



## The Living Reef

*May 2004 - Coral Fragging Demo and FRAGFEST III*  
**WEDNESDAY MEETING @ 7:30pm!**

### Editorial....

When I think back to when I first started keeping corals, something like 13 years ago, it was a much harder prospect to acquire all the necessary hardware and paraphernalia. In fact it was in the days when the trickle filter was king and here in WA we had only one aquarium shop that had serious reef displays and hardware. Back then if you wanted a skimmer, the only viable options were to bring one in from the states (expensive!) or build one yourself! Over the last few years however the hobby has really grown and now we have access to many of the products that we could have only dreamt about back then. In fact we are now getting to the stage in Australia that the lucky hobbyists in the US were back then! It's amazing to think that we were ever able to keep anything alive back then without the goodies available over the counter now!

### Inside this Issue....

April Meeting Rundown	2
May Meeting Information	2
MASWA Message Board	3
Beta Glucan as a Biological Defence	3
Busselton Jetty	6
Fishy Links and News	6
Buy, Sell, Swap & Wanted	6

### MASWA Meeting Calendar....

**26<sup>th</sup> May 2004 – Chris Ferrett**  
**19 Glebe Close, Mindarie**  
*Fragging Demonstration & FRAGFEST III*

June 2004 – Matt Weis  
*Special Raffle*

July 2004 – Terry and Val Peake  
*Decapsulating Artemia (brine shrimp) Cysts*

August 2004 – Nigel Clark  
*FRAGFEST IV*

September 2004 - ?  
*Special Raffle*

October 2004 - ?  
*Guest Speaker/Demonstration*

***This Meeting starts from 7:30pm, formalities start promptly @ 8:00pm!***

The Marine Aquarists Society of WA is a name that we, as a group of friends with like interests have applied to ourselves for the purpose of information exchange. No one person, nor the group as a whole, can be held responsible for liabilities, injuries or other that may result either directly or indirectly as a result of our gatherings or the information exchange therein. The same applies to the information contained in this newsletter.

## MASWA Contact Information....

### COMMITTEE - 2004

**President** – General Enquiries

Nathan Cope – 0416 092 000

[maswa@ingeniousresources.com.au](mailto:maswa@ingeniousresources.com.au)

**Vice President** – General Enquiries

Tony Fiorentino - 0412 467 519

[fioren@inet.net.au](mailto:fioren@inet.net.au)

**Treasurer** – Treasury/Payment Enquiries

Paul Tayler – 0419 908 264

[paul@pmtco.com.au](mailto:paul@pmtco.com.au)

**Secretary** - Correspondence

Marc Shewell – 0419 047 808

[marcus@inet.net.au](mailto:marcus@inet.net.au)

**Newsletter Editor** – Newsletter/Membership Enquiries

David Bloch – 9304 1274

[fishnut@optusnet.com.au](mailto:fishnut@optusnet.com.au)

**Web Editor** – Web Page Enquiries

Bill Blakers – 9247 3204.

[william\\_blakers@excite.com](mailto:william_blakers@excite.com)

**Social Coordinator** – Meeting Venues/Advertising Enquiries

Nigel Clark – 0412 412 681

[dovetails@iprimus.com.au](mailto:dovetails@iprimus.com.au)

**Science Officer** – Research and Scientific Information

Paul Groves – 0421 803 288

[paul@nw.com.au](mailto:paul@nw.com.au)

### WEB ADDRESS

[www.masa.asn.au/maswa/](http://www.masa.asn.au/maswa/)

### MEMBERSHIP PAYMENTS

**Cheque:** Make all cheques payable to Paul M. Tayler.

**EFT:** Make all EFT transfers to **BSB 086 217 A/C # 69355**

**1664** (please include your name on all EFT transfers!).

**Cash:** Make payment in person only.

### Postal Address:

Paul Tayler (MASWA Treasurer)

PO Box 7185

Shenton Park WA 6008

### NEWSLETTER CONTRIBUTIONS

If you would like to make a contribution to the newsletter please don't hesitate to contact the Newsletter Editor, David Bloch on the phone number or email address listed above.

Contributions to the newsletter need to be received no later than 7 days prior to the next meeting date.

## April Meeting Rundown....

By Nathan Cope

April's meeting was the first to ever be held on a Sunday. The drive to Casuarina (and the home of Julie and Perry Turnbull) would be a fairly long one for the majority of MASWA members and consequently if we held the meeting there on the usual Wednesday night, most members would have to leave early due to work commitments the next day. So we held it at 2pm on Sunday and that seemed to work fine... there was a pretty big turnout and even two "youngsters" (teenagers, actually) turned up in tow with their parents! Great to see the whole family getting involved. Some members seemed a bit concerned that all future meetings would be on a Sunday, but don't worry, this isn't the intention. Except for the meetings that will be a long drive for most, it will be Wednesday nights as usual.

Enough about the day the meeting was held on, let's hear about what happened at the meeting!

Julie and Perry had a bit of a disaster about 12 months ago when the bottom fell out of their second hand tank just before it was completely filled. They've had a new one made up the same as the old one but with a thicker base. They were very interested in hearing some ideas on how best to plumb the tank in order to utilise all the specy equipment that Julie had been slowly gathering from the likes of [Reef Online](#). There was an Eheim 1260, an Iwaki MD-20 (I think) external mag drive circulation pump, a Tunze Turbelle Stream 12000 lph internal pulsing powerhead (fantastic units!!!) and a Tunze 240 Automatic Skimmer. The main tank has a volume of roughly 900L with a 40mm hole (for an overflow standpipe) drilled through the very centre of the floor of the tank. At either end a 25mm return hole has also been drilled. Another, much smaller tank, is planned to sit alongside the main tank and will perhaps just be used for soft corals. A very large sump (around 600L!!!) with many, many baffles and provision for a large portion of live rock as a type of refugium, sat beneath the main tank

A semi-formal discussion was held amongst all meeting attendees covering different ideas of how the tank could be set up and how best to utilise all the pre-drilled holes. Nigel came up with some really interesting ideas on how to plumb the two tanks together and Stephen Cooperwhite, Chris Sutton, Dion Russel and Jan Anderson brought up some very valid and important considerations. At the end of the day, a diagram of the most popular ideas for plumbing the tank and utilising the equipment was drawn up for Julie and Perry. Hopefully next time we see their tank, it will be all finished and house a thriving reef community.

## May Meeting Information....

Up north again we travel to Mindarie where our host, Chris Ferrett will show us his love aquarium. Chris has been keeping marines for a few years now. In this time he has

had ups and downs but like most of us has hung in there and not given up. Chris's aquarium is filtered by live rock and sand, and a skimmer. The tank is populated by both hard and soft corals and has some nice fish in there too including a Moorish Idol.

This month we are going to have a demonstration of fragging corals. We have put on this demonstration after some requests from a few of our newer members who are a little unsure and or curious about the whole coral fragging issue. Hopefully this demo will explain how easy and rewarding fragging can be. Being our third "FRAGFEST" we hope that this one will be a little more successful than the last one. The whole concept of our "FRAGFEST" is to encourage captive propagation of corals. This is not only good for the environment, ie no collection of wild coral, but also good for us as captive corals are generally harder than wild collected specimens.

The meeting will be on **Wednesday @ 7:30pm and the address is 19 Glebe Close, Mindarie**. Drinks and nibbles will be provided.

Hope to see you all there.

## MASWA Message Board....

### MASWA DOOR PRIZE!

From now on, we will be having door prizes at every meeting. In order to be in the draw to win the prize, all you have to do is make sure you **write down your name** (and the name of any partner/guest you have brought with you) **on the meeting registration sheet** and then **put on your name badge** (ensure that partners/guests have one too). Once you've done that, see Nigel Clark (Social Coordinator) for your free door prize ticket. This month's door prize is a \$50 voucher donated by **Reef Online**, MASWA's first official sponsor.

### MASWA SPONSOR

It's official, MASWA finally has a commercial sponsor! **Reef Online** has offered to sponsor us for the next 12 months and over that period, you will see an advert for them in each issue of The Living Reef. Naturally the advert will tell you who Reef Online is and what they are all about, but will also inform you of new product launches and special offers exclusive to MASWA members. Reef Online has also generously donated several prizes for MASWA to use as we wish throughout the year PLUS an extra 5% MASWA discount on top of the existing 5% MASA discount (ie, MASWA members now get a 10% discount from Reef Online

### MASWA 2004 ARTICLE PRIZE!

To try and encourage members to get actively involved we have decided to offer a \$100 prize to the person who has contributed the most hobby related articles, cartoons or jokes etc to the MASWA 2004 newsletters. The content must be suitable for general audiences (no rude jokes Nigel and Tony! Ed.). The winner will be announced at the **December 2004 CHRISTMAS** meeting.

### RAFFLE PRIZE DONATIONS

If anyone has any books, hardware, livestock or any bits and pieces they wish to get rid of how about donating them to the raffle table? All the monies raised in the raffle go back into MASWA so the better the raffle the better the prizes and the more we can do during the year.

### GENERAL MEETING AGENDA (Wednesday's)

For those new members who have not been with us long or perspective visitors/members reading this for the first time below is a rough agenda of what happens at a MASWA meeting:

**7:30pm:** socialise and catch up with friends, introductions of visitors and new members to everyone by social coordinator and other committee members.

**8:00pm:** opening of meeting, formal introduction by president, welcome visitors and new members.

**8:30pm:** introduce host, host presentation of aquarium.

**9:00pm:** draw raffle and if appropriate start "fragfest" or guest speaker talk/presentation.

**10:00pm:** draw meeting to a close.

### CORAL FRAGGING DEMO & FRAGFEST III @ THIS MONTH'S MEETING!!!

In May we will be holding our third FRAGFEST so now is the time to start fragging and growing those corals that are overtaking you're your tank! The sooner you get them started the healthier and happier they be by the May meeting. Prior to the May FRAGFEST we will be conducting a fragging demonstration for all the newer members who did not get to see the demos last year. We will demonstrate fragging corals and show the various techniques used to separate and attach the frags to pieces of substrate.

## BETA GLUCAN as a Biological Defence - Helping Fish to Help Themselves....

*This article was sent to me by a friend from Uni. It's a little technical at times but nevertheless quite informative. Unfortunately my friend can't remember where it's from so if you recognize it please let me know so I can ask them for permission to use it - oops it may be too late for that!*

Have you ever watched helplessly while a favourite fish battled an illness and you didn't know what to do? Identifying fish disease is difficult, especially for hobbyists. Many of the most common symptoms that fish exhibit when ailing are shared by a multitude of possible causes. Unless a correct diagnosis (or educated guess) is made the odds of a happy ending are not in your "wet pet's" favour. Most hobbyists are forced to make a "best guess" as to what is causing the problem and how to counteract it. A water change is usually a good first step, but is there anything more that can be done without first becoming a fish disease expert?

Wouldn't it be great if there were one thing that we could give any sick fish that could help it? Aquarists dream of a

“magic bullet” that could be used as a treatment for a plethora of problems. Ideally this “magic bullet” would be helpful regardless of whether the infecting agent is bacterial, viral, fungal, or parasitic. It would even help fish to recover from stress, abnormal growths, and exposure to toxins such as ammonia. Let’s not forget that our magic bullet would have to be safe for fish, easy to administer and have no known side effects. It could even be used in conjunction with any medication.

We all know that finding such a magic bullet is just a pipe dream, sort of like searching for the “Holy Grail”, right? Does anything like this actually exist that can be used with animals? I know that this will come as a surprise, pleasant as it may be, and it sounds so fantastic that it may be hard to accept, but something on this order is available! I wouldn’t say that it is a “cure all”, but it is useful against pathogens and other threats to fish health management. Evidence for its effectiveness is abundant. A significant number of studies have been published in scientific journals that can be used as references. These reports comprise of trials in human and veterinary medicine, as well as studies performed on fish and invertebrates.

**What is it?**

Beta 1,3 glucan is the chemical name for a molecule that comes from the cell wall of Baker’s yeast. This natural substance is extracted from Baker’s yeast or *saccharomyce cerevisiae* by stripping away layers of arbohydrates, proteins and other materials that make up a yeast cell.

Endogenous substances that stimulate cells of the mononuclear phagocyte system are called immuomodulators. Beta glucan, or more specifically B-1,3 D polyglucose, is an immunomodulating agent that enhances major host defence mechanisms.

It is categorized by the Food and Drug Administration as “Generally Recognized As Safe” or GRAS and it is non toxic to fish with no known side effects. Beta glucan is safe to use in conjunction with herbal remedies (i.e. garlic) or pharmacological drugs. It has also proven to enhance the effects of vaccines and antibiotics.

**How does it work?**

Macrophages are a type of white blood cells that are found in most tissues and organs of the body. They play a central role in the defence of all multi-cellular animals against invading pathogens. Beta glucan is strongly stimulatory to macrophages (Seljelid et al., 1984). These white bloods cells, in turn, set in motion a cascade of other immune system activities. Macrophages circulate the body in search of foreign invaders (antigens).When they find a foreign invader they then engulf them through a process known as phagocytosis. They degrade the invader into peptides that are used to communicate the presence of foreign bodies to B-cells and T-Cells in the immune system. These cells are a part of the acquired immune system that learns to adapt and defend the body against specific threats. Simplified, acquired immunity is how the body becomes more resistant or immune to certain pathogens after exposure.

Non-specific defence mechanisms of the immune system are vitally important in protecting fish (Secombs and Fletcher, 1992). Beta 1, 3 D glucan is a non-specific immune system stimulant, meaning that it activates the immune system to respond in a general way rather than against a specific type of pathogen or invader. This makes it

a valuable tool against bacterial, viral, fungal and even parasitic pathogens, but it is not limited to these.

Beta glucan works as a biological defence modifier. It activates the immune system by stimulating receptors on macrophages that cause them to react as if a fungus is attacking the body. Biochemical studies have identified this receptor on fish macrophages and netrophils (Engstad and Robertsen 1993; Ainsworth 1994; Engstad and Robertsen 1994). Administering beta glucan begins a chain reaction of events which heighten cellular immune response. It stimulates the production of white blood cells such as macrophages, neutrophils and monocytes that combat invading pathogens. Cellular mobilization is increased helping immune system cells to recognize antigens and move to where they are needed most. The immune system’s capacity to engulf non-self cells is augmented and the productions of anti-microbial agents are increased.

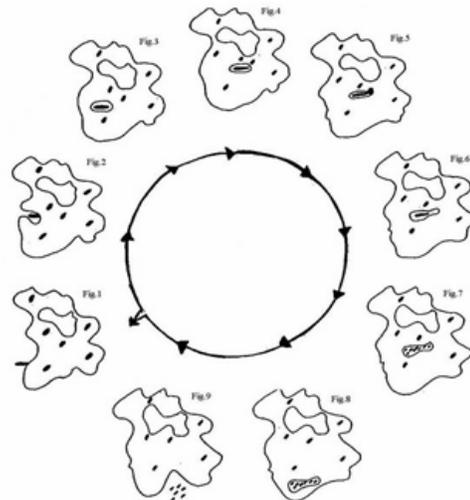


Figure 1: Macrophage adheres to bacterium  
 Figure 2: Pseudopodium formation is the protrusion of the cell membrane engulfing the invader  
 Figure 3: A phagosome is formed when the macrophage encapsulates the invading bacterium  
 Figure 4: Phagosome moves deeper into the macrophage  
 Figure 5: Phagosome comes into contact with lysosome  
 Figure 6: Lysosome and phagosome fuse together forming a phagolysosome  
 Figure 7: Lysosomal enzymes and toxic oxygen compounds dissolve contents in the peptides  
 Figure 8: Digested material moves towards the cell wall  
 Figure 9: Digested material is expelled (exocytosis) from the macrophage

**Why use it?**

Beta glucan has shown promise in trials against viral, fungal, parasitic and bacterial infection. It has proven in numerous scientific studies to be an immodulating agent that can enhance the major host defence mechanisms of the immune system. It is safe to use with any drug or chemical and it works synergistically with all current modes of therapy.

It has long been known that antibiotic treatment brings with it the risk of creating mutant or resistant strains of bacteria. Beta glucan could avoid this problem and is especially helpful when used in conjunction with antibiotics.

The Marine Aquarists Society of WA is a name that we, as a group of friends with like interests have applied to ourselves for the purpose of information exchange. No one person, nor the group as a whole, can be held responsible for liabilities, injuries or other that may result either directly or indirectly as a result of our gatherings or the information exchange therein. The same applies to the information contained in this newsletter.

Pretreatment with Beta glucan means that the host can activate and proliferate defence mechanisms at a faster rate than invading organisms. This will give the animals a head start against pathogens. Fish that have been exposed to an ill tank mate should be given beta glucan to prevent the spread of contagious disease.

#### **When should it be used?**

Stimulating immune function prior to attack can prove to be especially effective against facultative pathogens. This would include infections such as those caused by *Vibrio anguillarum*, *Flexibacter columnaris*, *Trichodina* spp. and fungal infections such as *Saprolegnia* spp. Beta glucan may also help fish combat obligate pathogens such as the parasite *Cryptocaryon irritans* and viral diseases such as *Lymphocystis*.

Beta 1-3D glucan can be administered to newly acquired specimens during the quarantine period. Fish that have recently been netted, transferred or otherwise handled are stressed. Stress inhibits immune function. Beta glucan helps to alleviate the effects of stress and it can prevent illness. It helps wounds to heal more quickly. Beta glucan is useful for helping fish recover from exposure to toxins in the water. Beta glucan has also shown to give positive results against tumours, or abnormal growths.

Beta glucan has proven useful in mice suffering from lymphocytic leukemia that were infected with *Staphylococcus Aureus* or "Staph" simultaneously. This suggests that it may be employed in immuno-compromised animals to avert infectious and/or neoplastic disease (abnormal growths).

Animals that are obviously sick should also be fed beta glucan. Do not forgo all other treatments for fish diseases or disorders in favour of beta glucan. It is especially helpful when used in conjunction with other therapies such as antibiotics.

Beta glucan has applications for spawning and rearing fish. Immersing free-floating larvae (embryos) and juveniles of marine fish with beta glucan will make them more resistant to infection and improve growth rates.

#### **Administering beta glucan**

Beta glucan has been shown to transfer to the blood circulation of Atlantic Salmon after oral administration (Svein Bjornsson et al, 1991). This means that it can be given to fish by adding it to food in small quantities. If you make your own fish foods then mix some beta glucan into the gelatine that holds it together and then freeze it. Bioencapsulation is another effective means of getting beta glucan into fish as a dietary supplement. This can be accomplished by adding beta glucan to saltwater that contains live adult brine shrimp several hours before feeding the shrimp to fish. Brine shrimp are filter feeders so they will ingest beta glucan and then you can feed the enriched (gut loaded) live food to your fish. You can also simply sprinkle a small portion on the food just prior to feeding.

It is important to note that studies indicate that the most effective form of Beta 1,3-D glucan is extracted from Baker's yeast or *Saccharomyces cerevisiae*. The diet should also be supplemented with vitamins and highly unsaturated fatty acids. These nutrients may enhance the capacity of immune system cells that are stimulated by the use of beta glucan.

Since there are no known side effects and it is not a drug giving the fish an exact dose is not critical. The dose of 0.02% a day of body weight has been suggested. However, safety evaluations indicate that beta glucan can be used over a wide dose range. Studies with animals suggest that the optimal oral dosage of beta glucan is in the range of 0.4-1.5 grams per 100 kilograms of body weight per day. Feeding a larger portion probably will not improve the results, can be expensive and is not intended as a replacement or reduction in the amount of food normally offered.

A Clark's Clownfish (*Amphiprion clarkii*) in a Rose Bubble Tip anemone (*Entacmaea quadricolor*). Like most *Amphiprion* sp., the Clark's Clownfish is susceptible to numerous diseases and may benefit from Beta Glucan administration.

#### **Where to get it**

Beta glucan can be found (albeit may take some persistence) at some local health food stores. It is available from Source Naturals among others. I suggest using the 7.5mg capsules because they are a more pure form of B-1, 3 glucan. Open the capsules and add a small portion in the food. You can find out more on their website at [www.sourcenaturals.com](http://www.sourcenaturals.com). There are many other product and information sources available on the Internet.

Products that contain beta glucan are manufactured for commercial fisheries. You can find at least a couple of these on the Internet. MacroGard® products can be found at <http://www.biotec.as/animal.htm>. Alpha Pharma packages a product for commercial fisheries called Vetregard™ at <http://www.alphaanimalhealth.co.uk/DOCS/VGARD.html>.

Foods and additives containing beta glucan are also packaged for the aquarium industry. One of these products is Carasius Immun™. It can be found at [http://www.dajanapet.cz/carasius\\_immun\\_A.html](http://www.dajanapet.cz/carasius_immun_A.html).

Several Ocean Nutrition products list beta glucan among the ingredients. Marc Weiss brand products has an additive called Marine-Fish Vital™ that contains beta glucan. (The products mentioned above serve only as examples and are not intended as endorsements.)

#### **Notable Studies of the Effects of Beta Glucan:**

B-1,3 glucan has been demonstrated to enhance macrophage phagocytic functions (Riggi, Di Luzio, 1961).

Enhancement of macrophage number, function and size (Ashworth, Di Luzio, Riggi, 1963) (Burgaleta, Golde, 1978)

Increased spreading of macrophages has been used as an indicator of activation in studies on fish (Secombs, 1987).

Beta glucan generates a significant difference in macrophage cell diameter and spreading as observed 12-24 hours after incubation. (B. Sveinbjornsson, R Seljelid, 1993).

It initiates phagocytic activity and production of anti-microbial mediators. This includes leukotrienes, super oxide, tumour necrosis factor (TNF), prostaglandins and interleukins (Robertson, Engstad et al. 1994).

Feeding beta glucan enhanced macrophage activity in turbot (*Scophthalmus maximus* (L.)) (Debaulny, Quentel et al. 1996) and channel catfish (*Ictalurus punctatus*) (Duncan and Klesius 1996).

Another study reported that shrimp infected with Taura Syndrome had a survival rate of less than 20%. The administration of beta glucan increased their survival rate up to 90%. NSC-24™ in prevention of Taura Syndrome in shrimp. 1995, ImmuDyne, Inc. Unpublished

#### Summary

Beta-1, 3-glucan is effective in all mammals as it is in fish and birds with its immunoenhancing properties established in a number of fish species. It has applications for prophylactic and therapeutic use. Beta glucan may be used as an alternative to antibiotics and vaccines for protecting farmed fish against microorganisms, or microparasitic disease. It also can be used together with vaccines to improve the effectiveness and it is non-toxic to fish. Beta glucan also works well in conjoint therapy with other treatments.

Beta Glucan products have been in practical use for many years in animal feeds all over the world to improve health of aquaculture species, pets and farm animals. Pretreatment definitely increases survival rates with enhanced phagocytes function and the inhibition of cellular injury. An overall enhancement of immune response can be achieved by the use of beta glucan. This may in turn allow fish the opportunity to effectively combat disease. Using beta glucan as a dietary supplement carries the potential to significantly impact the quality of health as well as longevity.

## Busselton Jetty....

By: Maria White

Last month Chris & Maria ventured on out to Busselton to have a gander at the Busselton Underwater Observatory. For those of you that are unaware the jetty was built in 1865 & was added to up til the 1960's. The jetty was then believed to be the longest in the Southern Hemisphere 1841m.

1978, cyclone Alby destroyed a large part of the Jetty. Funds were raised and the State Government & Shire Councils became involved to provide the needed funds. However the funds ran out. The Jetty Preservation Society, formed in 1987 turned to the community for fundraising. In December 1999, a fire burnt 70 metres of the Jetty & through community funds a further \$900,000 was raised for repairs. With significant local, national and international interest the Observatory was built at a cost of \$3.6 million. Attracting 60,000 visitors a year.

Now the Jetty stretches almost two kilometres into Geograph Bay. At the end of the Jetty you'll find the Observatory. Venture down 11 metres to the seabed below. Through the viewing windows within the chamber you can watch the natural environment. As you look out into this underwater world you can experience an abundant of both. Soft corals & marine life. Chris enjoyed watching schools of Old Wives & Scats. Nudibranchs had it made with a feast totally surrounding them. The colours were gorgeous oranges, reds & browns.

We were both in agreement that the time allowed below was 40 mins max (not long enough) due to the tours being overcrowded and the guides voice was too quiet, when compared to the children on our tour. But on a much more

positive outlook, it's a great way to open the eyes of the public, Chris was very also impressed, I would say to you "wait a few more years, then venture out, it is still in its very early days".

For those of you who would like to view beneath the Busselton Jetty, a marine cam updates photos every 60 seconds Log onto:

[www.watercorporation.com.au/marinecam](http://www.watercorporation.com.au/marinecam)



## Fishy Links and News....

#### CULTURING MYSID SHRIMP

Anyone who is interested in refugeums, seahorses and or culturing live food items for their aquarium will find this link very informative. It details a setup for culturing Mysid shrimp. This culture setup was designed by the staff at the Marincio Bioassay lab for the purpose of disease free culturing of Mysids for use in their marine environmental toxicity tests. Mysids are a great food source for fish such as seahorses and in fact comprise much of their diet in nature. Wild mysids can be collected however this can be time consuming and not always reliable. Follow the link below for a detailed guide to setting up and producing your own mysids:

[http://biologylab.com/assets/docs/MBL\\_Mysid\\_Generat\\_or.pdf](http://biologylab.com/assets/docs/MBL_Mysid_Generat_or.pdf)

## Buy, Sell, Swap and Wanted?....

#### FOR SALE:

2ft cube tank on pine cabinet with hood & 32mm overflow in tank - \$250 ono

Tank 120cmW x 100cmL x 70cmH with tapered front on sandstone look cabinet with hood. Tank has 2X 40mm holes for external sump \$450 ono.

Contact Paul Groves on 0421 803 288 if you are interested.

#### WANTED:

Second hand Chiller to fit 250 Lt tank

Contact: Andrew Brandreth on 0423 801 552 or email [bsa@powerdsl.com.au](mailto:bsa@powerdsl.com.au).



<http://www.reefonline.com.au>



Reef Online are proud to announce that they have come on board as the first official sponsor of MASWA!

As part of the sponsorship agreement with MASWA, **Reef Online are offering 10% discount to MASWA financial members on everything in the store.** This is not an introductory offer, this offer will be in place for as long as the agreement is in place!

Reef Online prides itself on selling only the best in Aquarium equipment, such as AquaFX Water Filters, Korallin Calcium Reactors, AquaC Protein Skimmers, Salifert Test Kits, and only the best book titles... many of which are not available anywhere else in Australia!

So come and check us out at <http://www.reefonline.com.au> and see what all the fuss is about!

No web access, no problem... give Natalie a call on 0408 530 934!



*Advertisements in The Living Reef do not necessarily reflect MASWA's endorsement of any product, service or advice offered by the advertised business. If you would like to advertise in The Living Reef, please contact Nigel Clark (Social Coordinator) on 0412 412 681.*

The Marine Aquarists Society of WA is a name that we, as a group of friends with like interests have applied to ourselves for the purpose of information exchange. No one person, nor the group as a whole, can be held responsible for liabilities, injuries or other that may result either directly or indirectly as a result of our gatherings or the information exchange therein. The same applies to the information contained in this newsletter.