



March 2002

ATTENTION

This month's **MASWA** meeting is on **Wednesday, 27th March 2002**. Check your calendar, because it could be the day you receive this!!!

THIS MONTH'S MEETING

Our esteemed leader, President Nathan Cope is the host of our March MASWA meeting. Nathan's aquarium tends to change size and shape every meeting but this time his tank has assumed a size of 1239L and a shape resembling a mushroom cloud. In his tank Nathan has an assortment of hard and soft corals, fish, molluscs including clams and trochus and crustaceans. Nathan dislikes greatly the chore of cleaning his captive tropical marine ecosystem so he has trained his son Cameron to dive in and clean it for him. The address of Nathan's home is **21A Norton Road South Perth**. The meeting starts at **7.30pm SHARP**. *Please note:* Nathan lives on a back lot so all that is visible from the road is his driveway. Look forward to seeing you all there.

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LAST MONTH'S MEETING

Tony Fiorentino

Our meeting last month was held at the home of Terry and Valerie Peake. The Peake's would probably have more aquariums than any other MASWA members. Terry and Valerie have worked long and hard on this setup that boasts a centralised filtration system with a trickle filter and commercial sized protein skimmer, a coral tank, two mixed fish aquariums and an outdoor pond. All of the aquariums looked really healthy which was great to see. This was no surprise however as Terry and Valerie are real animal lovers as is evident when you walk into their menagerie of a house!

The outdoor pond was an interesting addition to the average marine setup. Terry and Valerie have used this to rehabilitate sick or injured corals from their display tank. The coral aquarium was nicely setup and had an interesting use of 12 volt dichroic lighting to supplement the fluorescent lamps over the aquarium. The corals in the tank looked healthy and have shown some growth since they were first put in.

The meeting was well attended by members and it was especially great to have our two special visitors from Fisheries WA, Eve Bunbury and Colin Charmers in attendance.

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SALTY NEWS

- **Captive Crossbreeding of Corals**

In this month's issue of the Fisheries WA magazine, *Western Fisheries*, there was a report of the captive spawning and fertilisation between two different genera of coral. The successful union of gametes from the two unrelated coral genera yielded a 100% fertilisation rate which under normal conditions in the wild or captivity is unheard of. Further more the fertilised crossbred corals have survived and are developing normally.

- **Reefing the Australian Way**

If you haven't already heard of our own Australian marine aquarium related discussion board then you have been missing out. This is a must for beginners and experienced aquarist alike and is a great way to make new friends in the hobby, both here in Perth and interstate.

Reefing the Australian way is a place where you can get advice on equipment and livestock that is actually directly applicable to what is available here in Australia. People from elsewhere in the world are also welcome to join in. <http://www.ozreef.org/rtaw/cgi-bin/ultimatebb.cgi> .



Reefy Hints and Tips

Ever wondered if all those 90 and 45 degree bends and long runs of pipe are affecting the flow from your pump? Well for the definitive word input your information into the head loss calculator <http://www.fishwish.com/HeadLossCalcInputForm.htm> . This handy little calculator is an excellent program that calculates the loss of head pressure due to pipe sizes and bends.

CALCIUM FOR DUMMIES - Part 1

Mike Andrews

As a reefkeeper over the past 12 years or so, I found the topic of calcium additions to be one of the most challenging and confusing to learn and master. I found a large body of information available, and many, many products that made claims to help increase and maintain calcium levels in the aquarium. Unfortunately, some of it was conflictual and most of it was very difficult for me to understand. So, I write this article with the intent of helping other hobbyist to learn what I've learned regarding calcium additions to the marine aquarium reef tank.

Let me begin by saying that I am not a chemist. Indeed, (and this may become obvious), I have not even attended a chemistry class of any kind. This is a distinct weakness in that my understanding of the complex chemical interactions involved in water parameters for the reef aquarium has been slow to advance, and is still far from complete. However, it may be a strength in that I may be able to explain, in layman's terms, some important concepts involved in the use of calcium in the reef tank. To those of you who are more chemically knowledgeable, I apologize for my overly simplistic terms and descriptions. To those of you just learning these concepts, I hope I can be of some help. It is my intent to use plain language, as much as is possible, so that even the newest of hobbyist can use this information in deciding how to add calcium to their own system.

Calcium on the Reef:

Calcium is a crucial element on the natural reef, and in fact is a building block of the reef itself. Many corals, as well as invertebrates, clams, desirable algae, and other creatures on the reef depend on adequate calcium being available to them in the water. This is provided by an elaborate dance in the ecosystem whereby coral skeletons, and other calcium rich materials, are broken down into bio-available calcium in the water. This system is highly complex and multifaceted, so mimicking this in our reef aquariums is difficult. However, this does not mean that we are unable to provide an adequate calcium environment in our reef aquariums.

Calcium in the Reef Aquarium:

In trying to determine what is considered a "good" calcium level for my tanks, I found a number of authors who mention various levels of calcium that are found on the reef. I also found a variety of suggested levels of calcium for reef aquariums. It seems to be generally accepted that the calcium level in the reef aquarium should be somewhere between 350 ppm (parts per million) and 450 ppm.

Calcium levels that exceed approximately 550 ppm in the typical reef setup will "precipitate" out of solution. This means that given the water conditions at the time (including elements such as pH, temperature, and alkalinity) the calcium is saturated in the water and no more can be held. At this saturation point, the calcium becomes solid and forms calcium carbonate. When this happens, the tank can appear as if it is "snowing", or may become quite cloudy. It would be logical to think that this calcium carbonate is indeed "calcium", so what's wrong with this? The problem is that this particular form of calcium is not available in a biologically acceptable form to the tank inhabitants.

If calcium is not added to the aquarium in some form, calcium levels will fall naturally as the calcium is used by the tank inhabitants. When calcium levels fall below 350 ppm, there is no calamity. Indeed, reef aquariums that have calcium levels below 250 ppm are not uncommon, and the vast majority of inhabitants are not generally in imminent danger at these low levels. However, specimens may not thrive and desirable algae may not grow well. It is therefore, desirable to try and maintain adequate calcium levels in the aquarium to promote proper coral health and colorful coralline algae.

Calcium and Alkalinity, pH, Salinity and Magnesium:

To the new hobbyist, these terms can be rather intimidating. And when you are trying to consider the relative effects of each on the other, it can become quite confounding. I will try and cover some of the basic elements of the interaction of these elements as it relates to calcium.

pH is simply a measure of the relative balance of hydroxide and hydrogen ions in water. In layman's terms, this means that there are hydroxide elements and hydrogen elements in the water. In a particular solution, whatever the balance is in these two elements determines the "pH". pH is measured on a scale from 0 to 14, with the midpoint, 7 being described as "neutral". Solutions with a pH measurement above 7 are considered "base", while those below 7 are considered "acidic". Seawater pH is typically 8.0 - 8.5, and is therefore somewhat "base". Another thing to note about pH, is that the scale is logarithmic. This means is that each gradation represents a factor of ten. So a pH of 8 is 10 times more base than 7, and 9 is 100 times more base than 7, and so on.

What is important about all this is that small changes in pH are very significant to tank inhabitants and to calcium levels. With all things being equal, the higher the pH of the water, the less calcium the water will hold "in solution". This is not generally a problem as long as the hobbyist keeps the tank pH within the prescribed range, 8.0 - 8.5. However, some methods of adding calcium will affect aquarium pH, which is why it is important to understand the relationship of calcium and pH.

Alkalinity, in short, is the water's ability to withstand additions of acids, without changing the pH. Other terms that are commonly used to describe alkalinity include buffer or buffering, DKH, meq./ltr., and carbonate hardness. For all practical purposes, they are all the same thing (there are some slight differences in some, but not enough for our purposes here). The elements that provide this effect are carbonates, mostly sodium carbonate and sodium bicarbonate. Alkalinity is necessary in the aquarium to help guard against large swings in pH, which will stress the tank inhabitants. Recommended levels range from 7 dkh to 12 dkh. The other commonly used scale to measure alkalinity is meq./ltr (read as megaequivalents per litre). To convert dkh to meq./ltr you simply divide by 2.8. Relative to calcium, the higher the dkh, the less calcium that will stay in solution. So long as alkalinity is kept in the acceptable range, this should not hinder achieving proper levels of calcium. But, like pH, some calcium additive methods affect alkalinity, thus this basic understanding.

I would also like to refer those who are curious about the calcium/alkalinity dance to an article written by Craig Bingman (Aquarium Frontiers on-line, July 1998): <http://aquariumfrontiers.com/1998/july/bio/default.asp>. This is an excellent discussion of the relationship between alkalinity and calcium, and recommendations regarding simulating natural seawater levels of both components.

Salinity is another factor in calcium concentrations. The above calcium recommendations are at full strength seawater with a specific gravity of 1.025. If the aquarium is kept at a lower specific gravity, then a given concentration of calcium measured in the water will really be at a higher relative concentration to the other water elements. Put simply, if your tank is run at lower than full strength seawater levels, then the required concentration of calcium will also be proportionally lower.

Magnesium is another player in the dance with calcium. Magnesium levels are typically pretty stable in the aquarium, and are easily maintained with routine water changes. However, if calcium precipitation occurs, or the hobbyist does not do regular water changes, magnesium levels can decline. The recommended level of magnesium in the aquarium is 1300 ppm to 1500 ppm. If magnesium levels do fall, calcium has been found to be much more difficult to get to the proper levels of concentration. However, I want to emphasize that when the hobbyist encounters difficulty maintaining calcium levels, it is best to rule out all other causes before considering magnesium deficiency. This is simply because it is far more often the case that other factors are at play in the problem. If it is suspected that magnesium deficiencies are a problem, it is recommended that a magnesium test kit be purchased and used to verify the problem. Magnesium supplements are readily available, and replenishment can also be accomplished through the use of Epsom Salts.

Next month in Part 2 of the "Calcium for Dummies" we will discover the different methods used to add calcium to the aquarium.



Reefy Hints and Tips

Use thin strips of old nylon stockings/pantyhose to mount soft coral frags and corallimorphs. The soft nylon doesn't cut into the coral as much as a rubber band does and is less harsh than veil material.

Upcoming Meetings

March 2002 **Nathan Cope**
April 2002 David Bloch
May 2002 *U could b here!*
June 2002 *U could b here!*
July 2002 *U could b here!*
August 2002 *U could b here!*

MASWA's World Wide Web address

The web address:
<http://www.ifocas.fsworld.co.uk/MASWA/index.html>

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MASWA Membership

Currently MASWA requests an annual \$22 donation from adult members, \$11 from Junior members. This covers the cost of newsletters, drinks, nibbles and other costs associated with the society. Members will receive information sheets and discounts on some products.

Members List

Warren and Valaria Schmitt, Terry and Valerie Peake, Tom Devilee, Jan Anderson, Craig and Lissa Beaufond, David Bloch, Darren & Raquel Collins, Nathan Cope, Andy Dolphin, Tony Fiorentino, Paul Groves, Sid Harrison, Robert Harwood, Simon and Rose Hawke, Frank & Ben Krause, Grant Magill, Wayne Mothershaw, Phil Searle, Paul Tayler, Greg Weryk, Steve Tofts, Ronald Tan

If you are a member and your name is not on the members list please tell the editor David Bloch as soon as possible. Names in italics indicate that the member receives an E-Newsletter (emailed newsletter).

If there is anything you would like to know more about or anything you would like to add to the newsletter, call or send comments to the editor, David Bloch. Remember, this is your newsletter. Additions to the newsletter need to be received by the editor no later than one week prior to the next meeting.