provided in sufficient quantity, it may never eat much of that nasty algae, ever!



*Herbivores require a diet mostly composed of algae. Some Alga are actually quite beautiful.*

Like a child, a fish has to eat what is placed before it, selecting what tastes best. Eventually, if the fish doesn't die and, if properly coaxed,

hunger may persuade it to change its eating habits. It may begin to eat the only food that is available.

You can often teach the fish to accept new foods by mixing the new food with something it accepts readily. Most any fish will accept frozen brine shrimp, so you can start with that if the fish is new or not eating at all. Soak the new and the old food overnight to let the smells and tastes mix together.

Remember:

- Feed prepared foods sparingly.
- Try to provide an environment where the preferred foods can grow as much as possible to sustain the organisms.
- Know the preferred food of the tank inhabitants.
- Choose a balance of fish and inverts according to their eating habits.

### **Feed sparingly**

If the fish run to the table like hungry kids when you stand in the feeding position, but at the same time, they are not devouring each other or the coral, then you are probably feeding correctly. My Woods Polyps are the first to be nipped when the fish are very hungry. I believe an established reef tank should never be fed more than once per day and it should be able to survive a week without feeding. That means you can feed weekly or daily or anywhere in between.

This article is not about filtration, but it is good to remember that the more they eat the more they excrete. Some organisms and of course, algae, consume fish waste. It is good to have an understanding of how to export the waste, either through mechanical removal or consumption by other organisms.

### **Provide an Environment**

I once thought I had enough natural food sources living in my established 55 gallon reef to sustain a Tang and two Perculas without feeding. The fish had been doing very well for about ten months prior and the tank had been operating for almost two years. The clowns picked over the

live rock, but gradually became emaciated and died after about two months. That is when I learned that no matter how well I thought I was providing a natural environment, supplemental feeding was necessary in my tank.



*The ubiquitous hermit crab is a welcome omnivore that grazes algae all day. (Photo by LeRoy Headlee)*

### **Know the preferred food**

For long term success, the aquarium should have at least as many herbivores as carnivores. In other words and to stress the point, *for every carnivore there should be many more herbivores*. Here is a list of common herbivores:

Tangs (most are good, especially if they have the long snout shape of the Yellow Tang)  
Bicolor Blenny  
Lawnmower Blenny  
Red Lip Blenny  
Dwarf Angels (Flame, Coral Beauty, and some of the genus Centropyge)  
Foxface  
Rainfordi's Goby  
Banded Goby  
Small Hermit Crabs  
Sally Lightfoot Crab  
Urchins (Black Longspine is best)  
Snails (There are snail eating snails, so watch out for those. Queen Conch snails are herbivores!)  
Slugs (a lot of live rock seen lately has been home to small brown slugs)

Carnivores can strip a tank of naturally growing food such as crustaceans in a matter of weeks or even days.



*This flame hawk is an attractive and interesting carnivore. (Photo courtesy of Albert Thiel)*

Here is a list of common carnivores:

Wrasses, Puffers, Jawfish, Anthias, Clownfish, Damsels, Filefish, Basslets (the beautiful Royal Gramma is in this group. My daughter affectionately calls it "Flower")

Cardinals, Dottybacks, Butterflies, Gobies, Dragonets (Mandarin), Batfish, Lionfish, Eels, Groupers, Hawkfish, Snappers, Triggerfish, Goatfish. Large Crabs, Shrimp

The list of meat eaters appears to be longer than the list of algae eaters – most meat eaters are so colorful and interesting, that we (speaking to myself as well) succumb to the temptation to buy these in abundance. That little Dottyback has such bright color and it's just one little fish. How can one fish hurt?

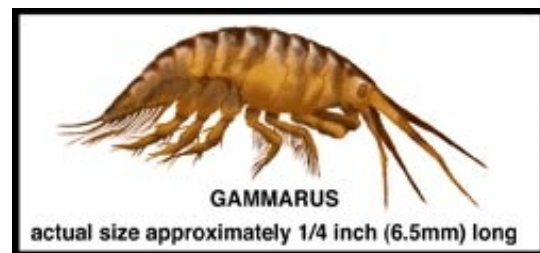
### **Choose a balance**

A hungry dottyback can, in one night, probably consume up to 50% of the population of small inverts in a small tank. One may say, "That's okay. I'll just feed a nice frozen food and it will be fine". Besides, I have other carnivores and they are doing fine.

What we need to think about is that carnivores eat little crustaceans and inverts; the "bugs" in the aquarium. And what we need to understand is that the "bugs" eat algae! They are part of the algae control at the micro level. By the time we see a haze of algae forming on the rock, the battle has already tipped in it's favor. Before we know it, it has become a nuisance or a "crash".

It is possible that there just weren't enough algae eating bugs in the tank. Two of the bugs we commonly hear about are Gammarus and Copepods. Gammarus, of the Arthropoda family,

are those little half circle shrimp like things that crawl over the rock and around in the substrate. Copepods are almost-microscopic, clear to white bugs that you may see on the glass and rock. These and other bugs are especially visible at night (try putting a flashlight up to your tank in the middle of the night and wait a few minutes!) or anytime if kept in the absence of predators. Reduce the population of these little bugs by predation or poor water quality (low carbonate hardness can wipe them out all at once) and there is a chance the ecosystem will be out of balance enough for algae to bloom.



An algae eating fish, added to the tank to counteract the bloom, may eat the algae, but it will also eat the prepared food. At best the fish will solve the algae problem, but at worst, it may ignore the algae or it may not eat enough to stop the algae from taking over! This is why it is important to have some organisms that can't get at the prepared food and are forced to eat the algae. Not only is the balance of meat eaters to algae eaters important, but a variety of algae eating fish and a gang of herbivorous inverts also seems to be important to the successful reef aquarium. 😊

### **Observations**

To the observant aquarist, even the tiniest micro-reef tank will offer an opportunity to observe some interesting and amazing feats of nature. Often I find myself looking at my tank and noticing things for the first time – "Wow, what's that!?"

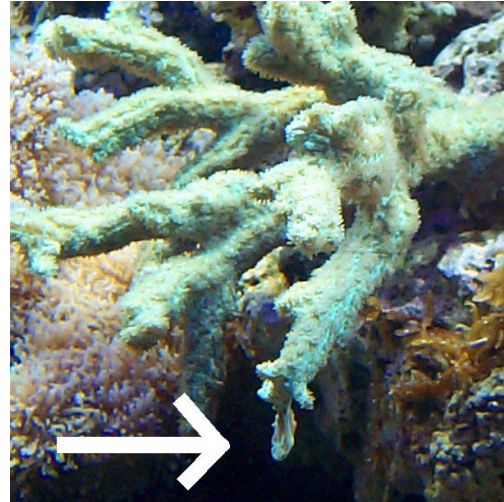
Observing in the middle of the night with a flashlight can be an eye-opening experience as well – you may be surprised what is lurking in your tank.

If you observe something you'd like to share, please send me a note and I'll include it in the next SeaStar. Send a picture if you can, but if not, at least let us know about it! This time I'll share something I observed in my aquarium.

### **Asexual reproduction in Hydnohpora**

You're probably aware that most stony corals reproduce sexually, mostly through annual mass-spawnings on the reef. You're probably also aware that these corals can reproduce asexually through broken branches from storms, waves, or other occurrences (such as hobbyists propagating coral!). Did you know that many stony corals reproduce asexually by dropping parts of themselves off?

I was fortunate to observe this in my reef last week. My Hydnohpora (green horn coral) developed a sort of fleshy sack at the end of a branch. The fleshy sack contained a piece of hard skeleton. The sack grew larger each day, as did the hard lump inside, until finally it dropped off the branch, hopefully to start a new coral!



The picture shows the sack about 2 days before it finally dropped off. Notice how the flesh is stretching down as the weight of the skeleton piece inside pulls down on it.

Many other corals exhibit this same behavior, including elegance coral (*Catalaphyllia*) and frogspawn (*Euphyllia divisa*).

This is the first time I have actually observed this occurring with a hydnohpora!