REEF HOBBYIST MAGAZINE

THIRD QUARTER 2015 | VOLUME 9

THE SEARCH FOR SOLOMON ISLAND *STUNNERS*

MEET MARITZA, THE VASE REEF

GET YOUR FEET WET WITH A FOWLR TANK

LEGENDS OF THE AQUARIUM

SOME LEGENDS PREFER NOT TO BE SEEN! WHILE INVISIBLE ONCE ADDED TO YOUR AQUARIUMS, THESE LEGENDS ARE WORKING 24/7 TO KEEP YOUR AQUARIUM HEALTHY.

AQUAPLUS
Makes tap water safe by removing Chlorine, Chloramines and toxic metals. Aquaplus also contains Herbal Extracts to help protect fish from injury and stress.

CYCLE
Rapidly removes toxic ammonia and nitrite. Contains massive amounts of bacteria that rapidly establishes a safe aquarium environment.

WASTE CONTROL
Reduces waste build-up on gravel, power filters and most surfaces inside the aquarium.

FLUVAL

fluvalaquatics.com

Seachem®

Celebrating 35 years

Digital Spoon Scale

- Ensures precise dosing of any chemical or supplement
- Measures up to 300 g in 0.1 increments (g and oz)
- Corrosion resistant
- Simple 3 button operation
- Battery operated

When precision matters, the Seachem Digiital Spoon Scale is the perfect companion tool for the serious aquarist. Accurate and easy to use, it will ensure precise dosing of any chemical or supplement up to 300 grams in 0.1 increments. The LCD display will display results in either grams or ounces and can be switched at the push of a button. It is corrosion resistant and colored to resist stains. It runs on 2 AAA batteries (included) with an easy-access battery compartment.

Seachem Laboratories, Inc. • 1000 Seachem Drive, Madison, GA 30650 • 888-SEACHEM • www.seachem.com

FEATURES

36 ON THE COVER

THIRD QUARTER 2015 | Volume 9

ANNOUNCEMENTS

- Want to share your breeding or husbandry success with the world? We are always looking for interesting articles to share with our readers. Email us with your ideas at info@rhmag.com.
- Hard copy subscriptions are available to hobbyists in the U.S.! Scan the QR code below or visit us at www.reefhobbyistmagazine.com to sign up.

RHM-SPONSORED EVENTS

(latest issue available at these events)

- **Reef Visions Community Frag Fest:** July 25, Tampa, FL – reefvisionscommunity.com/frag-fest-2015/
- **Red River Reef & Reptile Expo:** September 26, Fargo, ND – redriverreefandreptileexpo.com
- **Reef-A-Palooza California:** October 10-11, Costa Mesa, CA – reefapalooza show.net
- **Mid-Atlantic Marine Aquarium Expo:** October 17, Virginia Beach, VA – midatlanticmas.org/mamax-2015/
- **Cincy Reef Frag Swap:** November 7, West Chester, OH – cincyreef.com

DIGITAL & HARD COPY SUBSCRIPTIONS

Scan this QR code to sign up for our free digital subscription, which gives you full access to archives on our new website. You can also sign up for our new hard copy subscription for home delivery.

WANT RHM IN YOUR STORE?

Increase your store's foot traffic and sales by offering *Reef Hobbyist Magazine* to your valued customers! We help you educate your customers even when they're not in your store. Plus, we never publish e-tailer ads! Contact one of our distributors below or email us at **retailer@rhmag.com** to get stocked.

- A&M Aquatics – www.amaquatics.com
- All Seas Marine – www.allseaslax.com
- DFW Aquarium Supply – www.dfwaquarium.com
- Exotic Reef Imports – www.exoticreefimports.com
- Pacific Aqua Farms – www.pacificaquafarms.com
- Quality Marine – www.qualitymarine.com
- Reef Nutrition – www.reefnutrition.com
- Segrest Farms – www.segrestfarms.com

COME VISIT OUR NEW WEBSITE!

www.reefhobbyistmagazine.com

- Find full access to RHM archives.
- Download any issue in PDF for your computer or mobile device.
- Sign up for a hard copy subscription or FREE digital subscription.
- Watch exclusive videos and shows.
- Search for articles by topic, author, or keyword.
- www.facebook.com/reefhobbyistmag

RHM STAFF

President Harry Tung
Executive Editor Jim Adelberg
Art Director Yoony Byun
Advertising@rhmag.com
Photography Advisor Sabine Penisson
Copy Editor Steven Tanamachi
Graphic Designer Dave Tran

COMMENTS OR SUGGESTIONS? comments@rhmag.com

deepwater

BLDC PUMP SERIES

Become a Dealer by visiting

www.deepwateraquatics.com/dealers

deepwater

BLDC PUMP SERIES

- Sinewave Technology
- Smart Controller
- Adjustable Flow Rates
- Near Silent Operation
- Extended Warranty

www.DeepwaterAquatics.com

AQUARIUM SCIENCE PROGRAM:
PRODUCING CORALS, CLOWNS, AND AQUARISTS

MATT HAWKYARD

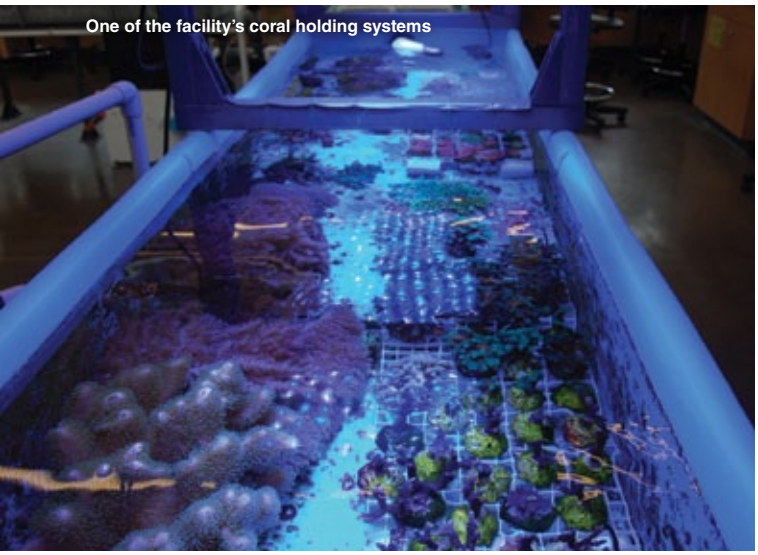
How does a person become a fish geek? For many of us, informal learning is the pathway we followed to develop our fish and invert husbandry and breeding skills. First, we probably asked questions at the local aquarium retailer and certainly they can be a wealth of knowledge. Or we learned from our friends with more experience in the hobby. We've also read books specific to our interests, and there are many great books about maintaining freshwater and marine aquaria. Of course, experiential learning (read: making mistakes) has played a huge role in our practical knowledge about biology and life support systems. And finally, we've used web-based resources. But what else is there? And what if you want a job in the industry where some formal education is required?

One of the only aquarium-specific training programs in the U.S. is the Aquarium Science Program (AQS), a hands-on technical program aimed at training students to work as aquarists in commercial, retail, and public aquaria. Now in its 13th year, the program has educated over 120 students and has placed graduates in many of the country's top public aquariums. This program includes a world-class training facility that was made possible through National Science Foundation support.

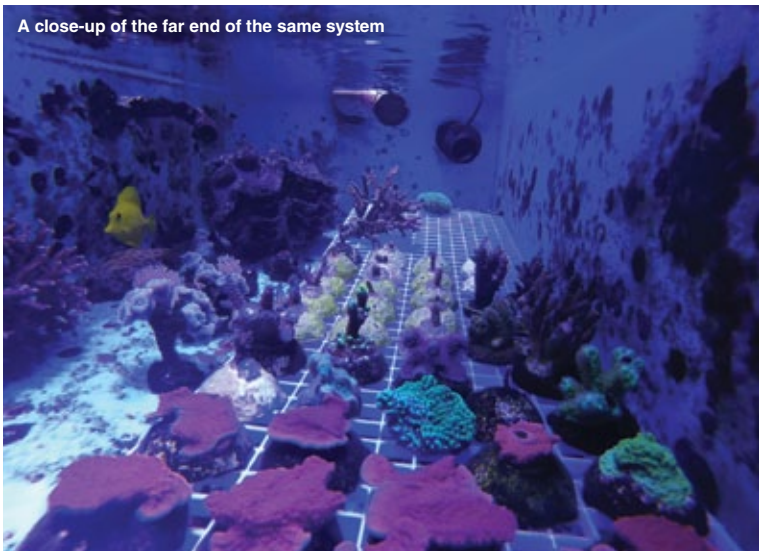
The AQS program is part of the Oregon Coast Community College and offers a two-year associate's degree in aquarium science as well as a one-year certificate program for students who already have their bachelor's degree. Students enroll in a variety of courses including biology of captive species, life support-system design, and aquatic-health management. Most importantly, all students receive critical hands-on experience in fish husbandry, water-quality analysis, system construction and maintenance, live feeds, and more.

Over the past several years, students and faculty have begun to develop captive reproduction programs for a variety of species. Currently, students are reproducing corals using fragmentation techniques. Coral fragmentation has become a common means to propagate and distribute corals throughout the aquarium community. However, there are very few opportunities for formal education in coral fragmentation techniques. The process of fragmentation is a relatively simple process in which small fragments of coral are removed from a mother colony. The fragments are attached to substrate or suspended and then grown into larger specimens. While simple enough, few programs have the facilities and resources to allow students to practice and experiment with these techniques.

"Corals reproduced in captivity can be sold in the retail industry, supplied to public aquaria, or used for conservation purposes," explained AQS student Micah Buster.



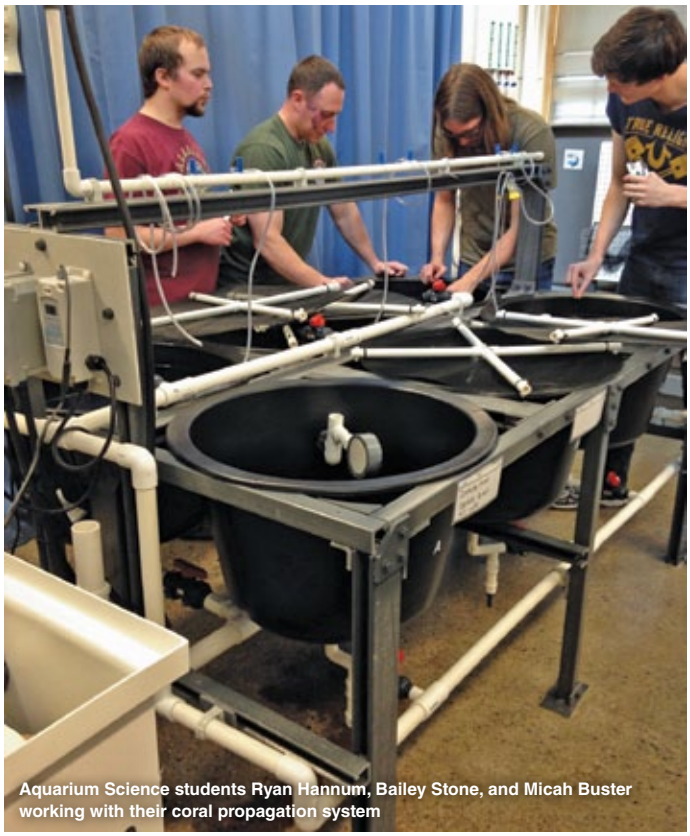
One of the facility's coral holding systems



A close-up of the far end of the same system

Aquarium Science students are also breeding tropical marine fish. They recently completed the construction of a recirculating larval-rearing system for culturing tropical marine fish and have been successful rearing clownfish from eggs to juveniles. Their success at rearing clownfish has been encouraging. Clownfish are one of few marine ornamentals that are commonly reproduced in captivity.

Methods for breeding clownfish are pretty well established, which makes them great introductory species for students. Clownfish are far easier than broadcast spawners such as angelfish, which challenge the skills of even the most skilled fish breeders. However, the concepts and techniques are relatively similar between species. What makes clownfish reproduction easier than other marine fish is that they lay nests containing relatively large eggs (~3-4 mm in length) that hatch into well-developed larvae, at least when compared to other marine fish. Students in the AQS program are using clay flowerpots and tiles for spawning substrate. A little more than a week after the eggs are laid, the flowerpots the eggs are



Aquarium Science students Ryan Hannum, Bailey Stone, and Micah Buster working with their coral propagation system

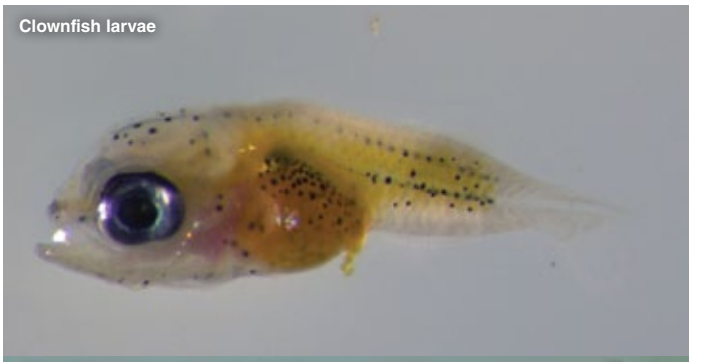
Broodstock system for tropical marine ornamentals

attached to are transferred into a larval incubation system that was built by the students. Newly hatched clownfish larvae are fed rotifers, *Artemia*, and harpacticoid copepods for the first several weeks of life until they can be weaned onto artificial diets, usually after metamorphosis. Reproduction programs such as this one test all elements of the students' skills and knowledge. To be successful, students must consider the nutrition and husbandry of the broodstock animals, maintain larval-rearing systems, monitor water-quality parameters, and also culture and enrich live prey.

Their success with clownfish has encouraged AQS students and faculty to attempt reproduction of a greater number of tropical marine fish. The program currently houses over a hundred species of fish and invertebrates in marine and freshwater aquaria. Students have already reproduced and reared several species of freshwater fish through the early life stages. Neon Gobies, Royal Dottybacks, and Banggai Cardinalfish are currently being conditioned for breeding. Furthermore, the program is currently developing a multi-life-stage system for seahorses, which the students plan to add to their portfolio. Over 90% of marine fish sold at aquarium stores are collected from the wild. We hope that our students will leave the program with some basic tools needed to reproduce a greater number of marine ornamental species.

The purpose of the Aquarium Science Program isn't to produce fish and corals, but rather to produce the next generation of aquarists. Coral and marine ornamental

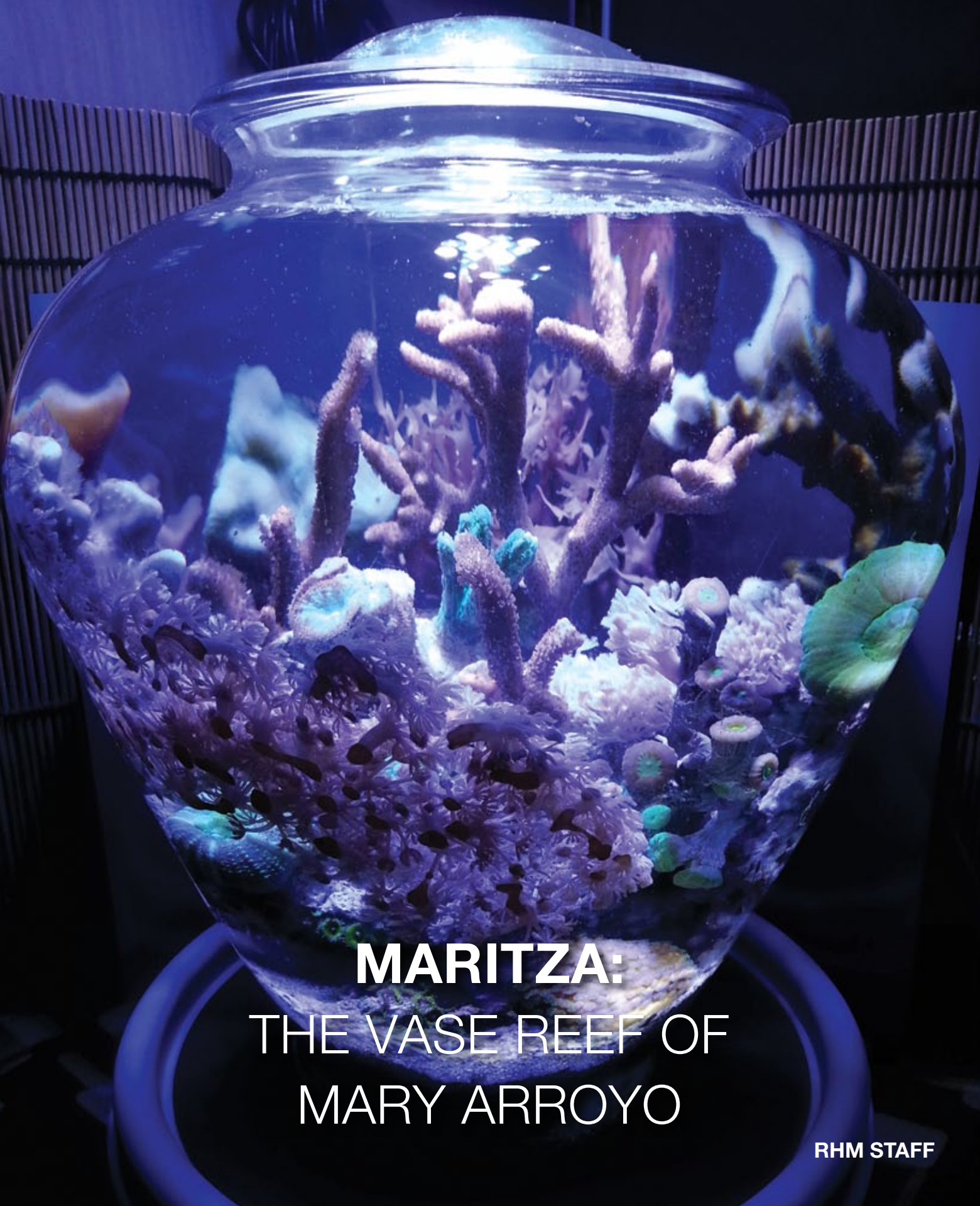
A breeding pair of clownfish



Clownfish larvae

Clownfish embryo. Image by Sid Stetson and author.

reproduction programs have been fun and exciting additions to a program that prides itself on practical, hands-on training and a focus on the fundamentals of biology, water quality, and system design. If you are interested in formal training in aquarium science, or would like to be an industry partner, please contact our director, Chris Spaulding (chris.spaulding@occc.cc.or.us).



MARITZA: THE VASE REEF OF MARY ARROYO

RHM STAFF

Our hobby has evolved tremendously in just a few short decades. The resources and information available to us now are far greater than anyone would have predicted even 10 years ago. There's also been huge development on the technological side of the hobby, and we now have a staggering number of controllers, reactors, skimmers, lights, and water flow devices from which to choose. In fact, the array of high quality, affordable, and useful gear on the market has never been greater. Perhaps as a consequence of this influx of relatively cheaper and easier to use gear, we've become accustomed to seeing world-class reef tanks supported by bank upon bank of electronics. This style of reefkeeping relies on extremely precise control and monitoring of all the important parameters, maintenance, and life-support functions of our tanks.

Here at RHM, we see a lot of high technology-driven, eye-popping reef tanks, and that's a good thing. Controlling the coral's habitat is known to be critical to getting the best color and growth out of our prized specimens. But there is more than one way to achieve this. Way back in the last century, when keeping corals in captivity was still in its infancy, we relied to a greater extent on "feel." Although it's a squishy and intangible term, feel amounts to a very high degree of familiarity with the animals, the system, and that elusive parameter known as good water quality. Over time, we all develop some level of feel for our systems as we observe how our animals react to changing parameters, food, water changes, etc. And most advanced reefkeepers have settled into a routine that keeps their animals happy and their parameters stable, though often with the help of controllers, dosers, reactors, and such. And so it was particularly refreshing when an RHM staff member suggested featuring a reef tank that relies almost 100% on feel.

It's our pleasure to present Maritza: the Vase Reef. This tank is a fascinating pico study in both feel and minimalism. The whole "system" is contained in a vintage 1.5-gallon vase and as of June 2015 was 29 months old.

Maritza is lit by one 12-watt ABI 50/50 Par38 LED fixture that runs for 8 hours daily. Water flow and aeration for this system are provided by a single airstone. The vase has a 3-inch sandbed and a small amount of live rock that makes up the reef structure. There is no doser, no controller, no sump, no skimmer, no reactors, and from what I can see, no problems.

Currently, Maritza is fed Cyclops and Albert Thiel's Total Nutrition Powder once a week, 4 hours before the weekly 100% water changes. Water changes are done with reverse-osmosis water and Instant Ocean salt mix. An aerator is used to mix the salt and

water for 72 hours, and an Instant Ocean hydrometer is employed to help maintain a specific gravity between 1.025 and 1.026. Mary reports that the heater is rarely on and the temperature generally stays between 76° F and 80° F.

A BettaMag is used to wipe down the inside of the vase, which has a cover to keep dust out and slow down evaporation. It takes about 4 days before there is noticeable evaporation. Top-off is done with an airline-hose siphon using reverse-osmosis water.

Currently, the vase contains over 26 different corals. Many of the corals are fragged regularly, especially the *Xenia* and *Montiporas*. Although some corals are new, many are the original corals placed in the vase when it was first constructed, including the *Cyphastrea*, Pachyseris Unchained, and the green branching *Psammocora*. Among the newer corals are an orange *Psammocora* and a branching *Hydnophora* frag from an earlier setup. A colony of Purple Monster and a Bonsai coral were removed due to coral warfare.

Brandon Mason (Brandon429) first introduced this unique type of reefkeeping over 10 years ago. His years of experimenting, documenting, and sharing this niche hobby have taught many of us the art of vase reefkeeping. Please note that vase reefkeeping is not for everyone. It is a challenging endeavor that should be undertaken only by those who are truly willing to dedicate a large amount of time on a consistent basis to keeping corals and inverts in a small volume of water.

Acknowledgements: Brandon Mason, Instant Ocean, Albert Thiel, Jose A. Martinez, Margaret Rodriguez, Shamika Melero, and the followers of Maritza. Blessings to all.

Scan this QR code to watch a video of Maritza from June 2015.

Scan this QR code to watch a video of Maritza from October 2013.

MP**40**wQD MP**10**wQD MP**60**wQD

VorTech™

QUIET**DRIVE**

Better in Every Way.

Night Mode

Feed Mode

ESL Via Mobile

So Much More

ECOTECH® MARINE

www.ecotechmarine.com

ACAN HUNTING

Since my last article in *Reef Hobbyist Magazine* (Q3 2013), I have upgraded my display to a Lee Mar 125-gallon starfire tank measuring 40" × 30" × 24". With this larger display tank, my collection of acans, and corals in general, has grown enormously. My main display is still filled with a diverse collection of small-polyp stony (SPS) corals, and I have also collected a large number of the highly prized Jawbreaker/Tie-Dye Mushrooms. However, my obsession with the world's nicest acans continues.

I now have a frag tank plumbed into the main display system. I continue to run T5 lighting fixtures by ATI on all of my tanks. The main display tank is powered by an 8 × 39-watt dimmable ATI SunPower fixture. For the beginning of the light cycle, I run two bulbs (Actinic and Blue Plus) at 100% for 3 hours. Then, the other six bulbs come on and ramp up to 85%. While they are ramping up, the first two bulbs are dimming down until they are completely off (within an hour). The six bulbs will continue to run at 85% for 4½ hours and then dim to "off" in the last 30 minutes of the light cycle.

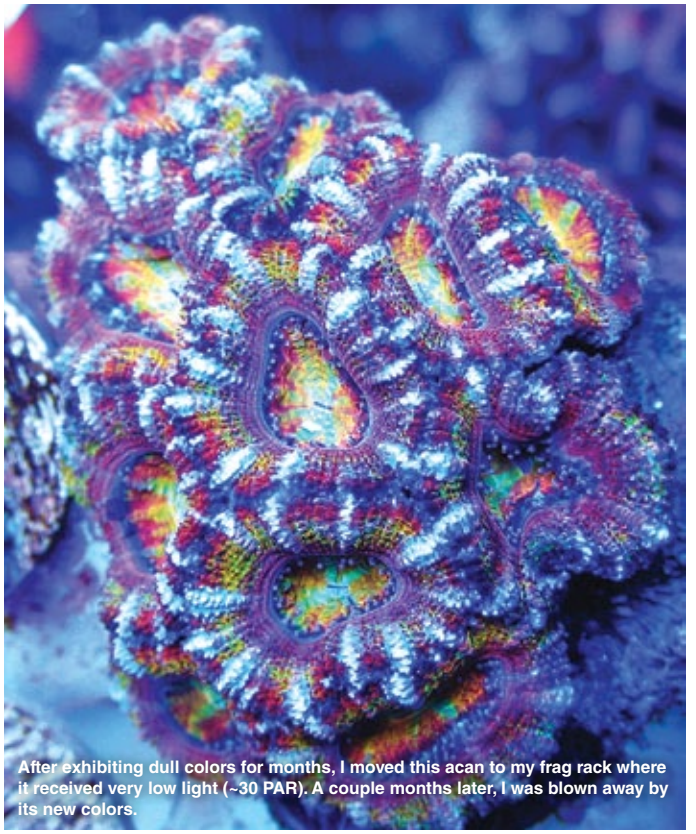
BULB LINE-UP (Display Tank)

Bulb 1: ATI True Actinic
Bulb 2: ATI Blue Plus
Bulb 3: ATI True Actinic
Bulb 4: ATI Blue Plus
Bulb 5: ATI Purple Plus
Bulb 6: ATI Blue Plus
Bulb 7: ATI Blue Plus
Bulb 8: ATI Blue Plus

This is the *before* shot of the acan pictured to the right when it was originally purchased at Reefapalooza.

All the acans in my display tank are positioned near the front glass, either on the sandbed or on the low points of the aquascape. You'll notice that two of my three front bulbs are actinic, with the third one being a Blue Plus. This configuration is designed to give as much blue light as possible to the acans while keeping overall par levels low. The par levels on these acans range from 50 to 100 when receiving full, direct light.

This acan was just a plain orange and gray frag I purchased from Reefapalooza. After feeding it Fauna Marin pellets for a few months, it developed an inner-red ring and the gray turned to a teal color.



After exhibiting dull colors for months, I moved this acan to my frag rack where it received very low light (~30 PAR). A couple months later, I was blown away by its new colors.

Believe it or not, this is the same coral as the one pictured to the right.

This is the same coral pictured to the left just 6 months later. Sometimes, you never know what you're going to end up with.

On my 5-foot frag tank, which measures 60" × 24" × 12", I am trying KZ-brand bulbs on an ATI Powermodule eight-bulb fixture. I run five KZ Super Blue, one KZ Fiji Purple, and two ATI Actinic bulbs. For the light cycle on this system, I run two Super Blue bulbs (switch #1) for the first 3 hours of the cycle. Then, for the next 3 hours, the two Super Blue bulbs turn off and I run three Super Blue, one Fiji Purple, and two ATI Actinic bulbs (switch #2). For the last 2 hours, I run only the two Super Blue bulbs again. Half of this frag tank is used to house additional coral that can't fit in the display tank, and there are many frags being grown out here as well.

This Stardust acan is extremely bright with just the right combination of complimentary colors.

Here's an Iller Wiggin' frag growing out in my frag tank.

AlgaGen

Often Imitated Never Duplicated

Coral Smoothie™

Phyco Pure ™

- Zooxanthellae
- Reef Blend

AlgaGen PODS™

- Tisbe - ReefPODS
- Pseudodiaptomus
- Parvocalanus
- Tangerine
- Acartia

Live Feeds Program

Feed The Frenzy

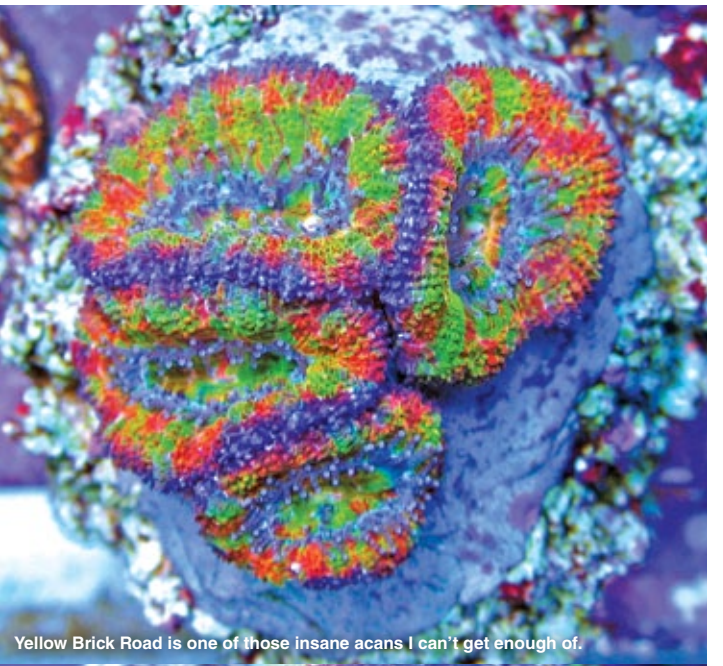
AlgaGen LLC
www.algagen.com
PO Box 1734 Vero Beach, Fl 32961
PH (772) 978.1395

Over the last year and a half, I have acquired some breathtaking acans. It still amazes me that no matter how many years I've been chasing these corals, I can still attend a show like MACNA or Reefapalooza and manage to walk away with a handful of color morphs that I've never seen before. One of my favorite purchases came when I finally had the opportunity to attend MACNA in 2014 (Colorado). There, I was able to scoop up the amazing Mai Tai acan from Gonzo Corals. It's such a beautiful acan, full of unique and inconsistent patterns of light green and orange. Under the right lighting, the orange hues will shift to a golden color. Some polyps are orange, some are green, and some are both. Note that the color patterns on the polyps change as they mature. The babies are all green but develop varying degrees of orange as they age. It's a very interesting acan and very scarcely distributed. Definitely the nicest coral I brought home from Colorado.

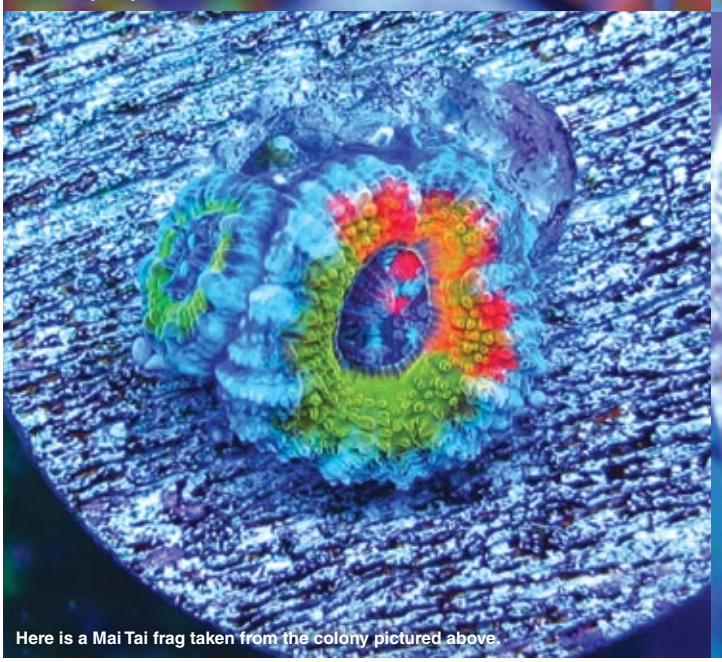
I was also very excited to hand select and purchase an acan called Yellow Brick Road. When I first saw this one, the yellow instantly pulled me in. Once I noticed the red speckles randomly scattered within the polyps, I knew this one was a true gem. The polyps have gotten fat and full, and it has retained its yellow coloration for over a year now. A few frags have been distributed to high-end collectors, so hopefully this one will be farmed and become more widespread.

Let's move on to my new favorite acan in the collection. I acquired this coral in a way I would never have expected. I must share

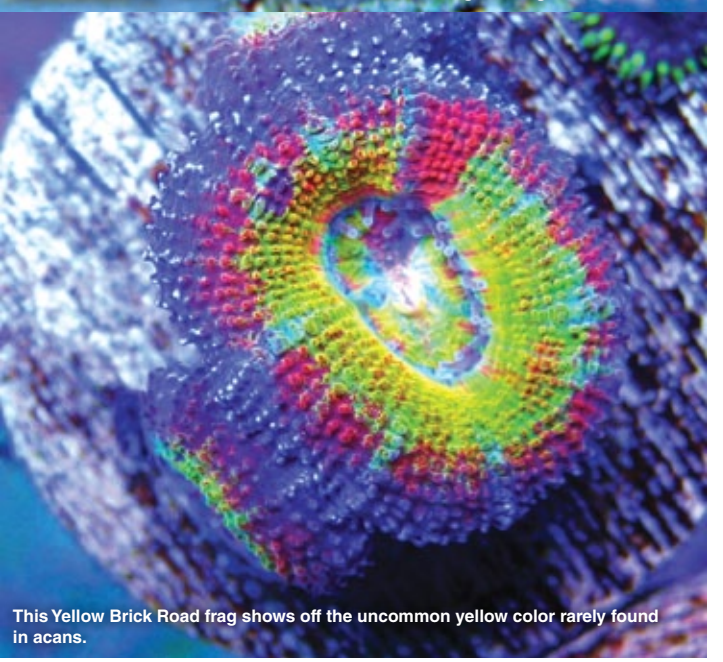
Gonzo's Mai Tai is a favorite amongst reefers. Even people who don't collect acans say they need this one.



Yellow Brick Road is one of those insane acans I can't get enough of.



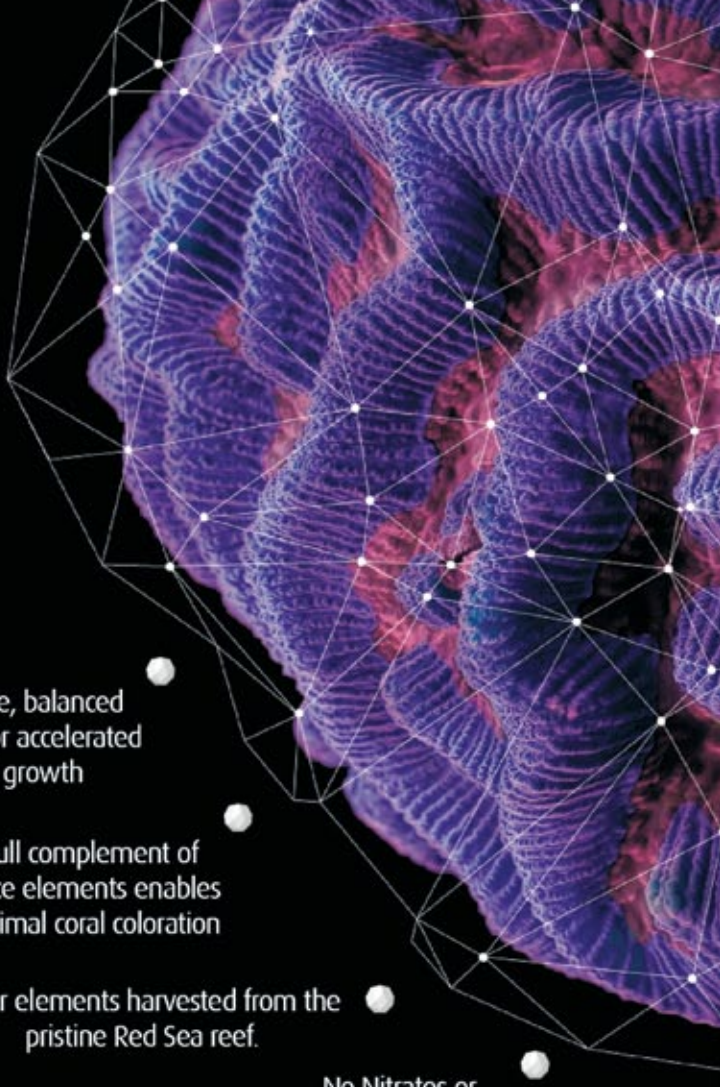
Here is a Mai Tai frag taken from the colony pictured above.



This Yellow Brick Road frag shows off the uncommon yellow color rarely found in acans.

CORAL PRO SALT

The Living Reef In Every Grain



Coral Pro Salt utilizes the natural properties of the Red Sea and contains elevated, balanced levels of the key Foundation Elements (Calcium, Carbonates & Magnesium) and a full complement of major, minor & trace elements. This advanced formula, which is based on proven research into the needs of corals within aquaria, stimulates accelerated, balanced coral growth and optimal coral coloration.

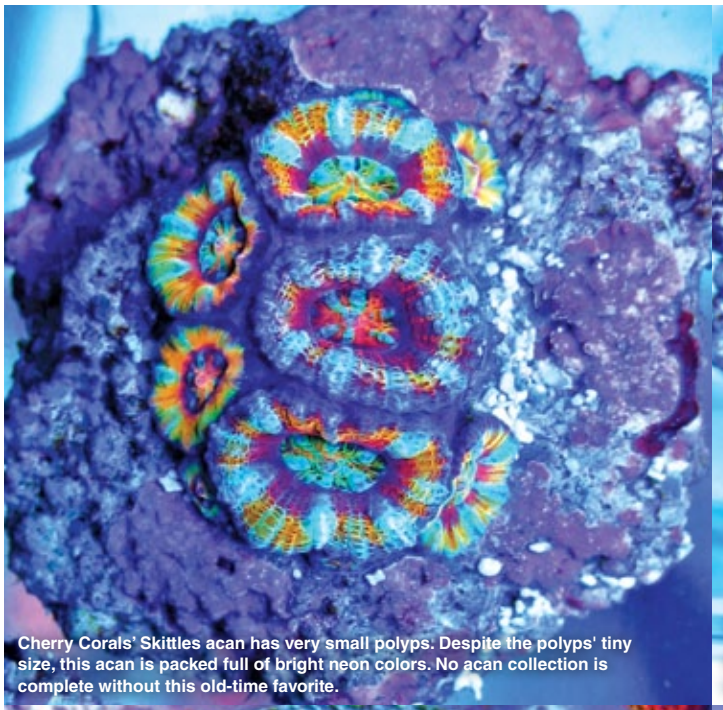
- Complete, balanced formula for accelerated coral growth
- Full complement of trace elements enables optimal coral coloration
- Major elements harvested from the pristine Red Sea reef.
- No Nitrates or Phosphates

Reef Foundation Elements

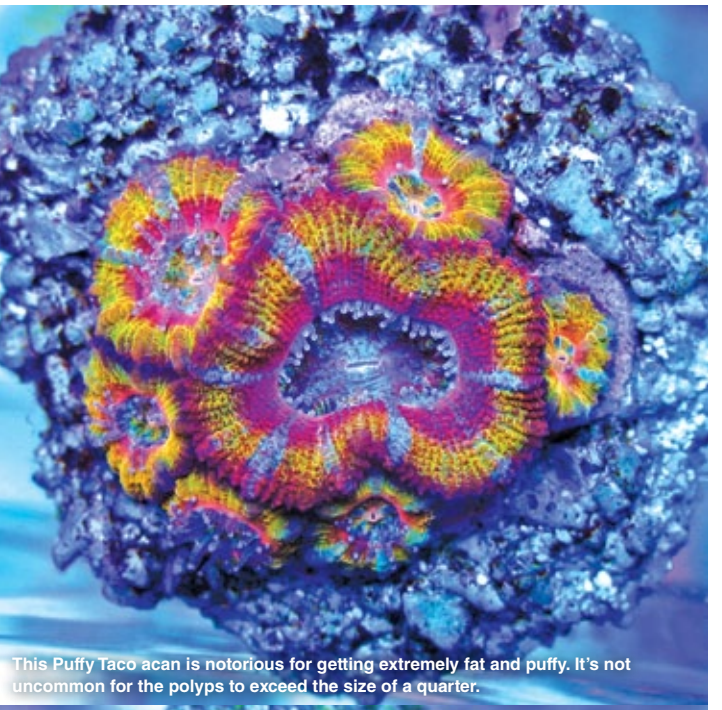
Aquarium type	Salinity	Alk (°dKH)	Ca (mg/l)	Mg (mg/l)
Soft/LPS corals	33.0 ppt	11.8 - 12.2	430 - 450	1280 - 1340
SPS/Giant clams	35.0 ppt	12.3 - 12.7	455 - 475	1360 - 1420

For more information please visit our website: **www.redseafish.com**

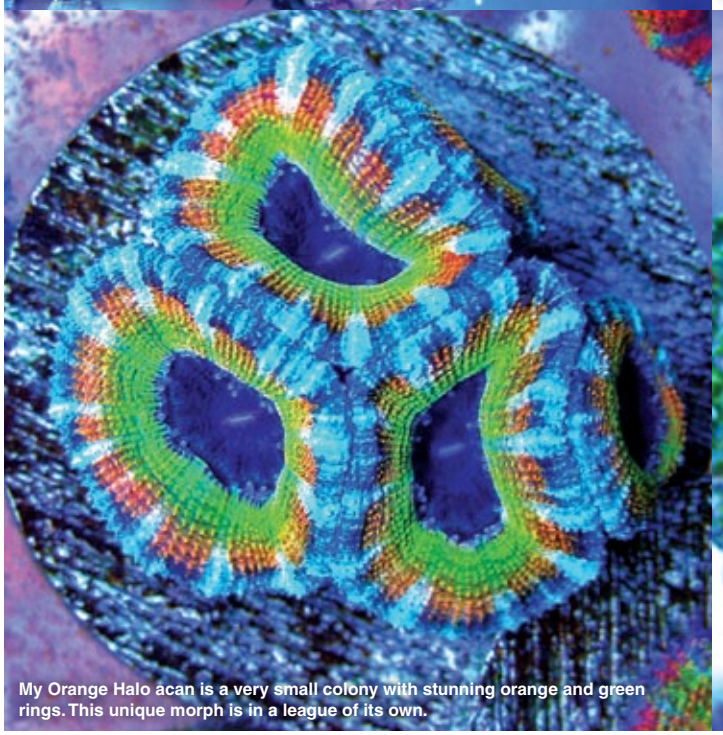
Red Sea



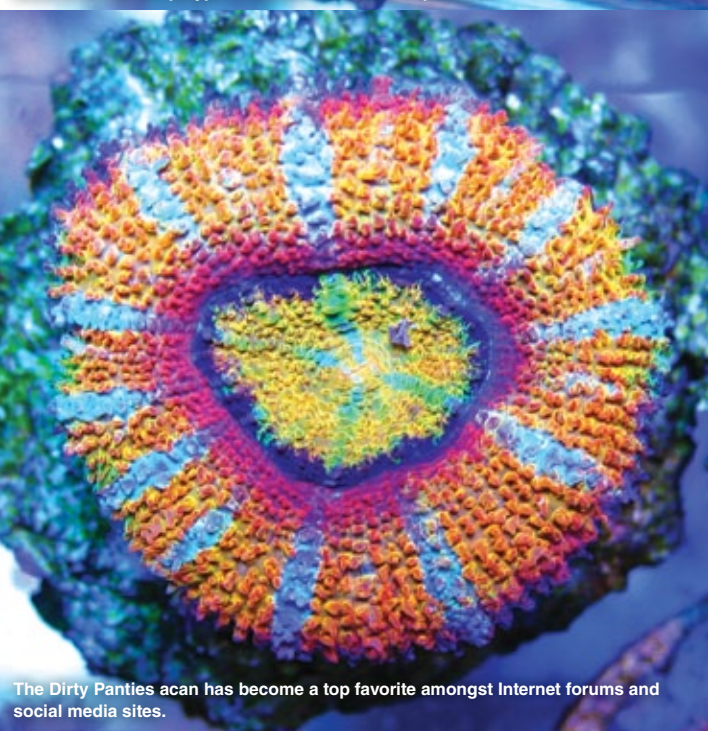
Cherry Corals' Skittles acan has very small polyps. Despite the polyps' tiny size, this acan is packed full of bright neon colors. No acan collection is complete without this old-time favorite.



This Puffy Taco acan is notorious for getting extremely fat and puffy. It's not uncommon for the polyps to exceed the size of a quarter.



My Orange Halo acan is a very small colony with stunning orange and green rings. This unique morph is in a league of its own.



The Dirty Panties acan has become a top favorite amongst Internet forums and social media sites.

this unlikely success story since this is the first time this picture is being made public. In most instances, local reefers selling off their corals use basic cell phone pictures that hardly give you an idea of what they're selling. I recently stumbled across the thread of a local hobbyist breaking down his tank, with acan colonies and a few other random LPS corals for sale ranging from $30 to $70. Then he posted a two-polyp frag of an acan he said he paid a fortune for and claimed it was definitely the nicest coral he had. His asking price was over $100, but I can't recall the exact amount. My first reaction as I compared the price of this coral to everything else he was selling was that it seemed odd. I thought this must be something special, but with his poor cell phone picture, it was hard to tell. After a day or two of messaging back and forth, I decided to pay this reefer a visit. The ever-curious acan addict in me wouldn't be satisfied until I checked this piece out. When I arrived, I was blown away by what I found. Undoubtedly, it was the most amazing acan I had ever seen. Without any hesitation, I told him I would take it. It didn't matter what the price was; I wanted it. It still brings a

In 10 years of collecting acans, I've never see one like the Be All, End All.

This Tin Cup acan is a favorite of mine for its bright and odd color patterns.

smile to my face when I think about how thrilled I was the entire way home. I called my wife and told her I just hit the jackpot. It didn't have any fancy or trendy name, but I called it the Be All, End All acan. The addict in me was well rewarded that day. I can't describe the feeling when the hobby rewards you in such ways. We all have ups and downs in reefing, but moments like these are priceless.

And so the hunt for all the greatest acans continues. As an unrepentant acan addict, I know this obsession will be with me for years to come. Thanks for reading my piece, and I hope you found the new additions to my collection interesting. If you would like to follow me on Instagram, you can find me as user IconicAcans or by using #alldelight or #iconiccollection.

FISH ONLY WITH LIVE ROCK

An Easy First Step Into Saltwater

Image by feathercollector.

ADAM MULLINS

It's inspiring to walk into an aquarium shop and see a fully stocked and well-established reef tank, but for the uninitiated, entering the hobby can be a bit overwhelming. The terminology, animals, and science involved in reefkeeping can be daunting even for experienced freshwater hobbyists. However, you don't have to jump immediately into keeping a complicated and expensive reef tank. A Fish-Only-With-Live-Rock (FOWLR) tank can be a great way to take your first step into the saltwater hobby.

A FOWLR tank operates on the basic aquarium principles of good water quality, attention to feeding, and appropriate stocking choices, which are all critical to the health of our livestock. This kind of tank differs from a freshwater tank mainly in terms of substrate (live rock and/or live sand) and of course, the use of saltwater. In live rock and live sand, the term "live" refers to the workhorse bacteria and various hitchhikers found in the rock and sand that remain alive throughout the shipping process and are deliberately introduced into hobbyists' tanks. As we will discuss later, these bacteria and hitchhikers play integral roles in the health of a marine aquarium.

FOWLR tanks are not just for beginners and are often set up by more experienced hobbyists who want to keep fish that require specialized conditions or fish that are not compatible with their display tank's inhabitants. But a FOWLR is perhaps the ideal way to begin as a saltwater

hobbyist. Though termed a fish-only system, it's not uncommon for hobbyists to add invertebrates such as cleaning crews of hermit crabs and snails. The fish-only tank can also be a great place to highlight some of the more uncommon invertebrates, such as blue lobsters or the larger anemone crabs, which would pose a significant threat to tankmates in a more traditional reef environment. The mix and match livestock scenarios are seemingly endless, but remember to always research the compatibility of various species you are considering keeping together. Chatting with store employees or other customers at your local fish store can provide valuable insight into experiences they've had.

Many of my reef customers today started out with fish-only tanks and eventually transitioned into reef tanks by adding additional lighting and hardy polyps or soft corals. While some hobbyists continue the progression into full-blown stony-reef-tank keepers, many are satisfied with simpler reef tanks that are able to maintain hardy corals.

EQUIPMENT

Compared to reef tank setups, FOWLR tank setups cost much less to start up. Intense lighting, expensive reactors, and complicated controllers often used in keeping reef tanks are not necessary. A fish-only tank can utilize the same filtration equipment as a traditional freshwater tank: hang-on filter, canister filter, wet-dry filter, etc. However, compared to freshwater tanks, the stocking level is greatly reduced since many marine fish are more sensitive to a buildup of waste in their water.

This beautiful saltwater aquarium contains fish, live rock, and a few hardy corals. Image by Sabine Penisson.

FILTRATION

For FOWLR tanks with populations of large fish, a protein skimmer is highly recommended. A protein skimmer is a device that removes dissolved fish waste from the water. Hang-on options are available but typically far underperform compared with in-sump models, which of course require the addition of a sump.

A sump can be as simple as a spare tank, typically ranging in size from 10 to 25% of the capacity of the display tank. It is usually placed below the main display and gravity fed with water that overflows through either a hang-on or internal overflow box mounted in the display tank. Although not a necessity, an external sump is highly recommended because of the increased skimmer and filtration options it allows for and the water volume it adds to the system's total volume, which creates a more stable environment.

Hang-on-the-back skimmers are ideal for aquariums without sumps.

In-sump skimmers are more effective but require a sump.

The first chamber in a sump is typically where the protein skimmer is placed to initially remove as many dissolved organics and proteins as possible. The following chambers, if any, can then be used to chemically treat the water coming from the first chamber. Filtration options include carbon, granular ferric oxide (GFO), and other various dissolved organic scavenging resins (such as Chemi-pure) to help remove nutrient buildup and yellowing compounds and to clarify the water. This clean, filtered water is then returned to the display tank via the return pump. A return pump should be able to turn over the tank's volume roughly 10 to 20 times per hour. For example, a 50-gallon display would require a 500- to 1000-gallon-per-hour (GPH) return pump.

LIGHTING

While lighting considerations for fish-only tanks are less critical than for tanks meant to support lush stony coral growth, there are still a few things to consider. The lighting should be bright enough to allow fish to easily see their food. Many of the marine animals we keep show best in bluish and actinic lighting. Overly yellowish lighting, while appearing bright, can enhance nuisance-algae growth. But in the final analysis, choose lighting that makes your eyes happy.

TEMPERATURE CONTROL

While lighting considerations for fish-only tanks are less critical than for reef tanks, the same is not true of temperature control. Reef fish—and marine fish in general—are adapted to more constant temperatures than their freshwater cousins. This is true whether they are tropical or coldwater fish. Even lagunal and estuarine fish usually experience temperature changes that are quite small in comparison to those of freshwater habitats. Consult with friends, read reviews, and ask questions at your local store to help you decide on the right heater and/or chiller for your tank.

This sump houses filter socks, a skimmer, and a remote sand bed for biological filtration.

Depending on where you live, you may need a heater, a chiller, or both to keep your water temperature in the preferred range.

THE ULTIMATE ALL-IN-ONE FILTER MEDIA

Chemi-pure Blue Nano is the ultimate all-in-one marine aquarium filtration media available today! They are in easy to use, conveniently sized 5 gallon nylon packets that offer superior filtration and fantastic results in even the most advanced marine, reef and/or Jellyfish aquariums. Chemi-pure Blue combines the highest grade of low dust extruded pelletized activated carbon with premium ion exchange resins to produce a synergistic formula for the health and wellbeing of your aquarium inhabitants. Chemi-pure Blue is capable of handling the toughest, dirtiest aquariums, yet gentle enough to be used in air driven, desktop jellyfish aquariums as well.

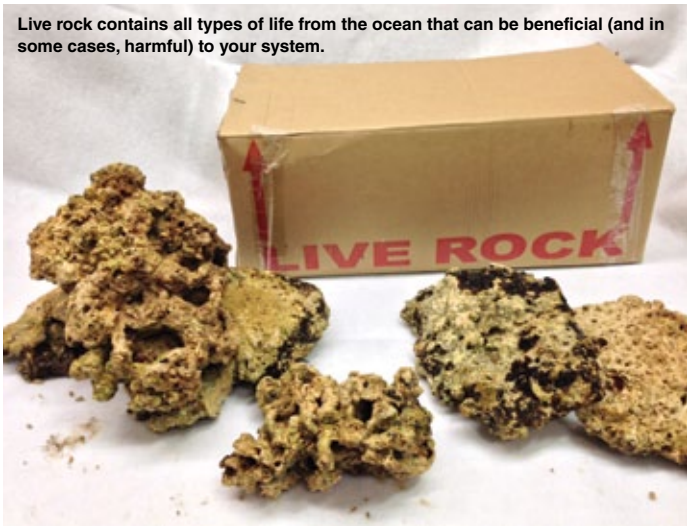
CRYSTAL CLEAR water

for over 50 years

Boyd Enterprises
Advanced Aquarist Products
www.chemi-pure.com
YouTube

LIVE ROCK

Live rock is often the primary building material of a tank's aquascape and can be used to create a variety of caves, arches, shelves, and towers to stunning effect. As mentioned above, live rock contains useful bacteria and micro and perhaps even macro flora that are beneficial to the health of a marine aquarium. The various bacteria aid in the breakdown of waste, while small hitchhiking invertebrates like copepods, amphipods, various worms, and other organisms function as micro consumers of algae and detritus in the aquarium. These animals add to the biodiversity of a healthy tank and also become a natural food source for larger inhabitants. Various types of alga and sponges are also often found on live rock, and these can add extra color and texture to a fish-only tank.

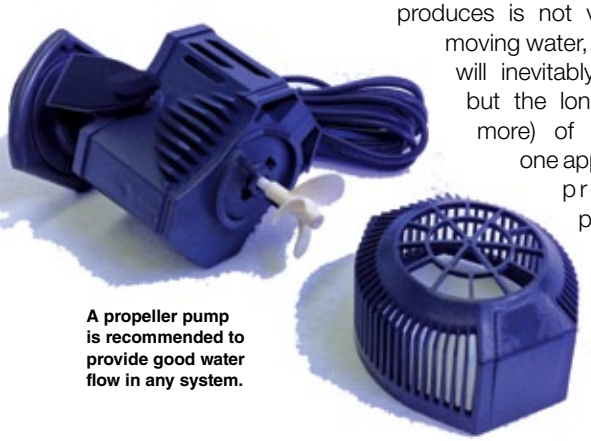


Live rock contains all types of life from the ocean that can be beneficial (and in some cases, harmful) to your system.

WATER FLOW

Good water flow is an important consideration for any marine tank. With good flow in the tank, fish waste and uneaten food are kept in the water column where they will eventually flow into the sump and filtration system rather than settling behind a rock or in the substrate. Additionally, many marine fish prefer strong, irregular water flow since they are physically adapted to that kind of environment. Further, saltwater carries less dissolved oxygen, so it's important to keep stale (deoxygenated) water moving to the surface where it can be reoxygenated.

I typically don't recommend relying on the return pump alone to provide in-tank flow since the current it produces is not very efficient at moving water, and dead spots will inevitably result. For all but the longest (4 feet or more) of FOWLR tanks, one appropriately sized propeller-style pump should be enough to provide the proper flow.



A propeller pump is recommended to provide good water flow in any system.

SETTING UP A NEW TANK

Once all the necessary equipment is acquired, check the tank and sump for leaks by filling them outside of your house on flat, level ground.

Depending on the size of your tank, you can either buy your saltwater premixed from a local fish store or mix new water with a salt mix. If you choose the latter, I do not recommend using tap water since the amount of silicates, minerals, and other organics present can increase cycling time and fuel a vigorous nuisance-algae bloom; I know this from experience. Instead, use reverse-osmosis water, preferably with the addition of deionization. This water can be purchased at various local fish stores or made at home with an RO/DI unit. Be sure to use a good quality and recently calibrated refractometer or hydrometer to ensure the desired salinity is reached. For a fish-only system, a lower salinity with specific gravity of 1.017-1.019 is completely fine and can even help to naturally combat nuisance parasites like Ich. If you are setting up the system all in one day and using live rock and live sand, be sure to let the salt and water mix thoroughly and heat the water to the proper temperature before adding the rock and sand; this will prevent potentially killing the beneficial bacteria.

A refractometer or hydrometer should be used to measure specific gravity.

After the rock and sand are added, the tank begins its new tank cycle, meaning the populations of bacteria must be fed and allowed to grow in order to be able to support livestock additions down the road. This process typically takes 4 to 8 weeks and can be tracked by the rise and fall of ammonia, nitrite, and then nitrate. Make sure to purchase a reliable marine test kit and test regularly to track your cycle. Once toxic ammonia and nitrite levels have reached zero, the tank is technically cycled, though that does not mean it can be rapidly stocked. Each new fish will add to the biological burden,

KORALIA
THIRD GENERATION

Since 1984, Hydor has specialized in design and production of high-tech aquarium products and is continuing the tradition of innovation by introducing the newly designed Koralia Third Generation circulation pump line for aquariums.

Dual Magnetic Support
New patented Dual Magnetic Support System (DMSS) allows the user to position the Koralia freely inside the aquarium. The pump can pivot in virtually any direction to guarantee flow where it is needed. Enhanced with vibration absorbing silicone for silent operation.

Energy Efficient
New motor design, new propeller profile, new intake spiral grid: the new Koralia Third Generation is state of the art in energy efficiency: only 1 Watt per 275 GPH flow.

Three Unique Attachments
Koralia Third Generation is customizable in flow and protection
Flow Diffuser - *For a wider and gentler flow*
Small Fish Guard - *For protection of smaller fish and shrimp*
Medium Fish Guard - *For protection of small to medium fish and shrimp*

HYDOR USA Inc.
Phone 916-920-5222
e-mail: hydor.usa@hydor.com
www.hydor.com
Koralia is designed and made in Italy

Once a FOWLR tank is set up, it is not difficult to upgrade the lighting in order to support corals. Image by Sabine Penisson.

and it will take time for the bacterial population to respond. Use your test kit regularly to ensure that your water parameters are at safe levels for your fish at all times.

COMMON PITFALLS AND MISTAKES

As a local fish store owner, I have seen just about every mistake that a new hobbyist can make. Most of the common mistakes can easily be avoided, and knowing about these potential pitfalls in advance will make for a far more enjoyable adventure.

Overstocking (too much, too soon): Sometimes, the excitement of a new hobby and the sheer variety of colors and forms of marine life available can cause new hobbyists to get a "kid in a candy store" mentality, wanting to quickly add as many different animals as possible. This can lead to multiple problems such as tank crashes from biological

overloading, death from disease or parasites, or incompatibility between species. Go slowly, monitor your water parameters, and be sure your system is stable before adding new fish.

Using tap water: As stated earlier, tap water should be avoided when mixing new water, but also when topping up water levels to account for evaporation. Use RO/DI water whenever possible.

Adding damsel fish: It has long been recommended to use the bright and cheap damsel fish as some sort of sacrificial kickstarter to seed biological filtration. Besides the ethical issue of introducing fish to an unstable new tank, surviving damsels will often become terrors of the tank, and if more than one is introduced, they will generally kill each other off until only one or two remain. A better approach is to patiently and slowly stock the tank with your desired livestock with long intervals between additions. A good store will be able to advise you on the particulars of what to add and in what order to avoid problems.

Using sand not for aquaria: Some people have used various cheap alternatives to live sand with differing results. In the worst cases, hobbyists have ended up with a mineral- and nutrient-rich substrate that fueled a never-ending algae battle. Always choose sand and rock that are specifically sold for marine aquarium use.

Using sand that is not intended for aquaria can lead to disastrous results.

CONCLUSION

Although stepping into the saltwater aquarium hobby may seem like an intimidating endeavor, just remember that behind every beautiful reef tank is a hobbyist that at one time or another was new to the hobby. With lots of research and patience, a FOWLR tank can be a great way to get your feet wet in this fascinating hobby. With time, you can continue to improve your husbandry skills and care for more delicate and exotic species, and perhaps one day, you will be the owner of an amazing reef tank that inspires another new hobbyist to give it a try.

RICHARD ASPINALL

THE ENTRANCING ORCHID DOTTYBACK

For the last dozen years, I've been a regular visitor to the Red Sea to get my dose of midwinter sunshine and warm water. A lot of folks venture to the Egyptian coast simply for a holiday, and if you live in Northern or Western Europe, the 5-hour-flight time and pretty much guaranteed sunshine all year round are real tourist pulls. For me though, it's all about diving on the wrecks and reefs.

When I first started diving over there, I had little idea which fish was which, and to be honest, the depth of my ignorance has only increased as I realize just how much more there is to know beyond the ID books, but I digress. On just about every dive, below the first 5 meters and away from the surge and high current areas of the shallows, I'd see these wee little fish, a few inches long, slender, and a wonderful electric blue. They seemed to be everywhere; every few square meters, I would see a fish sitting close to the rock. I'd have to get a camera and photograph them one day, I thought.

When I returned the next year, I was armed with a Sony compact camera in its bright-yellow housing (the camera sported a four megabyte sensor!), and I set about photographing everything I could find in the hope I could identify the subjects later. Back on land, I'd check the shots, and I couldn't understand where the blue fish had gone and why there was a purple fish picked out by the camera's flash. And as it happens, why was it a rather grainy, out-of-focus purple fish that looked nothing like it did in reality? Twelve years on and my camera has gotten a little more advanced, and I know a great deal more about differential absorption of light as it passes through water and why that blue fish wasn't really blue at

An Orchid Dottyback photographed in the wild


This is a stunning fish, whether it's blue or purple.

all but was the gorgeous purple Orchid Dottyback (*Pseudochromis fridmani*).

Over the following years, I decided I would return to marine fishkeeping after a long pause (since the mid-1980s and wow, hadn't things moved on), and one of my first acquisitions would be an Orchid Dottyback. I was amazed that I would be able to keep one of those rare gems in my own house. I have of course continued to take pictures of Orchid Dottybacks in the intervening years and have learned a great deal more about them. I've always recommended to anyone who would listen that they ought to try scuba diving or at least snorkeling if they get the opportunity. Not only does it offer inspiration to reefkeepers and aquarists in general, but it will teach you a lot about an animal's behavior and ecology. Perhaps it may educate you about the plight wild reefs are in and how we need to work harder in the hobby to contribute to their care.

In the wild, Orchid Dottybacks are incredibly abundant, as long as you're looking in the Red Sea, of course. They are endemic to this proto-ocean along with a great assortment of other fishes, corals, and remarkable invertebrates. In my experience, *Pseudochromis fridmani* tends to be found between 5 and 30 meters deep within rocky areas. They are not associated with open sand, rubble zones, or large expanses of live coral. *P. fridmani* prefers crevices, walls, under overhangs of large reef structures, and areas of dead coral that support the living reef. Small caves and overhangs are absolutely ideal, and I often see them swimming upside down against cave roofs.

The Orchid Dottyback's abundance can be seen by close examination of images taken of coral bommies, caves, and other structures. Look closely and there are often several small purple streaks. I've got countless images in my library of caves, collapsed coral structures, and even shipwrecks that when examined carefully reveal a number of Orchid Dottybacks in the background while the sweepers or soldierfish I was trying to capture in the first place take center stage.

Observing these fish in the wild not only reassures us that they are still common, which is always good news, but shows that they seldom leave the safety and shelter of the rocks and old coral.

Note the numerous Orchid Dottybacks in this cave. The non-photosynthetic gorgonians are pretty cool too.

They prefer to stick close by where they can retreat into small cracks and holes and of course where they can forage for small crustaceans. I have observed them picking at morsels from the water column, but they are not keen to venture too far from their home territory, especially not in the presence of a large diver blowing bubbles and flashing his camera at them.

The other thing you'll notice about these numerous little fish is just how small their home ranges are. So often you see fish, and I'll use Red Sea examples, such as Purple Tangs or Emperor Angels, that roam vast areas of the reef and really must be kept in large tanks with plenty of swimming room. In the case of the Orchid Dottyback, these fish really are "home bodies," and their territory appears to comprise only a few square meters at most, with ideal real estate being divided up into such parcels by several individuals. I've seen rocks that have a dozen or so fish, each maintaining its own territory of roughly equal size, and like any gregarious, yet not entirely social animal (I'd include humans here), they seem to spend an awful lot of time challenging and fighting off any neighbors with the temerity to encroach upon their territory.

Replicating this natural environment is therefore quite straightforward. These fish do not need a great deal of swimming room; they just need a smallish patch of turf to call their own as they would in the wild. Now, it must be stressed that natural territory sizes and shapes are always in flux, as one fish moves into area X and another moves out into area Y. This works well enough in the unrestricted wild, but not in the confines of a tank. Hence, Orchid Dottybacks always come with a warning that you should keep only one individual. Obviously, that's good advice in regards to many marine fish. I often wonder how many novices have thought, "I'll get two so they have company," only to see one poor individual bullied into an early demise.

Of course, breeding Orchid Dottybacks will require more than one fish—this sort of thing usually does need at least two, last time I checked. Orchid Dottybacks belong to that slowly increasing list of fish that can be bred and raised to adulthood in captivity, but sadly, I have never had the space, equipment, or enthusiasm to try. Still, the species is considered one of the best for the amateur breeder to try. Because of my lack of experience, I cannot suggest anything other than to research the subject. There are some great accounts and well-written protocols available that have contributed to the successful breeding of Orchid Dottybacks by amateur and commercial breeders alike. Orchid Dottybacks are perhaps one of the best examples of conscientious marine fishkeeping available: a captive-bred fish with simple requirements that has a small range—perfect. If you are concerned about the impact of fish collection on the wild, then a captive-bred *P. fridmani* is for you.

As mentioned, the Orchid Dottyback can tolerate life in a small tank of 50 liters (~13 gallons) or so, but will happily

Magenta Dottyback

The Royal Gramma is another great choice.

AQUASUN LED HO

WHY MODULES?

A COST EFFECTIVE SOLUTION
that allows you to easily replace LED's and not the entire fixture.

A FULLY CUSTOMIZABLE SOLUTION
that allows you to swap out LED modules for different lighting effects and tank environments.

THREE VARIETIES *of* MODULES AVAILABLE:

LIGHT MODULE (ITEM AL-SM)
The standard module included with the AQUASUN LED HO Aquarium Fixtures. Provides bright white light for viewing & shimmer effect, and blue light for coral growth & moonlight effect. Includes four white 6000K LEDs (one watt each), and two blue 465nm LEDs (500 milliwatts each).

DAYLIGHT MODULE (ITEM AL-DM):
For increased white light in your aquarium. Includes four white 6000K LEDs (one watt each), and two white 6000K LEDs (500 milliwatts each).

PLANT MODULE (ITEM AL-PM):
Provides the correct wavelengths needed for promoting chlorophyll absorption and photosynthesis. Includes four white 6000K LEDs (one watt each), and two red LEDs (620 to 630nm, 500 milliwatts each).

FOR FRESH *and* MARINE WATER AQUARIUMS

AQUASUN LED HO AQUARIUM FIXTURES AVAILABLE in 18", 24" 36" and 48" SIZES.

WWW.ZOOMED.COM


This is probably *Cypho purpurascens*, a beautiful but aggressive fish.

adapt to life in a larger system and with more robust tank mates. Naturally, predatory fishes that might make a meal of it should be excluded, but that's just common sense. You will also need to exclude other similar species (i.e., other dottybacks and grammas), though I have known Royal Grammas and Orchid Dottybacks to tolerate each other in larger tanks.

On the subject of grammas, an alternative species such as the stalwart and exemplary Royal Gramma is a great choice. Lower down my personal preference list would be the Magenta Dottyback, which always seems to lose color in captivity. I also really like *Cypho purpurascens*. It's a lot redder than the Orchid Dottyback, but it can be quite aggressive.

Over the years since I first encountered this fish, I've taken so many more images of them with a camera far more advanced and a great deal bulkier than that simple Sony. Still though, I have struggled to get a really good underwater shot of one, so my best images are still those taken of fish in captivity using a macro lens. To a certain extent, their behavior lends itself to being photographed. They often pause and hold stationary in the water, assessing threats and seeing what's around them before swimming off a short distance and pausing again to take things in. Their rock-hugging nature means that they're always against a background. I'd love to get a shot of them with an open-water background, but that's just not in the nature of this fish.

I mentioned earlier about the fish's "real" color. Let's explore that a bit more. What do we mean by real color? We tend to assume that


Here's another dottyback from the area, this time *P. springeri*.


Orchid Dottybacks are a good choice for most aquariums.

the colors we see are the correct ones, yet they are dependent on the nature of the light that strikes the colored subject (I'm ignoring luminescence and iridescence and talking about pigment here) and the light's subsequent reflection into our eyes. We aquarists understand the concept of color temperature and will tweak our aquarium light's spectra to provide specific color temperatures to favor certain species or to enhance colors for more aesthetic reasons. Fish have evolved to reflect certain wavelengths of light and to absorb others. Deep-sea fish that have a great deal of red pigment exist in a world without red light and therefore appear quite black to their predators and thus are hard to see. When dragged to the surface, we say they are red, but only outside of their natural environment with our eyes and a mix of wavelengths of light that they are not adapted to. Colors are basically subjective it seems, so is an Orchid Dottyback really deep electric blue? I'd suggest that as far as they are concerned, they are. What might that distinctive coloration offer? I'd be interested to know if any work has been done on this species, but I'd suspect that the color works to identify individuals to each other in the relatively darker, more shadowed areas of the reef. This allows them to more easily define their territories. While attempting to maintain and defend territory, if a fish can demonstrate territorial ownership without having to waste energy fighting off interlopers, it is more likely it will be able to feed, find a mate, and of course, pass its genes on. I could well be wrong but would welcome hearing the best theories.

So as I've mentioned, the Orchid Dottyback is a relatively undemanding fish, not that you shouldn't treat it with the maximum of consideration and care though, but it is a good fish for even the beginner. It can be a nuisance to other similarly sized fish if they are added to the tank after it establishes its territory; fire fish, for example, might not fare well. In terms of feeding, it is also quite undemanding and will take pellets, flake food, and frozen crustaceans such as *Mysis*. Cyclopeeze is a perennial favorite with this fish. It is also quite tolerant of less-than-perfect water quality and is no more susceptible to disease than any other fish.

As you can tell, I have a great liking for the Orchid Dottyback since it has long been a fish I've loved to photograph in the wild and in captivity. I especially like the fact that by purchasing captive-bred specimens, we can help contribute to a more sustainable industry.

THE SEARCH FOR SOLOMON ISLAND STUNNERS

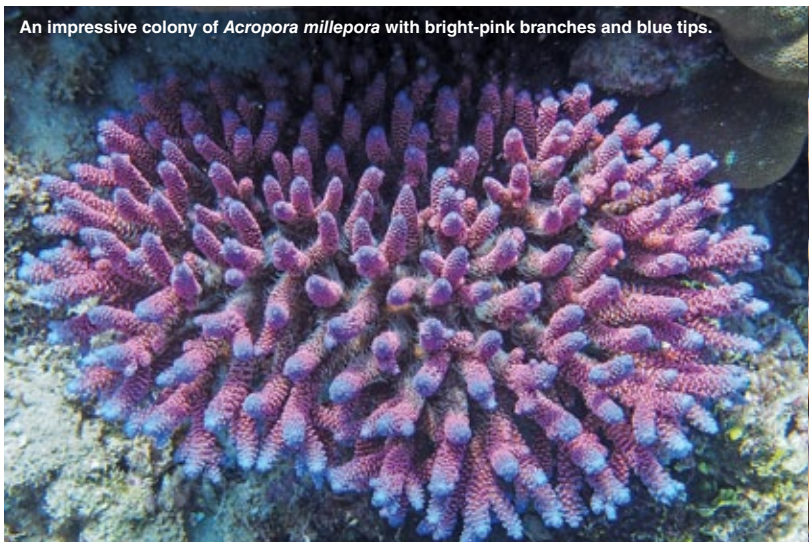
Paul Beta steers the boat through the inlet of the Florida Islands group.

JAKE ADAMS

I recently visited the Solomon Islands where I had the privilege of exploring many different types of coral reefs and marine ecoregions. From the coasts of the capital of Honiara, to a very newly formed island, and all the way to a completely different neighboring group of islands, challenging diving and living conditions were well rewarded with an abundance of exciting coral sightings. Some of these corals have been seen in the aquarium hobby before, but many of them are precisely the type of new and exotic corals that I long to see. This is why I subject myself to the harshness beyond the civilized world, all in the pursuit of a greater understanding of the best, brightest, and weirdest corals on the reef.

On a basic shallow-water reef, I came across a coral that has long been one of my super-favorite stonies—a nice, thick-branched *Acropora humilis* that is a brilliant teal with distinct, large purple tips. On most healthy shallow reefs where this species occurs, it is common to see bright-blue colonies of *A. humilis*, but the purple-tipped, teal Corn Cob Acropora (see pg. 37) is one I've always wanted to see in the wild and grow in an aquarium. I was actually snorkeling in strong current when I came across a relatively small colony. It was stout and very well affixed to the reef. It was quite a challenge to snorkel in this current even just at 10 feet of depth while trying to use a hammer and chisel to free the coral from the solid rock. In terms of sheer effort, this was the hardest coral to collect, and I was extremely happy (and somewhat surprised) that this coral arrived in perfect condition after a nearly 48-hour flight to Los Angeles.

Probably the most exciting small-polyp stony (SPS) coral I observed and collected in the Solomon Islands is one of the most beautiful *Acropora millepora* I have ever seen. I saw many different colonies of *A. millepora*, lots of which were bright pink with light-brown or light-yellow tips. But this particular specimen is an even more brilliant magenta-pink, but with bright-blue tip coloration that extends an inch down the branches; it made my heart skip a beat when I first spotted it. One interesting note is that it was living deeper than most of the other *Acropora millepora* colonies around, even if it was just 5 or 6 feet deeper. Since I was



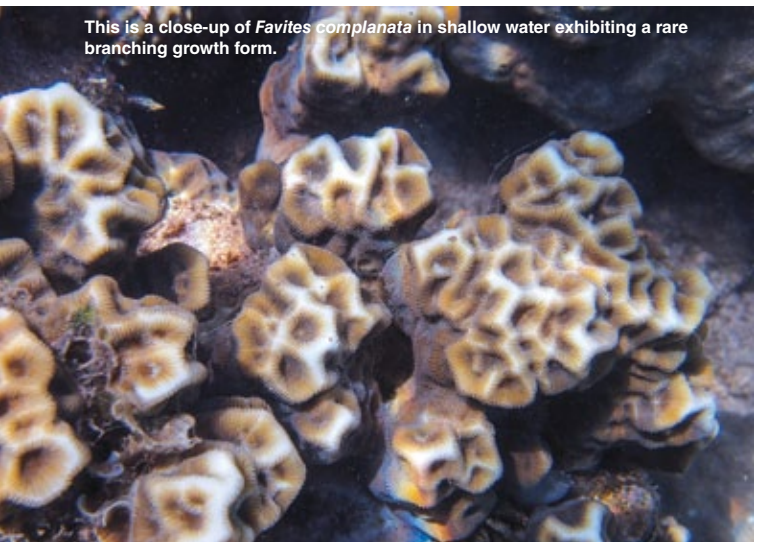
An impressive colony of *Acropora millepora* with bright-pink branches and blue tips.

snorkeling when I found this coral, I had to dive to a depth of about 20 feet to get up-close to photograph it and then dive again to collect the colony to bring it back for propagation.

I collected many different colonies of *Acropora* in the Solomon Islands, and in most cases, the colonies were large enough that I could thoughtfully sample a section of a larger colony. However, this particular colony of *Acropora millepora* was somewhat small for a wild reef coral, and the entire piece came off the reef so neatly that I ended up guiltily collecting the entire colony. Although I had decided to break this coral into six manageable pieces for shipping to ensure that some of it survived transport, I was extremely relieved to find every piece in perfect condition after the long transit.

This is the teal Corn Cob Acropora (*Acropora humilis*) with broad purple tips.

These first two corals were some of the very few corals that really excited me from what was otherwise a pretty typical shallow-water reef habitat. The real noteworthy observations were made in a completely different part of the Solomon Islands at an inlet of the Florida Islands group where the water was very turbid and exhibited a surprising lack of flow. The Florida Islands reef was really close to the mangrove and lush rainforest, and when the tide went out, you could clearly see and feel a freshwater lens that extended right over the shallow parts of the reef. Due to this freshwater influx, only very hardy corals like *Porites*, *Pavona*, and certain species of Faviids were able to survive in the locally reduced salinity. The most notable of the shallow-water corals here was a surprising abundance and diversity of various branching moon corals, mostly *Favites complanata* and *Goniastrea ramosa*, although I failed to spot a single colony of the locally abundant and iconic *Australogyra*



This is a close-up of *Favites complanata* in shallow water exhibiting a rare branching growth form.

This *Leptoseris tubulifera* is growing on top of *Pachyseris foliosa*.

zelli. Some *Acropora* were present, but they clearly looked like they weren't thriving, living in what must be a marginal environment for them with so much sedimentation and freshwater influence.

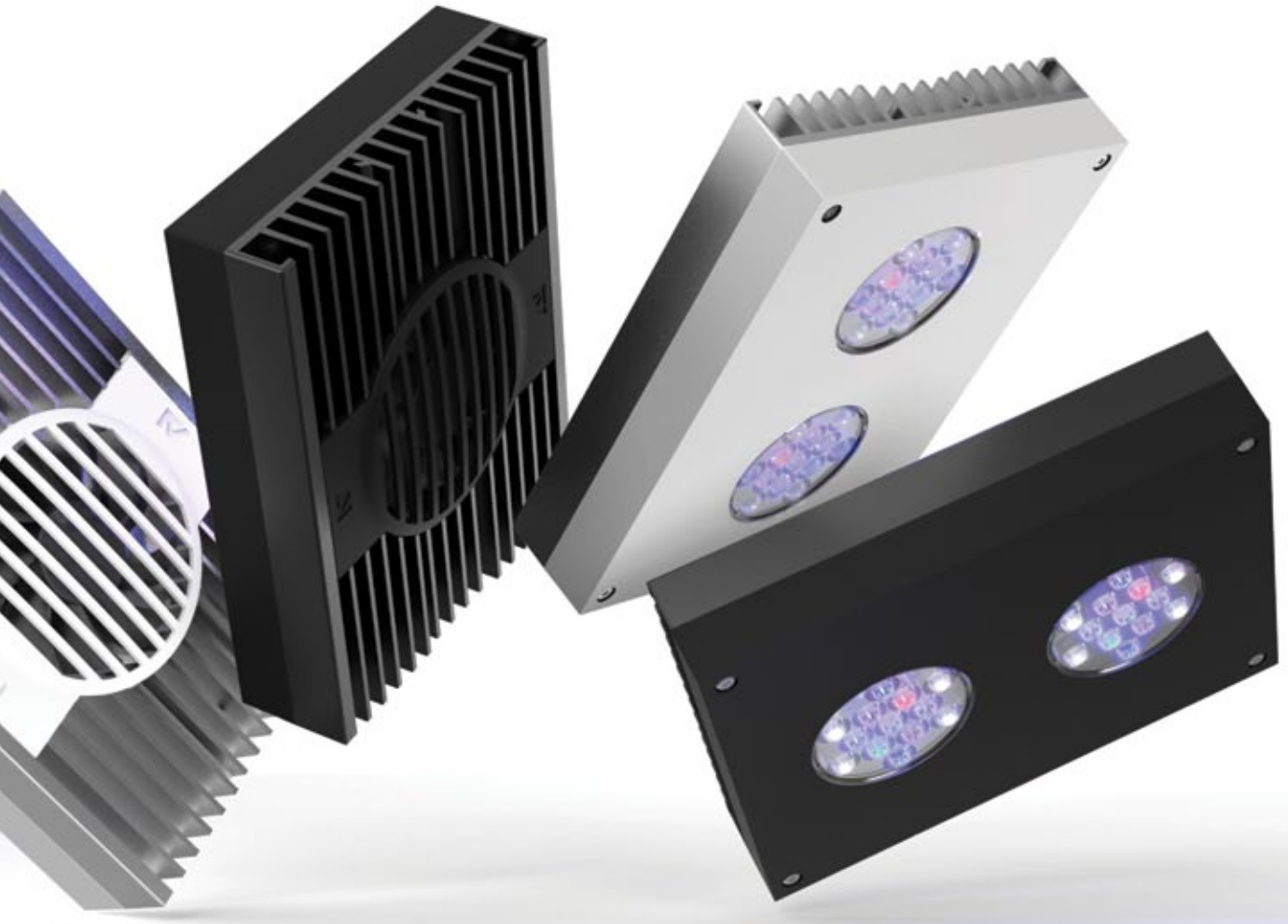
I've visited turbid and otherwise nutrient-rich coral habitats before, but nothing could have prepared me for the incredible diversity and abundance of odd corals I encountered at Florida Islands beginning at a depth of about 25 to 30 feet. In this transition zone, I observed plenty of *Anacropora*, still lots of *Porites*, and more interesting and healthier colonies of *Acropora*, including a thin-branched form of *Acropora aculeus* with blue tips. There were several other species whose exact identification escapes me because they are unfamiliar in appearance compared to the corals of Indonesia, Fiji, and Australia that are much more prevalent in the aquarium hobby. One specimen of *Acropora* was a perfect pillow-shaped colony with a deep-red interior and knobby, semi-plating blue edges and another was a smaller piece that was green with red radial corallites all the way down each branch!

However, it was when I ventured beyond this transition zone that my jaw truly hit the proverbial reef floor, as it was a complete paradise for chalice corals, and every species that can grow into scrolling, plating, and cup shapes was present in incredible numbers. At first, I really couldn't even focus on what I was seeing because there were juicy corals in every direction I looked. It was so overwhelming I couldn't decide where to start exploring.

The first corals to stand out were *Leptoseris* colonies growing in a formation almost like a staircase. They were mostly *L. tubulifera* at first, but then they diversified to include *L. yabei*, *L. hawaiiensis*, *L. foliosa*, and several more. In some cases, the corals were practically growing on top of each other, and in many instances, I saw huge stands of *Pachyseris foliosa* with *Leptoseris* growing right on top of them.

All of this *Leptoseris* action was concentrated around a depth of 30 to 50 feet and in its midst, there were beautiful colonies of plating *Astreopora randalli*, with so many of them

HYDRA
TWENTYSIX™

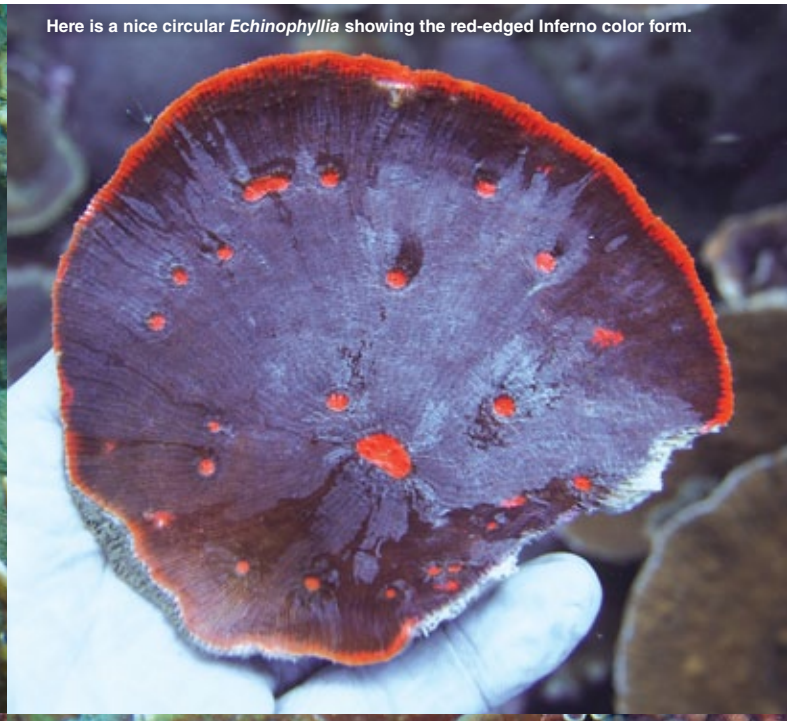


Full-Spectrum Wireless Reef LED.

Awesome Light. **Awesome Price.**

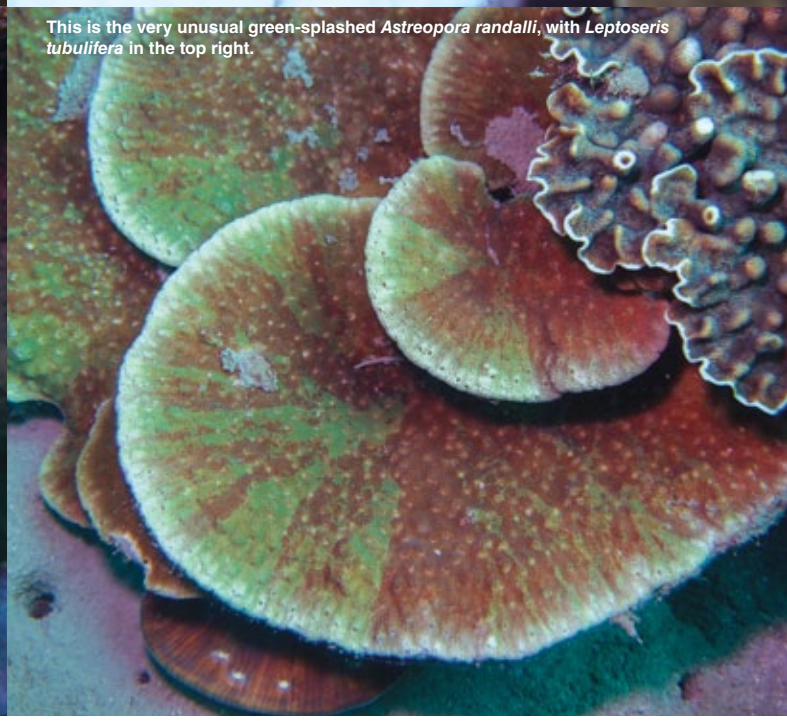
Learn more
aquaillumination.com

A brilliant yellow *Mycedium* with large red oral discs.



Here is a nice circular *Echinophyllia* showing the red-edged Inferno color form.

This multi-color *Mycedium* is an explosion of color and pattern.



This is the very unusual green-splashed *Astreopora randalli*, with *Leptoseris tubulifera* in the top right.

appearing to exhibit varying degrees of Green Fluorescent Protein infection that it was clearly the norm in this particular habitat. Other notable plating corals included huge colonies of brown *Oxypora lacera* with bright-green mouths, but it was the other chalice corals that were the main event in this habitat.

In between the large stands of many chalice-shaped coral colonies were innumerable specimens of brilliantly colored *Mycedium* and *Pectinia*. I came across some colonies that were variations of Space Invader—green with yellow mouths, yellow with red mouths, and a whole rainbow of colors in between. There were so many that I and the other collectors had the luxury of leaving certain particularly exquisite colonies behind without feeling like we were missing out.

There was also no shortage of extremely beautiful *Echinophyllia* corals. Many of them were bright green, orange, or red, often with colorful mouths and colorful edges like the Alien Eye, Inferno, and Watermelon chalice strains.

Introducing a New Masterpiece in Aquarium Craftsmanship.

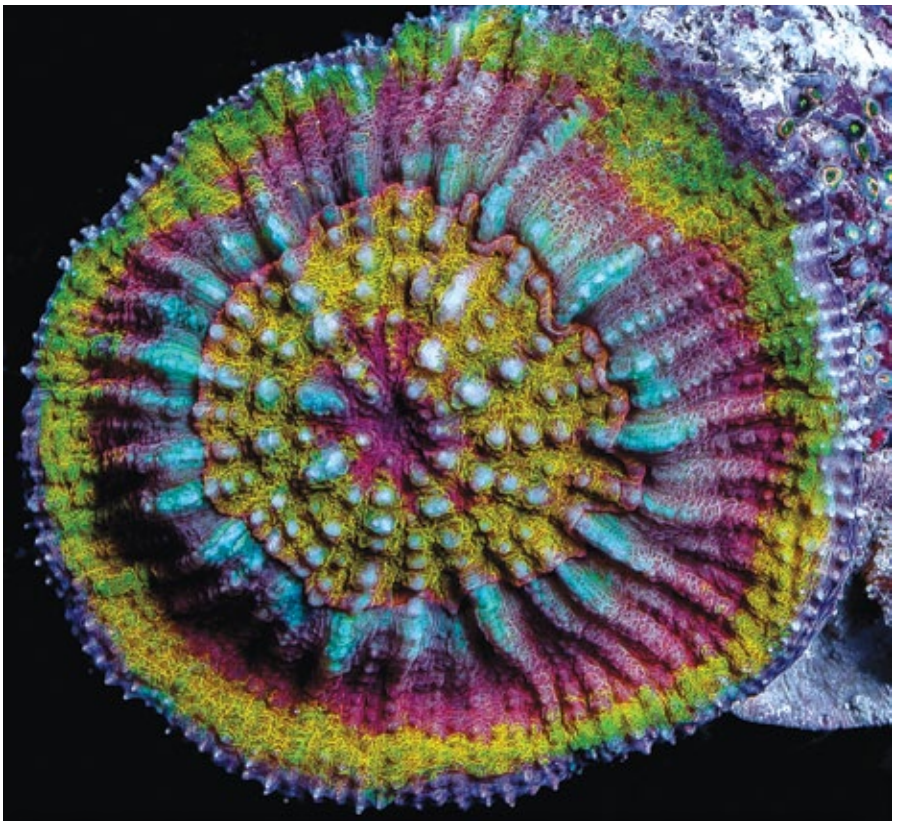
We've taken aquarium engineering to the next level with our Crystaline™ trimless, low-iron, crystal clear glass tanks. The clean lines of the black siliconed edges and black back are complimented by our sleek, modern stands made of real maple wood offered in 6 color stain options.

PLANET AQUARIUMS

For more information visit:
www.planetaquariums.com

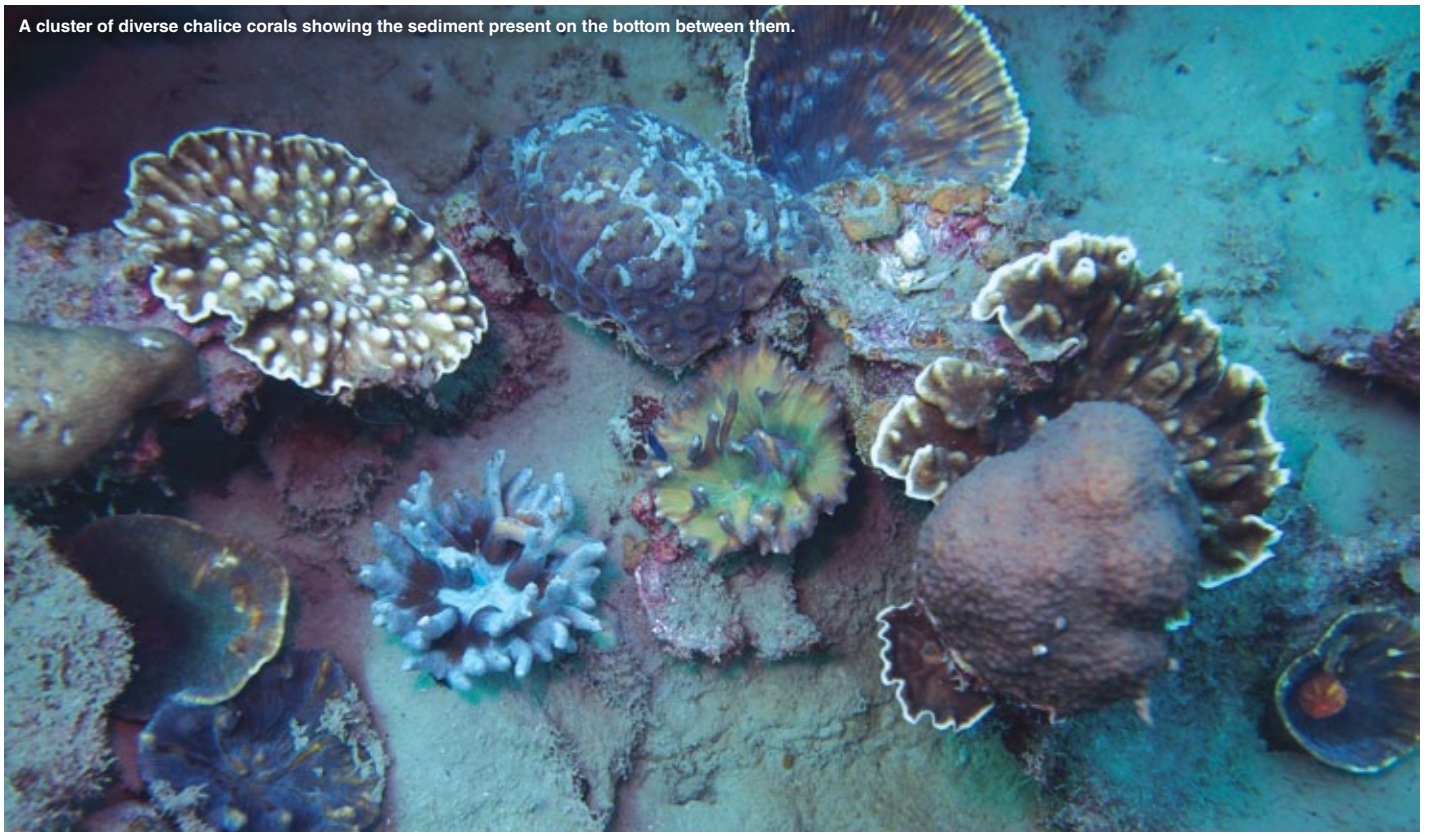
If that wasn't enough, this whole chalice-coral reefscape was highlighted by brilliant red colonies of *Lobophyllia robusta*, red and war paint-colored *Australomussa*, as well as a perennial favorite, the red and green *Favia speciosa*. *F. speciosa* is a common sight in home aquariums, but it was really cool to see it in the wild in a nutrient-rich habitat that was also pretty low energy in terms of water movement and lighting intensity. If there was a single Holy Grail coral that I brought back from this trip, it is what I am affectionately calling the Magic-Mussa. This coral is an incredible rainbow of colors that is wholly unique from any other *Australomussa* I have ever seen in person or in print, with what can only be described as a double rainbow of various colors in concentric rings as if it were channeling the likeness of an Australian UFO Scolymia.

The amount of corals definitely started dropping off in quantity and diversity at about 55 to 60 feet, but it's in this more open environment, where the slope became flatter and the sedimentation more pronounced, that a couple of other coral species really started showing up. Not known for its fast growth, *Cynarina lacrymalis* started appearing much more frequently in this last transition zone.



The mother of all *Australomussa* showing a rainbow of concentric color rings. Image by Unique Corals.

This is a red and green *Favia speciosa* in its natural habitat.



A cluster of diverse chalice corals showing the sediment present on the bottom between them.

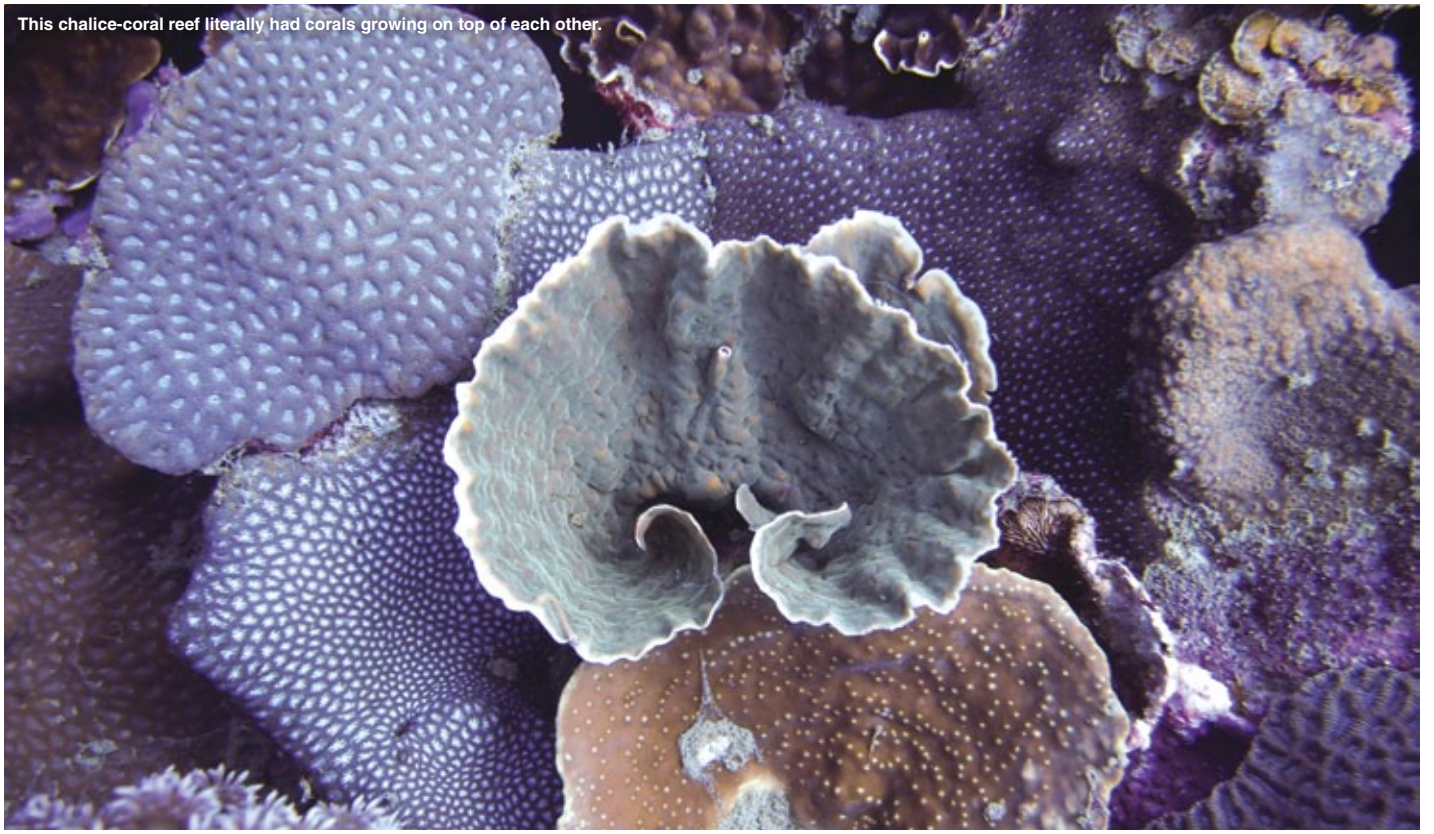
In the gray, sediment-covered bottom, the beautiful and symmetrical *Cynarina* was particularly obvious, and it was easy to imagine how its highly inflatable vesicles could help this coral avoid being buried by the slow rain of fine solids.

I mentioned how many *Leptoseris* I came across at the first transition zone, and one species I was especially looking for was the one and only branching *Leptoseris gardineri*. It wasn't until I came across the last frontier of corals here, at a depth of about 65 feet, that I started seeing *L. gardineri*. Most interestingly, this branching *Leptoseris* was the "last coral" in this habitat of various chalice-shaped corals, and beyond a certain point, the only coral I observed was the sporadic colony of *Leptoseris gardineri* spaced out as far as 50 to 100 feet apart. Beyond them, there was nothing more than sediment on the bottom, with this part of the inlet bottoming out at around 75 feet. It wasn't particularly dark, but the flow was greatly reduced compared to the surface, and this allowed the sediment to really fall out and probably smother most corals that tried to live here. Perhaps the branching shape of *L. gardineri* allows it to better rid itself of falling sediment and survive in this habitat.

While I was shell-shocked by the incredible concentration of exotic corals, I really wanted to see if I could notice any particular factors or environmental conditions that could account for why so many corals were found in this habitat. Besides the greatly reduced flow and light, there really was no shortage of organic particles in the water; they were clearly visible, and it didn't look like marine snow either, but more like some kind of light-brownish particles that could possibly be originating from the nearby dense jungle and mangrove forest. I took several water samples to submit to Triton Lab for precise water analysis. I've already received the results, and while there is no smoking-gun element present in any quantity that could account for a missing link in the general good health and vitality of so many different corals, the test did reveal a phosphate level of 0.04 mg/L, which is about double the concentration that you would expect to find on an offshore coral reef.

I've been fortunate to dive in a wide range of far-flung places, but this particular habitat was one of the most exciting because of the sheer diversity of species found in such great numbers in such a small place. Where you have a great diversity of coral species, you also tend to find a great deal of diversity within each species, and this was really true with so many of the corals that I observed here. The other really satisfying part of this coral scouting trip was being able to collect so many corals. I truly look forward to placing most of these coral strains into intensive propagation so that the general reefing public can share in the excitement of truly different and exciting new corals from the Solomon Islands.

This *Cynarina* is about as nice as it gets, with orange and pink vesicles and a nice bright-green mouth.



This chalice-coral reef literally had corals growing on top of each other.

ESHOPPS CUBE NANO REFUGIUM

JIM ADELBERG

- Dimensions: 14" × 14" × 16"
- Tank usage: 10-35 gallons
- Skimmer Compartment: 7.5" × 9"
- Refugium Compartment: 5" × 9"

A large part of what we do at RHM, and frankly in this hobby in general, is centered around equipment. So, when we see an interesting product, we reach out to the manufacturer to send us a unit to review for our readers.

In this issue, we will be reviewing the CUBE nano refugium from Eshopps. I will admit up front that sumps aren't necessarily the sexiest subject to write about, but this is a pretty neat product and it's clear that a good bit of thought went into its design. The first thing I noticed after unboxing this sump was that the quality of construction and thickness of acrylic were both good. Many manufacturers reveal their poor attention to detail in these two aspects, and let's be honest; no one wants a sump to fail, ever! I was also pleased that the provided overflow hose was of the high-grade pool-filter style, rather than a cheaper alternative. Another initial impression was that the unit is quite small. A 14-inch square footprint means that this sump can easily fit into a cabinet below even a small-sized cube-style tank.

Eshopps' new innovation for this unit is the dual water-path design, which they are calling ECD (Eshopps Channel Design). This allows the raw tank water to take two paths through the same sump and be returned to the display by a single pump. The first path is a relatively slow flow through a decently sized refugium section. This area is fully visible from the front or the side and is designed with an input situated a few inches from the bottom and a surface-extracting output. There is enough room at the bottom of this section for a few inches of sand to rest undisturbed below the input, where it can support rooted plants or sandbed critters. The water entering this section is unfiltered and unskimmed, which is what you'd want in order to feed the plants and animals in a refugium. This chamber then overflows into the skimmer compartment where it mixes with the second channel of water.

The second channel passes through a micron bag and then into the skimmer compartment where, after mixing with water from channel one, it is skimmed and overflows into a return chamber. This channel is also well thought out as one would want to pull physical particulates out with a micron sock before skimming. There is also a foam insert that keeps physical debris from overflowing the refugium into the skimmer chamber and one that keeps debris out of the return chamber.

A few other items of note are the nice cover that runs along the back (basically over the higher flow second channel) and both skimmer and refugium lighting options designed to be used in this system. Overall, I think this sump packs a good amount of valuable features into a surprisingly small footprint and price ($199.99 MSRP).

Feeds So Pure & Natural,

They're Effective for the Most Sensitive Animals in Your Tank.

"Reed's live zooplankton and enrichment products like **Roti-Feast®** and **R.O.E.®** are by and far the highest quality food you can use for almost any jellyfish."

— Wyatt Patry, *owner PB'N'Jellies*

The unique benefits of Reef Nutrition feeds:

- More colorful reefs and cleaner tanks
- Super nutrition from intact cells & organisms
- Concentrated – more for your money
- Cutting-edge, science-based feeds

Buy from retailers that carry refrigerated Reef Nutrition products or go to www.reefnutrition.com and click the "How to Buy" tab.

Visit us: ReefNutrition

Reef Nutrition®
WE FEED YOUR REEF

THE REED MARICULTURE INC FAMILY OF BRANDS

APBREED
Aquarists • Propagators • Breeders

Reed Mariculture
ENSURING HATCHERY SUCCESS™

ESHOPPS®
SIMPLICITY DEFINED

SIMPLICITY DEFINED

CUBE
Nano Refugium

ECD
ESHOPPS CHANNEL DESIGN
PATENT PENDING

Innovative Design

- Eshopps Channel Design (ECD, Patent Pending)
- Large Skimmer Compartment
- Viewable Refugium
- Quiet Operation

3rd Generation
Refugium

3rd Generation
Advance Series

16285 Gale Ave. City of Industry, CA 91745
Tel: 626-968-3678 | Fax: 626-236-9387
www.eshopps.com | sales@eshopps.com