Fish & Chips

A Monthly Marine Newsletter
August 1999 Issue

From Us

By Elizabeth M. Lukan 8/17/99

Part two of my series of articles on Tridacnid Clams is below. This article covers information you need to know to setup your tank for and purchase your clams. The next article in this series will cover clam diseases, parasites, pests, and commensals. Some of these are briefly mentioned in this month's article, but the next article will go into greater detail.

Remember that article on Saltwater Sail-Fin Mollies by guest author Carol E. Keen? I hope so, it was only last month! Along with another author, Carol appears in the August issue of Freshwater And Marine Aquarium Magazine (FAMA). Carol and Theresa Ulrich wrote two articles, a book review of *"Seahorses: An Identification Guide To The World's Species And Their Conservation"* by Sara A. Louri, Amanda C.J. Vincent, and Heather J. Hall and *Project Seahorse: A Night At The Shedd Aquarium*. Both are worth looking at for those of you interested in the keeping or saving of seahorses. Carol Keen can be reached at her website, Fish To The Nth, at http://www.fishtothenth.com/ ***(updated 8/24/04)***.

This month, we are including a product description and review article on the KORALLIN Kalkreaktor (Calcium Reactor). This should provide some insight into the workings of these very specialized types of aquarium equipment. Hope you like it.

A new section called **Upcoming Events** has been added to Fish & Chips. Anybody with events they want posted should send me an email (FishNChips@mail.com **(address updated 4/26/00)**) with all the details.

From now on additions to #reefs library will be noted in the **Caught In The Net** section. #reefs is that great chat channel that hosts all those talks by fellow hobbyists, from famous to the regular Joe. I am honored for their permission to re-post this information (as well as any upcoming chats they have in the **Upcoming Events** section mentioned above). For more information on #reefs, visit their website at http://www.reefs.org.

Critter Corner

Caring For Tridacnid Clams

By Elizabeth M. Lukan 8/18/99

Tridacnid clams are beautiful, hardy, grow rapidly, and require little care. As with all pets (in your tank or otherwise), they must be taken care of properly in order to actually live up to that last sentence.

All of the above is true when speaking of a clam that is already well adapted to your aquarium. The initial adjustment to your tank, however, can be a considerably difficult time. The differences in lighting pH, temperature, salinity, water current, and more can be drastic. It's important to be as well prepared, in advance, as you possibly can for the care of your clam.

Your Tank's Lighting

To put it simply, the more light you provide your clams, the better they will do. OK, maybe it's not that simple, read on, you'll see what I mean.

According to The Reef Aquarium Volume One, Delbeek and Sprung have successfully kept these clams under lighting systems of both fluorescent (R.O., H.O., and V.H.O.) and metal halide (H.Q.I.). But, the book doesn't go into any detail on the number of bulbs, watts, light spectrums, tank size, etc. The most common lighting discussed where clams are concerned is metal halide, PC (Power Compact) or VHO.

Looking downward on these clams will give you the best view. With brighter lights, you can place your clams lower in the tank. With lower intensity lights, you will be forced to place them near the surface. This will limit your visibility of them (in the old fashioned tank and hood setup at least).

Clams with brown mantles do not require as much light as those with blue mantles, usually, and are considered easier to keep in the home aquarium lighting wise. Clams with blue mantles are usually found in shallow-water. The blue pigment acts as a light filter and so they require substantial quantities of light. A good rule to stick to is, the more colorful the clam, the greater quality and quantity of light it will need.

Light requirements are different for the different species of clams. T. crocea and T. maxima need the most light, followed by T. gigas, T. derasa, T. squamosa, and then Hippopus spp.

Most clams need a lot of blue light in the bulb's spectrum. T. derasa needs less blue light than T. gigas and T. maxima.

When you take a clam from the sea and place it in the aquarium, the difference in the

spectral composition of the light can have drastic impact on the clam's food supply. A clam at sea receiving the full light spectrum transferred to a tank with the same light intensity, only with blue wavelengths dominating, is receiving the same amount of light but some wavelengths are missing and others are in greater quantities. Depending on the clam's adaptation, some of the zooxanthellae's assimilation pigments may cease to function and pigments that would use the new wavelengths aren't even present.

What the last paragraph means, basically, is that the new lighting is incorrect for the clam even though the intensity of the illumination is the same as before. The clam can adapt to the new spectral composition, slowly, but the time needed for this to occur may be too long. This leaves the clam weakened, with less resistance to defend against predators, diseases, etc.

Smaller clams require less light. As the clam grows, its mantle will thicken and the number of zooxanthellae will increase (with the deeper lying zooxanthellae receiving less light) and it will require more and more light. Smaller clams, those less than 1.56 inch / 4.0 cm, require less light to maintain their optimum growth while the larger clams require more light. Also, juvenile clams will adapt to lighting variables more readily than adult clams.

What To Know And Look For When Purchasing Tridacnid Clams

Recently imported or transported clams usually exhibit a behavior called gaping. A gaping clam will appear as follows: shell fully open, mantle poorly extended, and inhalant siphon widely stretched. This eventually passes.

Gaping will continue if the clam is kept under insufficient lighting, is damaged, or unhealthy. The mantle will begin to pull inwards, shriveling and tearing between the siphons. A healthy clam's inhalant siphon can open wide sometimes, but gaping leaves a very wide opening. The clam will stay like this for as long as the clam is unhealthy.

Examine the mantle. It should be colorful everywhere with no clear or white areas. Colorless areas may be the result of poor lighting, predators, or disease. A clam will quickly recover from poor lighting once conditions are improved. It is normal for T. gigas to have clear areas near the center of their mantle. Also check for rips and tears in the mantle. A healthy mantle should be extended over the edge of the shell and not pulled inwards. It is normal for H. Hippopus' mantles to not extend over the shell.

Check the clam's reactions. A healthy clam should react to external stimulus by forcefully closing it's shell. Newly imported and transported clams tend to react more slowly, but will improve as they regain their strength.

The byssus gland should be undamaged. You should not see any torn or loose tissue hanging from the bottom of the clam. Some byssal strands may be visible, but no solid

tissue hanging loose. Byssal gland damage isn't always visible, so be warned. The clam may appear fine for a couple of weeks and then die suddenly for seemingly no reason. On the good side, byssal gland damage isn't always fatal. According to The Reef Aquarium Volume One, Delbeek and Sprung have collected and purchased damaged clams with little loss.

If the clam is attached to substrate, please take care when detaching. Lift the shell gently and insert a sharp knife, razor, or scissors and cut the threads as close as possible to the substrate. Do not cut close to the shell. You could cut into the extended byssal gland. If the clam is attached to a small rock, pebbles, etc., just leave it alone. T. crocea and T. maxima are very sensitive about being handled like this and are best left attached if possible.

A Hint For Clam Sellers

A good way to display your clam stock would be to place them on small cups or pots filled with crushed coral. This way the clam will only attach to the gravel. This makes it very easy to remove the clam when sold and with much less stress on the clam, it's byssal threads and gland, and the seller who has to dismantle their display to detach the clam while the customer stands around waiting. Rinse the gravel routinely to prevent worms from moving in. Also, the pots will help keep the clams upright and positioned properly under the light source.

Dealers can also hang a mirror above the aquarium (at a 45 degree angle). The customer will then see the true colors of the clams without having to contort themselves.

What Might Be Hitching A Ride

Clam's sometimes arrive with growths of encrusting organisms on their shells, especially T. maxima and T. squamosa. Check these growths very carefully. Dead or necrotic areas may foul your tank.

Various parasitic snails can be imported with your clam. Look for small rice grain-sized, cream colored spots near the base or hidden within the flutes (the grooves and indentations in the shell) of the shell, or, at night, along the upper edge of the shell. If the clam is attached to a rock, check by lifting the clam a short distance off the rock and look underneath. You are looking for small (0.08-0.2 inch / 2-5 mm long) snails. Remove all of these snails. If you have the facilities, quarantining your clam until you are sure all the snails are removed is a good idea. Also check for the egg masses of these snails and remove them as well. They are small, jelly-like masses on the shell. Don't confuse the jelly-like mass some clams excrete around their byssus opening for these egg masses.

Keep looking for these snails. Just because you think you got them all when you added the clan to your tank doesn't mean you really did! They are carnivorous boring snails and that

description should be enough for you to want them out of your tank and as far away from your clams as possible.

Symbiotic shrimp from the family Palaemondidae (Anchistus, Conchodytes and Paranchistus) or small crabs (such as Pea Crabs of the family Pinnotheridae) may be visible through the inhalant siphon in larger clams. These animals live inside the clam and do not harm it, although what they eat and what they do for the clam is unknown.

Placing Clams In Your Tank

Clams can close their shells with enough force to expel a surprising amount of water out of their siphons. If you place your clam near the top of your tank, this water may be out of the tank or up into your lighting system. Clam's may also accidentally trap small, slow moving fish that rest on their mantle (for example, mandarins, gobies, hawkfish, or blennies).

Putting your clam in your tank. Find as flat a surface as possible and place the byssal opening flat on the substrate with the mantle facing directly up. Horizontal surfaces are best for clam placement.

If you insist on putting your clam on an incline, make sure the byssal opening is on the lower portion of the substrate. Place the clam so the inhalant siphon (which lies above the byssal opening) is on the lowest portion of the slope. As the clam grows it will place greater strain on its byssal gland, so if the gland is on the upper portion of the slope, the weight of the clam could gradually pull the gland out. If the incline is too great, the clam will not receive enough light, so do not place it on steep substrate.

Adult Hippopus spp. tend to sit more on their hinge than on the byssal opening. They should be placed so that the majority of their mantle is facing upwards. Juveniles will attach themselves to rocks with byssus threads just as other tridacnid clams do.

Tridacnid clams do not like strong currents, especially T. crocea. Do not place them where they would receive strong, direct water currents. Too much current will cause your clam not to open. They do need water flow to bring nutrients to them, just not too strong.

Your clam may fall over several times before it firmly attaches. A good idea is to put some small rocks (crushed coral, large pieces of your substrate, etc.) around the clam to help it stay upright. These small rocks, etc. will not get in the way of the opening and closing of the shell. Your clam will attach within a few days to a week. Substrate is not related to attachment speed. Once your clam is attached, you can remove the rocks, unless the clam has used them in it's attachment.

Do not place your clam between large rocks, inside small holes, or up against the tank wall,

or you may prevent them from opening fully.

Don't leave a clam that has fallen over, upright it as soon as possible.

Keep your clam as far away from any aggressive coral or anemone as is possible in your tank. If sections of the mantle are pulled away or shriveled on the same side as a coral or anemone, it is probably irritating the clam and move the coral, anemone, or clam as soon as possible. Do not hesitate, or it will die quickly.

Remember the lighting requirements of the clam you are putting in your tank. Clams with colorful mantles need a great deal of light. Clams with brown mantles, not as much light. If your clam has a brown mantle, place it nearer the bottom of your tank, or shield it (an overhang would work well for this) from strong lighting if you have to.

T. crocea and T. maxima are found in rocky habitats so it is best to place them on rocks. T. squamosa, T. derasa, and T. gigas are best placed on sandy substrates.

Once placed, clams generally cannot move around on their own. This is why where you put them in your tank is of vital importance. Clams placed on hard surfaces (rocks) will not be able to upright themselves or shift their positions. Clams on sand can manage to upright themselves or shift positions with small movements. Don't expect your clam to move any great distances, remember last month's article - juveniles settle permanently, only using their foot to travel short distances. To make a general statement, the larger the clam, the less moving around you should expect, which basically means your clam's place in your tank and it's happiness there is really up to you.

Trouble With Pests & Predators

In the wild, small tridacnid clams are heavily preyed upon. Since most of the clams available to aquarists are juveniles, hobbyists should be extra cautious.

Many species of fish (triggerfish, large wrasses, puffers, etc.), crabs, lobsters, shrimp, polychaetes (Bristleworms, Fireworms, etc.), octopi, and snails prey on clams. Even burrowing sponges!

Certain wrasse species (Family Labridae) are bad tankmates. Species like Coris aygula (Twin Spot Wrasse) and Gomphosus varius (Bird Wrasse) have been known to attack and devour juvenile clams in the aquarium. Sometimes the clam is eaten from above or knocked over and eaten through the soft and unprotected byssal opening. Any large wrasse species should be watched closely when introduced into a tank with tridacnid clams.

Other fish can irritate clams. Fish that are constantly grazing like as Centropyge spp.

(Pygmy Angels), Ctenochaetus spp. (Chevron Tang, etc.) and Acanthurus spp. (Achilles Tang, etc.) Tangs, and Ecsenius spp. (Blennies) will occasionally nip at a clam in passing. Sometimes small pieces of tissue are removed but the problem is that the clam is now irritated and it will expand less and less. It may eventually expand so little that it won't receive enough light and will slowly die.

Large crabs will eat clams and usually shortly after they are placed in the tank, before they can attach to the substrate. They attack the clam through the byssal opening, but larger crabs just crack the shells open.

Certain species of shrimp can also prey on clams. Large shrimp such as Saron marmoratus (Marble Shrimp) and Saron sp. (Buffalo Shrimp) will attack clams at night. The common Cleaner Shrimp (Lysmata amboinensis) has been known to attack clams. It's rare, but it does happen, especially when the clam is injured and the shrimp hungry.

Parasitic snails are sometimes imported with tridacnid clams as mentioned earlier. Examine new clams closely and remove any snails or eggs right away.

Algae is another problem for clams. If algae begins to grow over the lip of the shell, the mantle may become irritated and it will not expand as much. Macroalgae like Caulerpa can irritate the clam from underneath if allowed to grow under the byssal opening. If this happens, the clam will produce large amounts of mucus from below that surrounds the base. This is a normal means of protection for the clam against algae, stinging corals, or predators. The mucus is thick, clear, and often contains brown patches (brown jelly). The effect of noxious by-products of soft corals (example: Xenia spp.) can also cause clams to produce large amounts of clear mucus. The mucus can quickly clog prefilters.

If Aiptasia are allowed to grow on tridacnid clams, they can reach underneath the mantle and sting the clam. This will result in the mantle pulling away and the clam will eventually die.

Polychaete worms such as the larger Nereis spp. and Eunice spp. can prey upon tridacnids. They are usually active at night and feed on the clam from below, through the byssal opening or by boring a hole through the shell.

Air bubbles can be a problem too. They can become trapped inside the clam and cause the clam's demise.

Caring For Your Clam

With proper lighting and careful attention that they are not being irritated or fed upon by other organisms, tridacnid clams require little else in the way of care. Remember, water

quality is never to be ignored. These clams receive the majority of their nutrition from their zooxanthellae, whether additional feeding is required is still debated.

Some hobbyists believe that tridacnids should be fed, going on the assumption that they are filter feeders like other clams.

According to The Reef Aquarium Volume One, when Delbeek and Sprung attempted to feed the clams, they closed forcefully and expelled the food. They may accept a dilute suspension of live phytoplankton or a yeast. However, the effort required to feed these items is not worth it in the opinions of Delbeek and Sprung. Delbeek and Sprung noted that for many years, Tridacnid clams have been grown successfully in both culture systems and home aquaria without any supplemental feedings and that bacteria, organic and inorganic compounds are always present in the water of closed systems (like our tanks), and these may be consumed or absorbed by the clams.

Of opposing opinion, Albert Thiel noted that in some cases supplemental feeding may be necessary. What those "cases" are was not mentioned. Mr. Thiel further notes that small foods should be used and that clams do not feed on large chunks of food. Use good quality food like shrimp or scallop meat run through a blender.

The nutrition and feeding requirements of clams in general was discussed in greater detail in last month's article, Tridacnid Clams: The Basics.

Calcium is the main building block for clams and should be present in the water at levels of at least 280 mg/L for growth to occur. More rapid, natural growth is seen when calcium is in the range of 400-480 mg/L.

Strontium is incorporated in the shell along with calcium and should also be provided for optimum growth. The addition of iodide to the aquarium will also enhance growth and color in clams.

High pH and temperatures can cause problems. Do not let the aquarium exceed 82 degrees or a pH above 8.3. Maintain a dkh of 7.9.

Salinity is also important, too high or low a salinity can cause the death of a clam. Try to keep specific gravity between 1.023 and 1.025.

The number one cause of a clam's demise is usually water quality.

As mentioned in the lighting section above, clams from shallow and brightly lit waters are normally more colorful (iridescent golden, green, or blue colors). The normal habitat (shallow reefs) of these clams can be considered a sign of adaptation. If the clam can

handle all the environmental factors of a shallow reef habitat like occasionally strong currents, changes in salinity, or temperature (to name a few), the clam will be more likely to handle the sometimes unavoidable changes hitting the reef tank of even the most observant hobbyist.

Remember everything your clam goes through when you place it in your tank. Keep this in mind if you ever consider moving your clam. If the clam is threatened, by all means move it, with care. But, remember, that it will have to re-adapt to all the different things in it's new spot - the different water current, the different light or shadows, etc. So, keep that in mind if you only want to move your clam because you think "it would look better on this shelf of rock over here."

Wild Collecting

Tridacnid clams have been exterminated in many areas because of overharvesting by fishermen who collect them for food and shells. The mariculture of tridacnid clams was begun to re-stock areas where the clams had been eliminated, and to provide a farm raised source of clams for food. A portion of the farm raised clams now goes to the aquarium trade. Profits from the demand of aquarists has raised interest in producing colorful varieties of all the species. For all these reasons, and more, please purchase your clams instead of collecting them from the wild. Ask your fish stores and online sellers to sell farm raised clams. And, of course, buy the farm raised ones yourself.

Remember, hatchery (culture/farm) systems are setup basically the same. Baby clams only live a short time in tanks, clams that are 0.75 to 1.25 inches (20 to 30 millimeters) are moved to ocean nurseries. They spend the rest of their growing, till they reach about 1.5 inches (4 centimeters) or more, in the ocean. This is true for majority of the clams, regardless of their species, that are marketed to the hobby. So, when you really think about it, even the farm raised clams are from the sea!

Till Next Time...

KORALLIN Kalkreaktor (Calcium Reactor)
- Product Description & Reviews -

Edited By Elizabeth M. Lukan, 8/2/99

*This is absolutely the **BEST-SELLING** kalkreaktor in Germany for a few years in a row already.* The **C-1500** Kalkreaktor allows a simple, elegant and high efficacy way to produce calcium hydrogen carbonate including the necessary balanced carbonic acid. It is ready for immediate operation with its integrated Eheim powerhead (ceramic axis + carbon bearings), KORALlith media, and a CO2 component kit. It is rated for aquariums up to 400-gallon. On account of its small overall height (approx. 16"), it can be set up readily under the aquarium and also inside the sump box!

The internal recirculation flow rate of the C-1500 is around 80 g/h. Since that a *relatively high internal pressure* is present within the C-1500, the dissolution of the sand media by the carbonized water is enhanced. The effluent rate is only about 0.25 g/h. CO2 is being administered into the Eheim powerhead direct.

The maintenance of C-1500 is conceivably simple. All of the substrate is being replaced with new every 3-4 months. Further maintenance limits to an occasional adjustment of the CO2 and the effluent flowrate. For simple ventilation, C-1500 has a separate ventilation possibility. The energy consumption of the employed 110v Eheim pump is minimal at 5 Watt. All imported from Germany.

Other unique features:

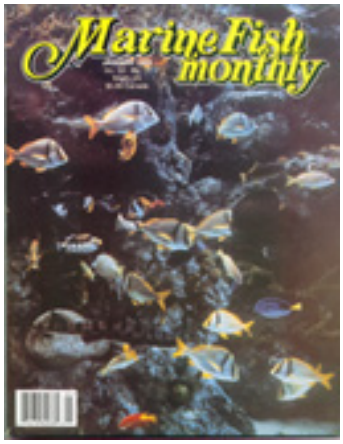
- Absolutely no fragile and unsightly PVC hangovers. Extremely sturdy Excelon construction for safe shipping and versatile positioning.
- Amazingly small footprint - 6 INCHES diameter!
- During function, the Korallin Kalkreaktors create an underpressure within its column such that aquarium or sump water can be sucked in actively, enabling a more reliable alternative way to the feeding pump or gravity-fed (siphon) methods.
- Extremely low CO2 consumption (only 10 bubbles per minute!!) due to its unique ***aspirating-venturi*** feature. CO2 is being introduced into the Eheim's impeller for a more thorough and even mix with the aquarium water.
- Extremely efficient Calcium Carbonate consumption. 3kg & 6.5kg of the media can support a system of up to 400 & 800-gallon respectively!

- Excessive CO2 indicating feature. Any minute excessive CO2 can be detected by its unique Visual Excessive CO2 Reservoire.
- Unique Eheim pump orientation and its "overheat-switch" to prevent excessive CO2 from entering your aquarium. Accumulated excessive CO2 air-pocket will enter the Eheim pump and stop it from functioning completely by breaking the water circuit. This is why the Eheim pump is positioned on top of the kalkreaktor.
- CO2 Ventilation Valve. To release the accumulated excessive CO2 from the chamber easily.
- High-quality miniature real ball valve to maintain a consistent effluent drip-rate.
- O-Ring on bottom to ensure leak-proof operation.
- Utilizing integrated Eheim pumps. Comes with a 24-month warranty.
- JACO pressure fittings for easy airline attachment!
- Protective strainer to prevent the Eheim from sucking in loose media particles.
- KORALLIN's original high-quality hydraulic-use precision CO2-safe Bubble-Counter included. Now even comes with 'industrial-grade' Brass Check Valve from German Air Pressure Systems. See picture.
- All tubing thickened substantially for safer transportation.

- ***C-1500*** - Rated for up to 400g. Reactor height: approx. 15.75"; Diameter: 4.5"; Ground: 6.25"; Filling amount to 3 kg. Eheim 1046 recirculation powerhead, bubble counter & brass check valve included. $349
- ***C-3000*** - Rated for up to 800g. Reactor height: approx. 30"; Diameter: 4.5"; Ground: 6.25"; Filling amount to 6.5 kg. Eheim 1048 recirculation powerhead, bubble counter & brass check valve included. $449
- ***Industrial-grade Brass Check Valve*** - Used by German Air Pressure Systems. $35

- Check out ~~http://www.marine-monsters.com/front/products/co2.html~~ ***(url dead 8/24/04)*** for information on our ***CO_2 System Component***.
- Fully-automate your calcium reactor setup with the ***Duo-ORpH Controller***. For more information check out ~~http://www.marine-monsters.com/front/products/controller.html~~ ***(url dead 8/24/04)***.

KORALLIN C-1500 Kalkreaktor
Product Review Article in Marine Fish Monthly Magazine
by Bob Goemans, Ph.D, January 1999



For those of us that maintain reef aquariums, those not equipped with a calcium reactor usually require more husbandry skills in the area of alkalinity and calcium control. Calcification rates by stony corals, coralline algae growth, precipitation of calcium and magnesium/calcium clogged powerheads and/or the demand on system carbonates and bicarbonates to maintain pH and/or alkalinity put a severe drain on these seawater elements. This greatly adds to the level of time needed to properly maintain the reef aquarium. For those of us that have learned of calcium reactor benefits, we now sit back and have time for the spouse again so to speak. At least, that's how my wife described it, however, not exactly in those words!

Reactors in general fall into a category of highly specialized equipment. There are those that add dissolved oxygen, control carbon dioxide/pH levels, or those such as calcium reactors which supplement/control alkalinity/calcium levels. Reactors are useful for those hobbyists who want to maximize certain aspects of their marine environment. However, in the wrong hands, they can quickly get out of control and ruin a perfectly good aquarium. If there is a parameter that could be enhanced with a particular reactor, it may be a good idea to ask someone, especially someone that is not selling the device, if it's something you really need. Yet, where the reef hobbyist is concerned, I doubt whether there's a system that wouldn't benefit from a calcium reactor.

As for calcium reactors, they are filled with a calcareous material such as crushed coral, oyster shell, or aragonite. A small amount of carbon dioxide (CO2), supplied by a compressed CO2 cylinder, is mixed with incoming water from the aquarium. The pH reduced/acidified water, near 6.0, is then circulated throughout the reactors calcium carbonate media, slowly dissolving it and thereby releasing small amounts of calcium, various carbonates and bicarbonates along with some trace elements. The water in the reactor experiences a rise in dKH, and is slowly returned/dripped back into the aquarium. Calcium reactors also come with a device called a bubble counter, which is nothing more than a clear cylinder filled with water in which you can see/control the flow rate of CO2 bubbles entering the reactor.

Okay, you're now thinking about how much time/cost/hassle would be saved if you no longer had to prepare and add Kalkwasser, and/or dose other types of calcium/buffer additives. You might even get to know your spouse again! Imagine having a very stable reef aquarium environment where calcium level remains in the 400's, and alkalinity is easily maintained between 12 to 16 dKH! Just imagine your supply of additives reduced to only iodine! Well, that's very possible if you have a calcium reactor connected to your aquarium.

Monolith Marine Monsters asked me to test their new, 'second generation' KORALLIN C-1500 Kalkreaktor. I say 'second generation' because this new improved version has

corrected some bothersome design issues in the initial version. I'll explain more about these improvements further on in this article.

Let me begin by saying that the clear acrylic cylinder-shaped KORALLIN Kalkreaktor is a quality made unit. It comes in two sizes: a C-1500 model rated to handle a 400 gallon reef system; and, their C-3000 unit, rated to handle a 750 gallon system. The C-1500 unit stands 15.75 inches tall including the top mounted Eheim pump and its connecting piping. It holds 6.6 pounds (3 kg) of media. The C-3000 is 30.0 inches tall, holds 14.3 pounds of media and has the same footprint as the smaller unit.

The KORALLIN unit has many features not found on other calcium reactors. The first of which, is its extremely small footprint, a six inch diameter! Second is its extremely sturdy construction. Another feature is that its Eheim pump is top mounted so as to stop excessive CO2 from entering the aquarium. And, its Eheim pump consumes only five watts of electrical energy on the C-1500 unit and ten watts on the C-3000 unit, besides being totally quiet when operating! If that wasn't good enough, CO2 usage is extremely low because it's drawn into the Eheim's impeller where it's reduced into millions of micro-sized bubbles and mixed with the circulating water inside the unit. This unique aspirating-venturi feature provides for very efficient use of the CO2 gas and reduces the needed flow to approximately 10 bubbles a minute! Yes, I said ten bubbles a minute, not one to two bubbles per second as in some other reactors!

During the initial installation/operation of the unit, there may be some trapped air in the units pump, inlet tubing or in the media itself. It may finally manifest itself as an air space at the inside top of the reaction cylinder. However, there's a ventilation valve located in the top of the unit that can be opened, so as to bleed-off the accumulating air.

As mentioned above, the Eheim is located on the top of the reactor cylinder. If an excessive amount of CO2 gas is applied and creates a large enough air pocket at the top inside of the unit, the gas would flow into the internal inlet of the pump, which extends downward about one inch from the top of the reactor, and halt circulation of water within the unit. If this happens, the pump has now become air bound and even though it's still running, it's not drawing water from the aquarium or returning any effluent. If the Eheim pump runs dry, there is an overheat switch that will stop the pump from running, as well as producing an audible tone to notify the hobbyist it requires attention. Opening the ventilation valve, a quality made ball valve, will bleed-off the excess CO2. However, the speed of the CO2 bubbles needs further tweaking so it will not continue to occur. Once the flow of CO2 bubbles are correctly regulated, somewhere between 10 - 12 bubbles per minute, no further air pockets should occur.

The demo model, a C-1500 unit, its Eheim pump and bubble counter arrived on my doorstep via the brown gorilla covered in bubble-wrap inside a small cardboard box. The unit is so well made that it could have been shipped without any protective covering!

However, the written instructions for loading the unit with media and adjusting its flow need further revision. Revised instructions will soon be available. When I first looked at the unit, I thought, "how strange, it loads from the bottom, and that could easily clog its top input to the pump." I called Edward Tsang with Monolith Marine Monsters and asked if there was anyone with previous experience with the unit. He recommended I call Gianni Angelidi with Tropico Reeflife in Florida. Gianni was kind enough to describe the earlier unit and we compared it to this second generation model. Instead of iron bolts in the removable, O-ring fitted base, the new unit had stainless steel bolts **(m3: All the high-grade stainless steel bolts can be replaced by the included nylon bolts)**. Also, all tubing fittings, i.e., effluent, inlet, and CO2 inlet were now leak-proof nylon compression fittings. Big improvements I must say!

Gianni suggested placing a powerhead strainer, over the Eheim's internal inlet tube. I removed the bottom plate of the unit, placed a screen from an old powerhead over the Eheim's inlet tube and filled the unit to the prescribed depth with the supplied KORALlith media, a phosphate free calcium carbonate product having a grain size of about 4 - 5 mm. The base plate and O-ring were reinstalled and it was time to install the Eheim pump, which took all of ten seconds! Its inlet and outlet connections simply slip into corresponding vinyl tubes already on the reactors top surface. A small nylon screw firmly secures the Eheim's base plate to the top of the reactor. The inputs to the Eheim come from three sources: CO2, water from inside the reactor, and that coming from the aquarium. It has one output connection that delivers conditioned water back to the aquarium.

The Eheim continues to circulate these two sources of water and CO2 in the unit. Water is withdrawn from underneath a small felt covered plenum at the bottom of the unit by a long tube extending from the pump to just below the plenum, thereby providing a well mixed effluent high in dKH/calcium and very low in CO2 for return to the aquarium. Next, the bubble counter was mounted near the reactor and connected to the Eheim and its supply of CO2.

Through one of the still open connections (the effluent fitting), the unit was filled with aquarium water. I used a small powerhead with a length of airline tubing to fill the unit while leaving the ventilation valve open to bleed-off air inside the unit. When the reactor was full, including the Eheim pump, I inserted the effluent tube, tightened its fitting and closed the ventilation valve. All tubing for hooking up the effluent, feed line and CO2 supply lines is regular airline tubing, and it works well! In fact, it is recommended that silicone tubing not be used. KORALLIN say's that it has been proven there is a certain chemical reaction between carbon dioxide and silicone tubing that makes the reactor less efficient. Another feature is that there are no unsightly PVC piping or fittings! I started the pump and adjusted the effluent rate to 40 drops per minute and the CO2 bubble rate to 10 bubbles per minute. In twelve hours I had an effluent that was 15.5 meq/l, or 45 dKH!

Keep in mind the effluent should enter the aquarium/sump a little above its surface so you

can count the returning drops. There's another small quality-made ball valve that comes with the unit for placement in the effluent tubing so you can control its flow. All in all, it's an extremely small, totally quite and efficient, both energy-wise and effluent-wise, unit and it did not have any leaks.

Before I close this review of the KORALLIN Kalkreaktor, I want to note that it doesn't come with a CO2 bottle or regulator. These are something you will need to supply and there is some thought on this subject matter that you should be aware of before you purchase this type equipment. First, I highly recommend you purchase your CO2 bottle from a local welding supply company. Bottles come in different size, i.e., 5, 10, 15, 20 pound and larger. But, since you are going to refill the bottle at some point in time, your local welding company may not want to refill a bottle they have no safety record on. For safety reasons and your convenience, I recommend you procure your bottle from a local welding company. Next, it would be more practical to purchase a regulator that is equipped with a "solenoid." For those of you that are not familiar with that term, it is simply an electrical device that will shut off the gas flow when there is a power failure. If you purchase a regulator without a solenoid, CO2 will continue to flow during a power outage, possibly evacuating the reactor water and then finding its way to your aquarium, introducing a large dose of CO2 into the aquarium. Purchase a regulator equipped with a 110V solenoid.

As you may know, I've used calcium reactors for the past few years. But with the KORALLIN Kalkreaktor, I'm finding my pH remains slightly higher as no excess CO2 is entering my aquarium, there is no heat or noise associated with the Eheim pump, and energy consumption is extremely low. Add to that its extremely small footprint and it makes for a unit that is probably impossible to beat in features and price. However, I've had to increase effluent rate to about 70 drops per minute to keep pace with the alkalinity/ calcium draw in my 125 gallon reef aquarium. This has reduced effluent dKH to about 9 meq/l, but seems to be working quite well. For that reason, I'm unsure if the C-1500 would adequately handle a 400 gallon reef system where there were many sps corals and significant coralline algae growth. Also, loading from the bottom doesn't make sense and this aspect of the unit should be changed in future production models **(KORALLIN responds: There is one and only one reason to use this exclusive bottom-loading method: Which is to place the recirculating pump on the top instead of at the bottom. And no other manufacturers dare to do this so far except KORALLIN. Reasons being that others may NOT want you to see the excessive CO2 which results from a less-than-100% dissolution between the CO2 and the media. Others prefer you to think that if the CO2 can't be seen and collected, it must be dissolved with the media. As a matter of fact, in most cases, the excessive CO2 already escaped and goes into your system! They may not pose an immediate effect in your pH, but your hairy algae will sure love this 'gaseous fertilizer'. Only KORALLIN's intensive research and precise design and engineering which makes the most efficient use of the CO2 and the media is capable of demonstrating a 100% efficient CO2 usage during operation! So in order**

not to incorporate the external PVC tubing configuration like the other kalkreaktors on the market and deal with all the disadvantages, we are very proud of this bottom-loading design and will continue to use it. Also, it involves basically the same procedure and steps with a conventional top-loading kalkreaktor for maintenance and refilling purposes. Because the housing is always completely filled with water and under internal pressure, the locations of the inlet and outlet tubes are irrelevant to leakage if that is what some of you worry about. Our kalkreaktors are guaranteed not to leak.) Okay, what is the unit's price. ~~The C-1500 sells for $375, and the C-3000 sells for $550. To refill the C-1500, the KORALlith media costs $24~~. ***(m3: Please see our current pricing.)***

Of course, you may like adding calcium and buffer to your aquarium or having a closet full of additives! You may also like cleaning powerheads of calcium buildup every six months! If that's the case, don't checkout the KORALLIN Kalkreaktor! However, if the spouse is demanding more attention, contact Monolith Marine Monsters for further information.

KORALLIN C-1500 Kalkreaktor
Product Review Article in Freshwater And Marine Aquarium Magazine
by Bob Goemans, Ph.D, July, 1999

When Monolith Marine Monsters asked me to test their new "second generation" Korallin Kalkreaktor, I thought it best to voice my position on these type endeavors before doing so! I wanted them to know I've never been a paid employee of an aquarium product company nor have I ever received payment for the use of my name. I have been in the hobby for over fifty years... **(m3: text deleted)** If it were a poorly designed product or had no positive value for the organisms or the valuable chemical and microbial processes in our aquariums, the product review would never reach the hobbyist... **(m3: text deleted)**. However, Monolith Marine Monsters already knew my position on these matters and felt confident that I would be impressed with their product... **(m3: for the complete article, please read the magazine)**.

About Bob Goemans, Ph.D

Bob Goemans, Ph.D, author and consultant. Over fifty years in the aquarium hobby. Contributing Editor/Columnist for Marine Fish Monthly and Freshwater and Marine Aquarium magazines. His column Salt Corner has been running for over 12 years in Marine Fish Monthly. Dr. Bob Goemans had personal experience with most other brands of calcium reactor prior to the

composition of this product review article. This indicates that Dr. Bob Goemans finds the KORALLIN Kalkreaktor the **best** calcium reactor on the market today. And after the review, it is indeed the only choice of calcium reactor he chooses for his own personal use. Shouldn't it be yours, too?

Editor's Comments:
Articles above were obtained from the Monolith Marine Monsters (m3) website at http://www.marine-monsters.com ***(url dead 8/24/04)*** with the permission of Edward Tsang. Editing was limited to re-working the html to the Fish & Chips format and correcting a few grammar errors.

Photo Credits:
All images with this article were obtained from the Monolith Marine Monsters (m3) website at http://www.marine-monsters.com ***(url dead 8/24/04)*** with the permission of Edward Tsang.

Nova Wet/Dry Filter with Venturi Skimmer

- A Hobbyist Skimmer Review -

Edited By Elizabeth M. Lukan, 8/4/99

General Information:
All ratings are 1 through 10 (10 being the best or yes, 1 being the worst or no). The items in parentheses are only given as a more detailed explanation and to give you an idea of what was meant by the category. Permission to publish these reviews was obtained through a clause in the survey. See the end of this article for review, survey, and article credits.

Construction Quality (Acrylic thickness, polish, glue job, etc.):
Score: 6

Aesthetic Quality (Does it look good, etc.):
Score: 9

Performance (Does it keep your water clean, must you adjust it all the time, etc.):
Score: 8

Foaming (Does it do it consistently, is it nice and thick, is it dark, etc.):
Score: 8

Ease Of Installation:
Score: 10

Would you buy it again?:
Comments: *Editor's Note - Instead of yes or no, reviewer said "4".*

Electrical Efficiency (Does the pump it uses work well, etc.):
Score: 6

Plankton Level (Do you have a lot, etc.):
Score: 2

Overall Value (Did you get what you paid for, etc.):
Score: 8

Overall Satisfaction (Do you like it, etc.):
Score: 7

Comments:
It's a Nova Wet/Dry with a built in venturi protein skimmer. After I figured out how to make it work like a champ, it has been alright. It has to have the collection tube cleaned out with a brush and a paper towel every 3 to 7 days to be effective. Also, the venturi valve gets salt buildup that I use a twist-tie wire to clear out every other day to really get the bubbles going. The unit came with the used setup that I bought with my tank, it works well drawing out a pint to a quart of skimmate per week of a dark brown consistency.

Review, Survey, and Article Credits:
Review by Anonymous.

Survey created and hosted by Ian McDonald (IANsSnakes@aol.com) **The Survey is closed.**

Ian would like to extend his thanks to Chris Paris (aka Cap) and Steve Wolfe (aka NerveGas) for all their assistance in getting the survey going.

Editor's Comments:
Editing was limited to spelling corrections and some grammar (capitalizing the beginning of a sentence, adding a period at the end, etc.). No other editing was done, what you read was exactly what was sent to Ian by the reviewer.

I was unable to find any Wet/Dry filter called Nova. I checked 10 sites that sell filters. Sorry folks.

Caught In The Net

By Elizabeth M. Lukan 8/17/99

New Articles On #reefs

Live Sand Examination by Ron Shimek
http://www.reefs.org/library/article/r_shimek4.html
How do you measure how live your sand bed is? Well, Ron posted a simple technique which you can gauge how well it is populated.

Wild Larval Fish Collection and Raising by Bob Mankin,
http://www.reefs.org/library/article/b_mankin.html
Bob provides some details on the possibilities of collecting and raising fish larvae for the hobby, it certainly has some great possibilities.

Members' Aquarium Series talk by Michael Buckley http://www.reefs.org/library/members/m_buckley_080599.html

This Month's Selection From The Fish & Chips Site List

Informational & Educational Sites

Chat Area

- **Fish To The Nth - http://home.earthlink.net/~fish2nth/ (9/20/99)**
  (address updated 4/19/00)
  "I specialize in getting in what people are looking for, even if it is harder to find. Live food, such as ghost shrimps, aren't updated to the site, but I am selling them. And, ALL fish sold are in good health, and parasite treated before they leave here. I have sold to Public Aquariums, but I love selling to the individuals and provide after sales support for the fish they get from me. Sincerely, Carol E. Keen/Fish To The Nth"
- ~~**http://www.fishroom.com**~~ ***(url dead 8/24/04)*** **(7/29/99)**
  "We are a community. Always looking for people to help."
- ~~**Monolith Marine Monsters (m3)**~~ **- http://www.marine-monsters.com** ***(url dead 8/24/04)*** **(6/25/99)**
- **Reefers - http://www.acropora.com (1/12/99)** ***(url dead 10/03/05)***
  (Listed by ELukan, Fish & Chips)

The above list matches a portion of the site list maintained on the Fish & Chips Website as of the date of this publication. What you see above is what was listed as on their site by the submitter. The date that follows in parenthesis is the date submitted to the list. For the complete up-to-date list, check out the Fish & Chips Website at http://www.marinefiends.

com/ ***(updated 8/24/04)***.

Site Submission and Updating: To submit your site for inclusion in the Fish & Chips newsletter and website based Site List, please go to the Fish & Chips Website at http://www.marinefiends.com/ ***(updated 8/24/04)*** and complete the Site Submission Form. Please do **NOT** send any site submission or update requests via email - ***I will not process them***. Of course, emails are welcome if you are having trouble submitting the form or if your browser doesn't support forms.

Chips...er...Tips

Buying Livestock During A Heat Wave

By Elizabeth M. Lukan 8/14/99

Most of the United States is just coming out of a major heat wave. I know that here in New York, we've broken a number of records. Trust me, I'd rather we hadn't. Between running two air conditioners and a fish tank chiller, my electric bill is through the roof. But, the alternative was a sweaty, cranky two-year old, an equally annoyed Mom, and a fish tank full of boiled critters. Which brought to mind this month's tip. While talking with a friend about buying some Peppermint Shrimps to end my Aiptasia woes once and for all, she asked if I could wait until September because she told her divers not to bother until the heat wave had passed because she wouldn't be chancing any animals' lives till after. Well, let's just say I smacked myself right in the forehead for that one. Here I am, the publisher of a marine newsletter that's supposed to help others do the right thing by the animals they keep, pricing an order for delivery in the middle of the hottest summer in history. DUH! So, with that in mind, think about the poor animals and how they'd feel sitting on the airport runway, or in the mail carrier's truck, or however they have to go to get to your door in heat over 100 degrees. I told my friend, that yes, I'll take those Peppermints, but not till she thinks it's safe to ship them.

To Submit Your Tip: Send your tip via email to FishNChips@mail.com **(address updated 4/26/00)** ~~with a subject of *Tip Submission*~~ **(information updated 4/26/00: coding replaces need for subject notation)** and I'll publish it in an upcoming issue of Fish & Chips. I'll write it up for you or you can do it yourself if you are so inclined. Make sure you let me know if I can include your name and email address or if you'd rather go anonymous.

Upcoming Events

By Elizabeth M. Lukan 8/14/99

August 1999

Date and Time: Wednesday, August 25th at 9pm Eastern (New York, USA) on #reefs
Info: One View on Where are we Going, an In-Depth Look at the Hobby, Trade, and Future of the Business Dealing with the Marine Hobby with Jonathan Lowrie (aka SeaMuskrat).
Access: See http://www.reefs.org/times.html for the times around the world and http://www.reefs.org/access/ on how to connect to #reefs.

September 1999

Date and Time: Sunday, September 5th at 9pm Eastern (New York, USA) on #reefs
Info: Photosynthesis/Irradiance (P/I) Curves and Why They are Important to ReefKeepers with Dana Riddle.
Access: See http://www.reefs.org/times.html for the times around the world and http://www.reefs.org/access/ on how to connect to #reefs.

October 1999

The 1999 Eastern PA Reef Club Symposium
Date and Time: Saturday, October 16, 1999. Registration starts at 9:00 AM, Seminar starts at 10:00 AM. The event will end around 6:00 PM.
Guest Speakers: Joyce Wilkerson, Todd Gardner, Noel Curry.
Location: East Stroudsburg University, 200 Prospect Street, East Stroudsburg, PA, USA 18301-2999
Cost: EPARC Members: $15, Non-EPARC Members: $20, ESU Students: $13
Info: For more information go to ~~http://www.eparc.com~~ ***(url dead 8/24/04)*** or direct link to ~~http://www.eparc.com/fall1999/symposium.shtml~~ ***(url dead 8/24/04)***. To order via a credit card go to http://www.acropora.com ***(url dead 10/03/05)***, click Catalog and then EPARC. If you have any questions please email William Horst, President of the Eastern PA Reef Club at ~~president@eparc.com~~ ***(url dead 8/24/04)***. They are limited to 125 people in the amphitheater seating at the University, so please order your tickets today. You will definitely not want to miss this event!

To Submit Your Event: Send your event and all the specifics (date, time, location, pricing, contact info, etc.) via email to FishNChips@mail.com **(address updated 4/26/00)** ~~with a subject of *Event Submission*~~ **(information updated 4/26/00: coding replaces need for subject notation)** and I'll publish it in all issues of Fish & Chips prior to the event.

What the ... ?

By Elizabeth M. Lukan ?/?/99

Byssus Gland

The structure in clams that produces fibrous threads (byssus) that attach the clam to substrate.

Commensal / Commensalism

A symbiotic relationship between two organisms of different species in which one derives some benefit while the other is unaffected.

Mantle

Large, pigmented fleshy portion of tridacnid clams that is exposed to the light by gaping of the shell valves. Also called siphonal tissue. Also coral tissue is fleshy polyps (e.g. Catalaphyllia).

Necrosis / Necrotic

Death of cells or tissues through injury or disease.

Phytoplankton

Microscopic algae which is suspended in the part of the water column that is penetrated by light.

Siphon

The inhalant and exhalant siphons of tridacnid clams are used to allow for gas exchange and to expel wastes.

Zooxanthellae

These are the tiny plants called dinoflagellates (single-celled microscopic organisms which belong to the Protista kingdom) that live symbiotically with corals, tridacnid clams, and some sponges. They provide food for the host and in return get the nitrogen, phosphorous, and carbon dioxide they need for growth. The scientific name is Symbiodinium spp.

Prove It!

By Elizabeth M. Lukan 8/17/99

The American Heritage Dictionary, Third Edition, Copyright 1994 by Houghton Mifflin Company

Exotic Tropicals, http://www.exotictropicals.com

Freshwater And Marine Aquarium Magazine, May 1996, The Secret Of The Giant Clam by Annie Mercier & Jean-Francois Hamel

Freshwater And Marine Aquarium Magazine, August 1999, Buyer's Guide To Corals Part 3: Assorted Reef Animals by Michael P. Janes

Monolith Marine Monsters (m3), http://www.marine-monsters.com ***(url dead 8/24/04)***

Aquarium Frontiers (http://www.aquariumfrontiers.com), October 1997, On The Half Shell By Daniel Knop

The Reef Aquarium Volume One by J. Charles Delbeek and Julian Sprung, First Printing July 1994, Published by Ricordea Publishing

The Wave - Eastern PA Reef Club Newsletter Volume #1, Issue #9, July 1998, Tridacna Clams By Todd Kunkel, found on the Eastern PA Reef Club website, ~~http://www.eparc.com~~ ***(url dead 8/24/04)***

Tips on Clams, especially Tridacnid Varieties by Albert Thiel, 11/18/98, found on Thiel Infobase, http://www.athiel.com

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