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THE BOUNCE PHENOMENON

Lou Schiavo Jr. resides in Orlando, Florida, and is co-owner of World Wide Corals. The Bounce mushroom phenomenon is now well established in our hobby, and as the popularity of these mushrooms continues to grow, we bring you a quick review from the guy who started it all.

Cover image by Chris Tanner



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ANNOUNCEMENTS

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INTRODUCING JOHNSON'S FAIRY WRASSE



Images by Hunter Hammond unless otherwise noted

MINDY VAN LEUR

Big Bad John is neither big nor bad. What he is is one sweet little fairy wrasse. I set up my first marine aquarium in 1993, and over the years, I've had different types of favorite fish. My first favorite was butterflyfish. Then I really got into breeding and raising Banggai Cardinals. Clownfish were next—every type imaginable! Sebae Clownfish are still a favorite. Right now, though, I'm into wrasses—bad! That's where Big Bad John (aka Johnny) comes in.

Big Bad John is a *Cirrhilabrus johnsoni*, commonly named Johnson's Fairy Wrasse. I acquired Big Bad John in late November 2016, so he's still pretty new to me. Bayside Corals, the local fish store here in Saskatoon, Saskatchewan (Canada), had been trying to find me a Johnson's Fairy Wrasse for several months. I missed out on one earlier in the year because I was too slow to confirm the order, so I was quick to act when this one became available. *C. johnsoni* is a fairly rare wrasse in the hobby, and I'm very pleased to have a beautiful, healthy specimen in my care.



Big Bad John | Image by author

above their pectoral fins. This patch morphs into a dorsal stripe and a broken, iridescent medial line. They have black markings on their dorsal, anal, and tail fins. When not courting, the male *C. johnsoni* is an unassuming pinkish-red color with iridescent bluish stripes typical of *Cirrhilabrus* spp. In its nuptial display, the male *C. johnsoni* is exceptional! The body turns a bright yellowish-orange and the dorsal, anal, and tail fins turn bright scarlet

C. johnsoni is part of the lunatus complex of fairy wrasses. This species was thought to inhabit only the Marshall Islands at the Kwajalein Atoll, but it has also been discovered near the Caroline Islands. Fairy wrasses within the same complex have the potential to form hybrids. However, *C. johnsoni* is the only species of the lunatus complex to inhabit these waters, so naturally occurring hybrids are very unlikely. Researchers anticipate that *C. johnsoni* may inhabit waters in other areas of Micronesia as well and are also suspected to inhabit deeper waters in the Mariana Islands and Palau. If confirmed there, the range of *C. johnsoni* would overlap with the distribution of *C. lunatus* (Crescent-Tail Fairy Wrasse) and/or *C. brunneus* (Dusky Fairy Wrasse), both of which are part of the lunatus complex. *C. johnsoni* could potentially form natural hybrids with either of these two species.

C. johnsoni inhabits rubble zones where calcareous *Halimeda* spp. of algae grow. This fish is typically seen in groups—commonly with *C. balteatus* (Girdled Fairy Wrasse) at reported depths of 18 to 28 m (about 60 to 90 feet). *C. johnsoni* shares territory in some areas with *C. rhomboidalis* (Rhomboid Fairy Wrasse) and *Paracheilinus bellae* (Bell's Flasher Wrasse), neither of which are from the lunatus complex.

C. johnsoni is one of the smallest fairy wrasses, with the terminal-phase males reaching a maximum length of only about 4 inches in total, including the beautiful crescent-shaped tail fin, which may account for 25% of the fish's total length. Terminal-phase males are rather striking and are distinguished by the iridescent patch

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Anampses femininus (female) with Johnson's Fairy Wrasse (male)

with highlights of intense sapphire blue. The female *C. johnsoni* stays smaller than the male and looks very typical of other female *Cirrhitilabrus* spp., though it has a markedly yellow head and small white spots scattered across its body.

When I went to the local fish store to pick up Big Bad John, he was happily swimming around the tank, though he was certainly wary of prying eyes. He readily slurped up a slurry of frozen mysis and brine shrimp, so I knew he was eating. When Johnny came home, he went straight into my quarantine tank. I quarantine all incoming

fish and treat them prophylactically for Marine Ich (*Cryptocaryon irritans*) and Marine Velvet (*Amyloodinium ocellatum*), as well as internal parasites and flukes.

Wrasses are known to be sensitive to copper medications, as well as chloroquine phosphate, so the best method for prophylactic Ich treatment is the Tank Transfer Method. For copper medications, wrasses seem to tolerate Mardel Coppersafe better than other brands, though care must still be taken.

Since I've had previous success with Coppersafe for wrasses, I chose to try it with Johnny. When treating wrasses (or any fish) with copper, you should take about 5 days to reach a therapeutic dose to help the fish acclimate to the medication. This also gives you the opportunity to identify individuals that may be particularly sensitive to copper and require different methods of Ich eradication. The therapeutic level of Coppersafe is 1.5 to 2 ppm copper, tested with an API test kit (other test kits are not compatible). It must be maintained at this therapeutic level for a minimum of 14 days, though 30 days is definitely better since there are different strains of Ich, some with longer life cycles. If the copper level falls below the therapeutic level at any time, the treatment period must begin again.

PraziPro is a simple treatment that is generally well tolerated by wrasses. PraziPro shouldn't be combined with other medications as it will often cause a bacterial bloom, which significantly lowers the oxygen level in the tank, threatening the fish's welfare. A second PraziPro dose follows 5 to 7 days after the first. PraziPro contains praziquantel, which is a wormer. It helps to eradicate gill and skin flukes as well as internal parasites. It may cause temporary loss of appetite and anorexia in some fish, though the fish's appetite should return once the medication is removed with carbon.

Once Big Bad John started eating well in the quarantine tank, I started to add Coppersafe. He was treated with Coppersafe for 30 days, followed by two doses of PraziPro. He was a champ through it all and continued to eat the entire time. At the end of his treatment, I introduced him to my reef tank in the evening after the lights went out. I put him into an acclimation box with a piece of 1-inch PVC for him to retreat into. He just kept hiding in the PVC, so



I went to remove the PVC the next morning and he escaped into the tank! For fear the other fish might harass Johnny (and since I'd be at work for the day), I turned off the tank lights as a precaution. That evening, I came home and immediately went to find Johnny. He was bashfully swimming along the back wall of the tank, wary of all the other fish, but no one was harassing him. I turned the lights on dimly and fed the tank. Johnny sprang into action! I breathed a sigh of relief and figured all would be well.

Nowadays, Johnny is all about feeding time. He eats anything I put into the tank—homemade frozen mash, frozen mysis shrimp, brine shrimp, and *Calanus*, as well as New Life Spectrum 2-mm pellets. Johnny eats so much that he looks pregnant after feeding! With his small size and speedy agility, he zips all around gobbling up big pieces as well as all the small pieces that the other fish ignore. Since he's such a good eater, he's put on a lot of bulk in just 10 weeks. He has really colored up too! When I first got him, I was a little disappointed that he was only an initial-phase male with just a hint of a crescent-shaped tail forming and coloring typically associated with females. But another part of me was happy, thinking he could be fairly young and would have a long lifespan with me. In only 10 weeks, though, he's probably put on 30% more weight and has a significant crescent-shaped tail forming. His



coloration is excellent now, and even though he has a way to go to become a terminal-phase male, he is quite striking already! I haven't seen him display any nuptial colors yet, but he's the only fairy wrasse in the tank for now. 



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IT'S OK TO FLAKE

JASON ONEPPO

In the 1950s, the aquarium hobby took a giant step forward with the invention of flake food. Before that, fish were mainly fed live foods collected from local rivers and ponds, making fish keeping nearly impossible for many people. At that time, aquarium fish were mostly freshwater species. The invention of dried flake food allowed the hobby to grow by leaps and bounds. Now, flake has been around for such a long time that I liken it to other ubiquitous processed foods like cereal or dog kibble. Flake food has now become a staple in the hobby, and you can buy it just about anywhere and in a dizzying array of varieties. In fact, flake food is such a hobby mainstay that it is even carried in most supermarkets.

The manufacturing process for flake food begins with a mix of precisely measured ingredients that are blended into a wet slurry. This slurry is then sprayed in layers onto heated drum rollers where it dries. Big sheets of flake food come off the rollers and are broken up into small pieces for packaging. Flake is most commonly packaged in plastic containers to protect it from humidity, light, and being crushed. The containers are sealed with moisture barriers to ensure that the nutrients don't degrade.

The process of making flake has evolved and matured since the 1950s. Some manufacturers have moved toward small-batch processing, and most flake producers process their foods at very specific temperatures to retain the nutrient levels of fresh ingredients. Some brands have over 40 ingredients in their formulations, while others opt to limit the number of ingredients used to achieve the desired nutritional target. Some have eliminated traditional binders or thickeners, such as glues and starches, historically considered to be necessary to form and hold the flake together.

According to a recent pet industry survey, "In the past year, the most popular food purchased by both freshwater and saltwater fish owners was food flakes, bought by an average of 76% for both types of fish owners." Why do so many people use flake? It's affordable, nutritious, and easy to use and store. Most new aquarists start off with flake food, and some never venture beyond it.

I have been feeding flake food to fish for over 30 years. In some instances, flake was fed as part of a varied diet, and in other instances, it was the only food the fish were fed. I have successfully kept both freshwater and marine fish exclusively on flake food.



This double drum flaker dries the slurry, transforming it into large sheets of flake. | Image by author

Although often overlooked by more advanced hobbyists, flake is a viable option as a staple or as part of a more diverse feeding regimen.

There are more brands of flake food on the market today than ever before. Each has its own nutritional balance and formulation. Some flake foods are specifically targeted to meet the dietary requirements of certain species while other flake is more generally formulated for a wide variety of aquarium fish and invertebrates.

COLOR

Flake food is available in a rainbow of colors. This serves a dual purpose: to attract fish and to represent the ingredients of the flake. Usually, flake for carnivores is colored red and flake intended for herbivores is colored green, but there are many more colors in between, including blue. Not only do these colors attract fish, but



For nano aquariums containing a few small fish, flake can be a good staple diet. | Image by Nicola Bertolini

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they play a role in how we perceive the products as well. We pick up a container, see the label showing green flake, and know it is formulated for herbivores.

DENSITY AND TEXTURE

If you look at the wide array of flake food available today, you will notice a variety of different textures and densities. Some are lumpy due to the inclusion of larger pieces of ingredients or even whole organisms such as small shrimp, giving them a rougher appearance. There is grain-free flake that is thicker and harder like a pellet or wafer, and some even have ripples like potato chips. A number of brands have reduced or eliminated ingredients typically used to bind flake, replacing them with ingredients of marine origin, which affect flake density. Additionally, some companies have utilized different levels of moisture to produce flake food of various textures and thicknesses that lend themselves to different applications.

INGREDIENTS

Keep in mind that fish-food ingredients can, and usually will, affect water chemistry. Some ingredients may not be fully digestible, possibly having a negative impact on the water quality of your tank. When maintaining a reef aquarium, nutrient levels are important, and you don't want to overfeed a flake that is going to pollute your aquarium, directly or indirectly.

A lot of people don't know what to look for in the flake food's ingredients list, and most of their purchasing decisions are made based on the manufacturer's claims or a recommendation made by a friend or store employee. The ingredients list for fish feeds must by law be printed on the package and is listed in descending order by weight. Reading the ingredients list can tell you a lot about a food. If the first three to four ingredients are of animal or plant origin, preferably from the marine environment, then it has the potential to be a good food. Wheat gluten might be high up on the ingredients list for some brands, but this is not necessarily a bad thing since that inclusion rate might be necessary to ensure the integrity of the flake.

The main ingredient in most flake food is fish or fishmeal, followed a little further down the list by glutens, starches, vitamins, minerals, and amino acids. But even the position of an ingredient on the list doesn't tell the whole story. The way vitamins, minerals, and amino acids are processed can make a difference in how fish absorb these critical nutrients.

A nutritional analysis is also required on all fish-food packaging. It must state the percentage of protein, fat, fiber, moisture, and microorganisms (when probiotics are present). Some manufacturers also list vitamins, ash, phosphorus, and more, even though the law does not require it. It's always nice when additional information is present to help hobbyists make an educated decision.

FISH AS A FLAKE-FOOD INGREDIENT

In the wild, fish don't eat flake food, and many fish don't eat other fish as part of their natural diet. So why is fish often the first ingredient listed in flake food? It's an affordable source of protein that has proven to create positive results as a fish-food ingredient. Fish also find it palatable, and its smell is a natural attractant. Fish as an ingredient is used in several different forms, such as whole fish, filets, and fishmeal.

Fresh fish is a popular alternative ingredient to fishmeal. | Image by GraphicStock



TOP A saltwater flake mix that contains varieties for herbivorous and carnivorous fish is an excellent choice for feeding mixed reefs. **CENTER** Carnivorous and omnivorous fish are attracted to these red- and orange-colored flakes. **BOTTOM** The bright-green coloration of these flakes indicates they are intended for herbivorous and omnivorous fish, like tangs and rabbitfish. | Images by author

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Scavengers such as Banded Coral Shrimp will accept most flake foods. | Image by CigdemSeanCooper

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OTHER ANIMAL MATTER

Other sources of animal proteins from aquatic environments that are commonly used in flake food are krill, mussel, mysis shrimp, shrimp, squid, and crab. These ingredients are natural sources of proteins, vitamins, amino acids, omega-3s, antioxidants, and more. Some brands now incorporate zooplankton in the form of *Calanus*. *Calanus* is a genus of marine copepod that is regularly consumed by fish in the reef environment.

Animal proteins are not the only sources of protein found in flake food. Plant proteins are also important, helping fish with various feeding behaviors to digest food. Spirulina, a blue-green algae, is the most commonly used source of plant protein. Many companies offer spirulina flake marketed for herbivorous and omnivorous fish, such as tangs, angelfish, and rabbitfish.

The inclusion rate of spirulina and the overall composition of spirulina flake varies from brand to brand. Other common and acceptable sources of plant protein include *Chlorella*, phytoplankton, and alfalfa (often listed simply as chlorophyll). Some flake foods contain kelp and different seaweeds that are commonly fed to marine fish, such as nori and *Ulva*. There is even seaweed flake made from nothing but, well, seaweed!

FEEDING FLAKE

Feeding flake is rather straightforward. There are several techniques that can be used depending on your situation. Traditionally, flake food would

Whole fish and filets can be fresh or frozen and must be puréed and added to the slurry mix. Fishmeal is a powder or cake that can be made of scraps left over from processing fish for human consumption or from whole fish that are used specifically for making fishmeal. Most fishmeal made from whole fish for use in animal feed is made using a sustainable source and has a high nutritional value. Cooking and then grinding the fish or fish by-products is the most common way to produce fishmeal. It can also be produced using an enzymatic process, often referred to on labels as fish proteins, concentrates, or digest. The enzymes can be engineered to leave behind items such as bones and scales that would otherwise raise the level of phosphorus in the flake. Fishmeal produced using an

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be sprinkled on the surface of the water, and fish would come up and feed. One problem with this technique is that the flake food often goes down the overflow of your aquarium before the fish can eat it. You can prevent this by turning off or reducing the speed of your return pump when feeding. Several companies make what are commonly referred to as feeding rings. These either float on the water's surface or can be attached to the side of the aquarium. They create a barrier around the food and prevent it from floating away on the surface. Another commonly used technique is to take some flake food between your fingers, stick your hand in the aquarium, and release the food below the water's surface. This creates a more natural feeding experience since many fish (especially marine fish) don't naturally feed on floating items. If you don't like to stick your hands in the tank, you can soak the flake in a cup of aquarium water, allowing it to become water-logged. Then pour the entire cup of water with flake food into the aquarium.

A commonly asked question is whether flake food can be used in an automatic feeder. Although pellets are better suited for this purpose, flake can be used in auto-feeders as well. The important thing to keep in mind is that when flake takes on moisture, it clumps together. Therefore, it is important to select a quality feeder that is well sealed and doesn't allow excess moisture to enter the food chamber.

If you have someone feed your tank while you are away, flake is an excellent choice. It can't accidentally be left thawing on the counter like frozen food, and it can be pre-portioned using pill containers marked with the days of the week to eliminate the worry of your tank sitter overfeeding.



LEFT Alfalfa powder is a good source of chlorophyll and has a very high protein content. **RIGHT** The color of spirulina flake can vary due to the inclusion rate of spirulina and other ingredients in the formulation. | Images by author

When flake is not in use, it is best stored in a cool, dark place with low humidity. Most people will store it under their aquarium, which is fine. Just make sure the container is tightly sealed to avoid the flake taking on excess moisture and spoiling.

Although flake food might not be the perfect feeding solution for every situation, it has proven to be one of the most universal feeding solutions in our hobby for over 60 years. If you haven't looked at flake food in a while, you may want to check some out. With all of the advancements in flake manufacturing, you may be pleasantly surprised by what you find. As always, keep it real, fishes! 



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JOSEPH CHI

A CONTROL FREAK'S GUIDE TO REEFING

My name is Joseph Chi, and I'm a reefkeeper, an engineer, and a daydreamer. Like most of us, my reefing journey was initially triggered by keeping freshwater tanks at a young age. In 2000, I started my first saltwater tank, which contained just a few wild-caught animals. I later moved to the Bay Area, where I built my first SPS (small-polyped stony) reef tank. Unfortunately, it burned down in an accident in 2008. After that, safety became the top priority for my tank design and daily operations.

In 2011, I built my second SPS-dominated tank here in Taiwan. Corals in this 120-gallon tank grew very well after my first year of trial and error, but the colors did not pop the way I had hoped. This tank ran for over 3 years but was dismantled when we moved to a new house.

When the time came to build my current SPS tank, I did some serious planning to ensure that my new setup would be well thought out, highly controllable, and as safe as possible. Some

trained engineers may cross the line, taking things to a control freak's level. I consider myself one of them.

Here are some important rules and guidelines that I spent tremendous effort and time focusing on.

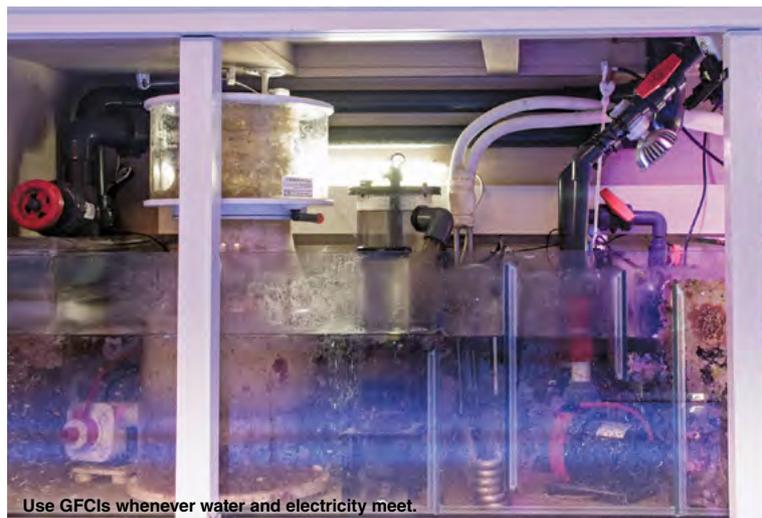
SYSTEM PLANNING

1. USE QUALITY PRODUCTS ONLY: Only top-of-the-line aquarium equipment should be considered. I believe that a 50% increase in cost is definitely worthwhile, even if you only gain another 5% of product reliability, especially when you have a mature tank with years of time and effort invested. Keep in mind that your tank is a place where water and electricity come together.

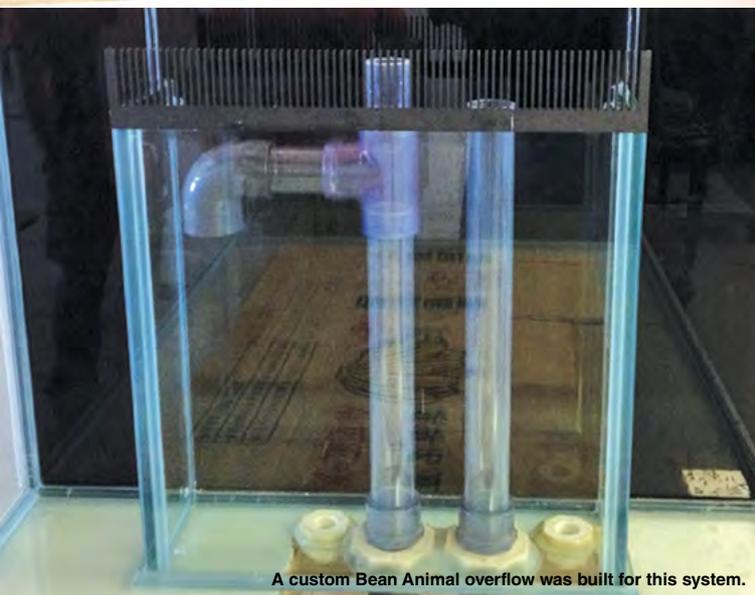
2. NEVER CUT CORNERS ON PLUMBING: Plumbing is not just about gluing pipes together and hoping for no leaks; it is about detailed planning to prevent leaks and emergencies. I only use schedule-80 PVC and Cepex true union ball valves, and I let professional plumbers do the work instead of doing it myself.



The system controls must be neat and tidy.



Use GFCIs whenever water and electricity meet.



A custom Bean Animal overflow was built for this system.

3. USE GFCI OUTLETS: A GFCI (ground-fault circuit interrupter) is completely different from a fuse. A GFCI monitors the amount of current flowing from a power source to ground. If there is any imbalance, it trips the circuit. It is there to protect people from electrical shock or a dangerous short that could cause a house fire.

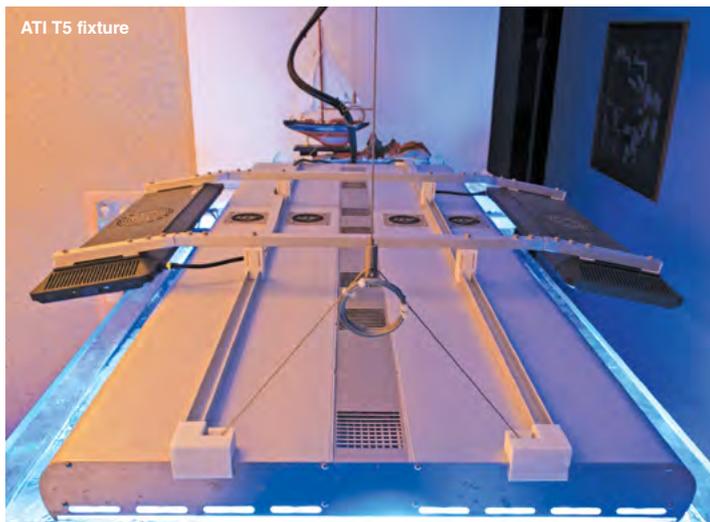
4. USE THE BEAN ANIMAL OVERFLOW: The Bean Animal dead-silent overflow design will keep tank operation silent when the sump door is closed. This is extremely important because I keep my rimless, open-top tank in the living room. Equally important, this overflow is fail-safe.

5. CONTROLLER, CONTROLLER, CONTROLLER: There is no smart aquarium without an aquarium control system. With today's controllers, function separation, failure recovery, and robustness are already superior to any human-operated system. Use it; you won't regret it.

6. ENSURE REDUNDANCY: All critical items must have a backup or utilize a dual system. For example, I have a complete second

controller set in my garage, an extra Red Dragon main pump, and even a secondary backup main pump. I keep two extra Tunze wave makers as backups while four are in daily operation. I use a BK Deluxe 300 skimmer but have a BK 250 as a backup.

7. LIGHTING: I must admit that I don't understand LEDs much, not even T5s or metal halides. My philosophy is just to stick with the most popular and successful lighting setups. After studying many "tank of the month" tanks and articles, I chose an ATI T5 light fixture. I added a winch for the lighting system to facilitate the



changing of bulbs. I have never regretted this investment. It also provides a unique and convenient way to adjust for PAR when I add new coral colonies. I can raise my ATI fixture instead of putting new corals on the sandbed.

8. KEEP PARAMETERS CONSISTENT: To keep my water parameters stable, I abandoned a calcium reactor for a dosing

pump. A good dosing pump keeps my dosing volume rock solid, and when coral growth booms or decreases, no physical knob twisting is needed for KH adjustment. I simply use the app to change dosing volume, even if I am a thousand miles away from home. Also, I have a KHG (KH test device) that tests alkalinity automatically every 4 hours and sends logs to me at any time. I have a total of 12 dosing heads (Alk, Ca, Mg, K+, AF balling, AF components [A, B, and C],

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AF Iodine, KZ Start3, KZ Flatworm Stop, and KZ Coral Booster).

9. MINIMIZE CABLES AND CLUTTER:

Many reefers are able to keep beautiful corals, but their displays may not look impressive if too many cables or accessories are exposed. I did not apply any advanced skills here, but a separate sump area, an added hidden ceiling (for the winch), and a closet (for the doser) were definitely helpful for aesthetics.

In my opinion, 90% of a reef tank's success is decided in the planning phase. With good system planning accomplished, the last 10% is maintenance, which is key to keeping an outstanding tank. Running an SPS-dominated tank and realizing great coral coloration and growth are far more complicated than just system planning. Maintaining a reef requires passion, care, and skills—things that money can't buy.

MAINTENANCE

1. MIND YOUR FILTRATION: I am aware that there are some high NP (nitrate/phosphate) coral tanks, but I believe that keeping NP values lower equates to a higher success rate. I decided to shoot for an ultra-low nutrient system (ULNS), and more specifically, to use the KZ Zeovit system. Lately, I have chosen to mix KZ with the Aquaforest solution.

2. KEEPING A ULNS: It is not easy for all tanks to maintain a ULNS balance, even when utilizing a Zeovit system, especially if the tank bioload is high. To help address this, I wrap my Tunze pump with filter pads and blow them directly on the rock and sandbed twice a week. This helps remove fish feces and other particulate organic material from the tank before it has a chance to break down to the next phase in the nitrogen cycle. With that, I am always able to keep NO₃ below 0.2 ppm and PO₄ at less than 0.01 ppm.

3. MANAGE WATER FLOW: All too often, filter socks and protein skimmers become nutrient traps during the feeding period. Lowering the return flow (from 20 times to 5 or 6 times per hour) and increasing internal currents and turbulence in the main tank effectively brings more food to all of the corals and keeps it out of the skimmer and socks.



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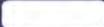
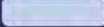
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This picture shows how I integrated the AT15, the Kessil A700s, and the winch.



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Monitoring your corals is the best way to determine system performance.

4. ACHIEVE DESIRED PAR: Some surveys show the best coloration and growth in SPS corals are achieved using T5 bulbs. I provided my own twist and upgraded to an ATI T5/LED hybrid. To fully light an approximately 35-inch-wide tank, I also added one Kessil A700 on each side to provide enough light coverage.

5. OBSERVE YOUR CORALS: Observation and patience are key. I usually pick a few different *Acropora* colonies and analyze their growth, tip-coloration change, and polyp extension as indicators of tank health.

6. CHANGE YOUR WATER: I do 6% weekly water changes with exactly the same salinity, temperature, and alkalinity as the tank water. I also do 40% water changes every 3 months. When tank performance goes significantly down, I quickly do 33% water changes three times a week.

Lately, we have seen an influx of new technological advances in our hobby with more on the horizon; what we attribute only to the control freaks today could be everyone's baseline-level technology tomorrow. What will remain the same, though, is the passion and commitment needed, both for your tank and for your own safety. We are all so lucky to have discovered this hobby and joined this great reefing community. This hobby requires integration of biology, engineering, high technology, chemistry, art, photography, and more, all rolled together in a fun way with a huge return. I am also grateful that in my saltwater aquarium journey, my wife always keeps a cool attitude and is willing to ignore me when I stay in my garage, backyard, or balcony for long periods of time. And she doesn't scream too much when the floor gets all wet. Happy reefing, everyone! 

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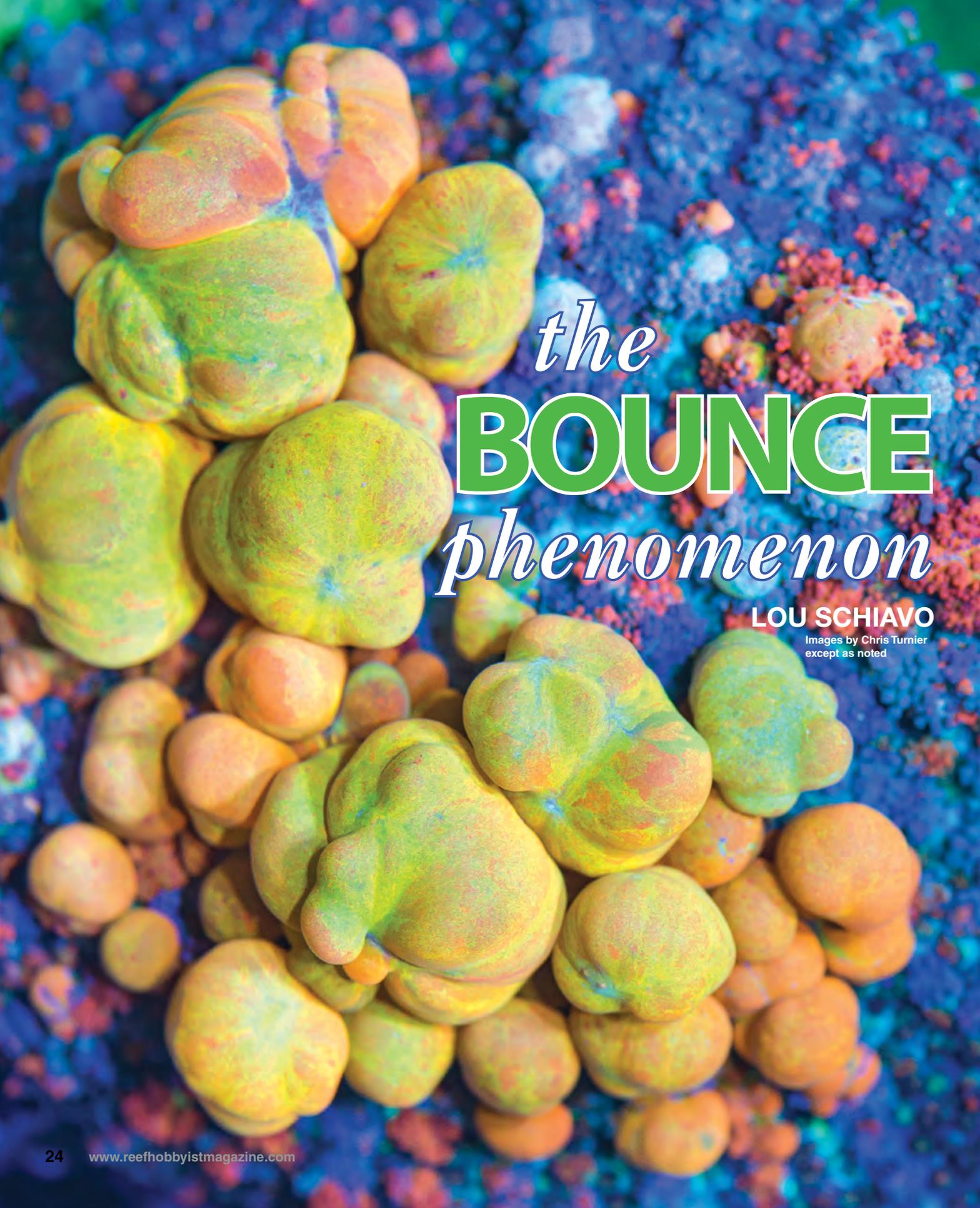


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the
BOUNCE
phenomenon

LOU SCHIAVO

Images by Chris Turnier
except as noted

Throughout the history of reef keeping, certain corals have caught the eye of high-end coral collectors. When that happens, top collectors are willing to pay large sums to acquire these corals. Sometimes, these large price tags keep the average collector from getting the hottest coral right away. When a coral is in very high demand and the availability is limited, that coral's price trends up. However, what goes up must come down, right? The exception to this trend is the demand for Bounce mushrooms. The popularity of Bounce mushrooms remains strong, and the prices have remained high while availability has been somewhat limited.

Trends in the saltwater aquarium hobby are nothing new. Several years back, small-polyped stonies (SPS), particularly brightly colored *Acropora* spp., were hot among collectors. Then the trend shifted to colorful zoanthids and *Palythoa*. Soon after, chalice corals became the talk of the hobby, and the entire industry took notice. As the chalice craze faded, the industry moved toward mushrooms. The Facebook group-page Shroom Room has gained a lot of momentum and is now one of the most popular hobby groups on Facebook.

For many years, mushrooms were considered beginner corals. Some could even become invasive pests if allowed to reproduce freely. This changed with the likes of the Eclectus mushroom, the Jawbreaker mushroom (with its tie-dyed appearance), and of course, the Bounce mushroom's introduction to the hobby.

Bounce mushrooms are one of the most sought after and the single most expensive coral polyps ever sold in the aquarium hobby. This corallimorph strain is not your typical furry *Rhodactis* mushroom. Ever since the World Wide Corals OG Bounce Mushroom was first introduced to the hobby several years ago, things have not been the same.

How does this "Bounce" thing happen to these *Rhodactis* mushrooms? It has been hard to pin down what is causing portions of the polyp tissue to become enlarged and take on a bubble-like appearance. There are a few theories around, and they all seem to lead back to water conditions and lighting. Could it be that a certain type of water parameter helps develop these large, almost tumor-like bubbles on the mushroom? With the advancement of aquarium lighting, maybe lighting could be the culprit.

The hobby's fascination with these Bounce mushrooms has raised questions about the wild Bounce strains. Do these shrooms show



Jawbreaker | Image by Alex Whedbee

any Bounce characteristics in nature or just in captivity, and what do divers look for to indicate a potential Bounce strain? I have had the opportunity to talk to a reef diver who dived specifically for Bounce mushrooms on several scuba diving expeditions in Indonesia. In the wild, these mushrooms typically show very little bubble formation. Divers keep this in mind when looking for these shrooms. It is highly unlikely to find a fully developed Bounce mushroom in the wild; only once they are acclimated to a controlled environment do some of these mushrooms produce full Bounce characteristics. Once this occurs, you can easily identify and separate the Semi-Bounce from the true Bounce mushrooms.



Eclectus mushrooms | Image by Jacob Larsen



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Since the debut of the WWC OG Bounce Mushroom, there has been a global push to bring to market other Bounce mushrooms, as well as Semi-Bounce mushrooms. In turn, marine exporters have been working harder than ever to find more of these amazing animals. A recent search of the inventories of coral vendors shows that the Indonesian exporters have been successful in finding more varieties and color variations of the Bounce mushroom.

Not all Bounce mushrooms are created equal. Some Bounce mushrooms do not have the brightly colored, enlarged vesicles. Some may have only a few bubbles and may not be as brightly colored. These types of Semi-Bounce mushrooms do not have as high a price tag, but they are unique and still a great addition to the home aquarium. Let's look at some of the top-shelf specimens.

Name: WWC OG Bounce Mushroom

Genus: *Rhodactis*

Type: soft coral

Color: orange bubbles, purple and green base

Feeding: photosynthetic



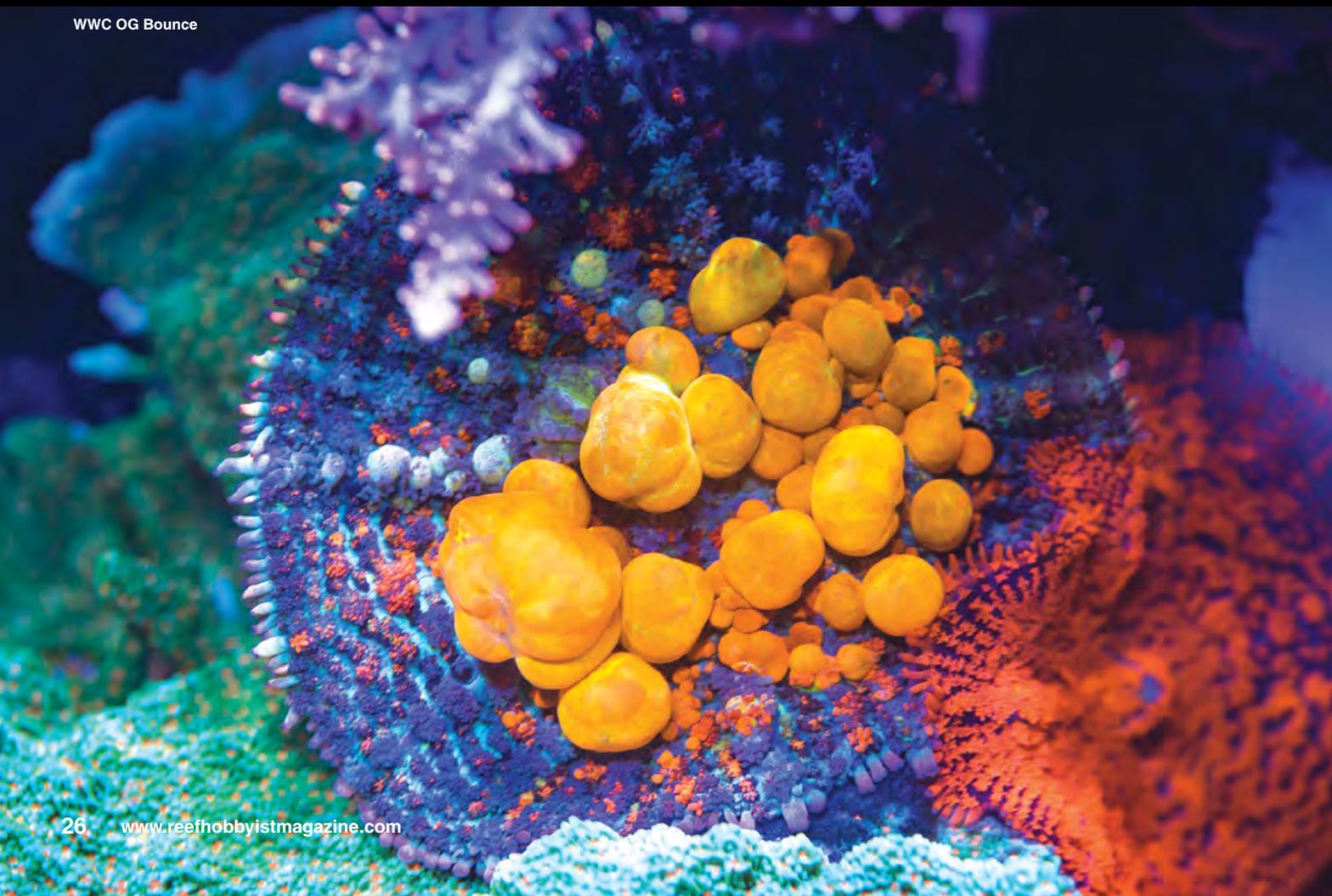
WWC Biohazard Bounce

Flow: medium

Lighting: medium

The OG Bounce Mushroom has been called the "King of All Bounce Mushrooms" and is the original Bounce mushroom that started the madness. The best way to describe its appearance is to imagine a *Rhodactis* mushroom anemone with amazing neon orange, neon green, and yellow highlighter colors throughout the bubbling tissue.

WWC OG Bounce



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WWC Sunkist Bounce

WWC Biohazard Bounce



Name: WWC Sunkist Bounce Mushroom
Genus: *Rhodactis*
Type: soft coral
Color: orange bubbles, purple and green base
Feeding: photosynthetic
Flow: medium
Lighting: medium

If the OG Bounce is the king, then the Sunkist Bounce Mushroom, with orange bubbles and purple and green throughout the coral, is the prince. The bubbles on this mushroom are so bright that Sunkist is the perfect word to describe it.

Name: WWC Biohazard Bounce Mushroom
Genus: *Rhodactis*
Type: soft coral
Color: yellow bubbles with a green, blue, and orange base
Feeding: photosynthetic
Flow: medium
Lighting: medium

The Biohazard Bounce Mushroom is another one that is fittingly named for its appearance. Take a close look at the contrasting colors of the yellow bubbles and the green, blue, and orange base.



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WWC Frostbite Bounce



WWC Sunkist Bounce

Name: WWC Frostbite Bounce Mushroom

Genus: *Rhodactis*

Type: soft coral

Color: blue and lavender bubbles with orange, purple, and green base

Feeding: photosynthetic

Flow: medium

Lighting: medium

The Frostbite Bounce Mushroom lives up to its given name, with blue and lavender bubbles. You will also find orange, purple, and green throughout the tissue of the mushroom. This Bounce strain makes a beautiful contrast with some of the more hotly colored (red and orange) Bounce mushrooms.

PROPAGATION

Coral propagation refers to the reproduction of coral and is often accomplished through a process called fragmentation, or fragging. Like other mushroom corals, Bounce mushrooms can be fragged/propagated. For those of you who are squeamish or faint of heart, some of these fragging methods may not be for you.

For manual propagation, there are three options available:

- Razor blade-cut the mushroom's foot to induce pedal laceration
- Put a very thin rubber band over the mushroom. Leave it alone in a safe spot for a few weeks, and the mushroom should start splitting on its own.
- Cut the mushroom in half

For natural propagation, there is only one option:

- The mushroom can clone itself by splitting off a piece of its foot onto the base of the rock to which it is attached. This method demands patience on the hobbyist's part.

So what is the current state of this Bounce mushroom craziness? As recently as July of 2016, an article on Reef Builders noted, "We've written many articles in the past on Bounce Mushrooms and all the craziness surrounding them in the last few years. However, based on what was seen at ReefAPalooza New York 2016, it is very clear that Bounce mushrooms are still the king of current coral vending."

Surely, there will be another coral trend in the future. For now, though, we are smack in the middle of the Bounce mushroom craze, and it looks like there will be no slowdown any time soon. 



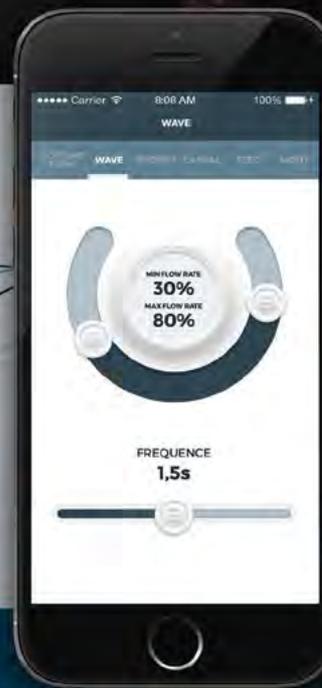
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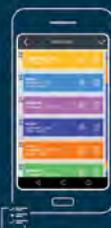
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DARTFISH TARGET OUR HEARTS!



SABINE PENISSON
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Commonly called dartfish for their tapered bodies, habit of darting vertically to the substrate, and readiness to rush into their shelter at the slightest alarm, *Nemateleotris* and *Ptereleotris* have a well-deserved place in the reef aquarium hobby. While these two genera are two of the most well known of the Ptereleotridae family, there are other less common ones with anecdotal appearance in the trade, like *Aiollops*, *Oxymetopon*, and *Parioglossus*.

All genera combined, the Ptereleotridae family contains about 70 described species to date. Their common features include a thin, tubular, and very elongate body and a prognathous and oblique jaw, which opens wide. The scales are very small, and the dorsal and anal fins extend over a large part of the body.

The most well-known genus, *Nemateleotris*, includes four species: *N. decora* and *N. magnifica*, which are by far the most widespread in the hobby, the much scarcer *N. helfrichi*, and the brand-new *N. exquisita*, described in 2013 by John Randall. They are all brightly colored, and some possess a long, elegant first dorsal ray.

There are 20 species of *Ptereleotris*, the best known of which are *P. evides*, *P. zebra*, and *P. hanae*, although they are imported far less often than their *Nemateleotris* cousins.

In many professional facilities, shops, and some obsolete databases, these fish are still improperly classified as gobies. This confusion goes back to the days when the group was not

a proper family. After long being included in the Gobiidae, they were even recently included as a subgroup of the Microdesmidae, under the name of Ptereleotrinae. In 2000, research by biologist Christine Thacker led to the reclassification of the Ptereleotrinae as a distinct family: the Ptereleotridae. This new classification was later confirmed by genetic analysis and constructed to reform the phylogenetic scheme of the order Gobioidae, which now includes, at the same classification level, families Eleotridae, Ptereleotridae, Gobiidae, and Microdesmidae. Some species remained in the Microdesmidae family, such as those in the genera *Gunnellichthys* and *Microdesmus* (commonly called wormfish and seen very rarely in the trade).

Members of the Ptereleotridae have an average life expectancy of 6 to 8 years, a typical lifespan for this type of small reef fish. They are protogynous hermaphrodites, but any sexual dimorphism is currently unknown and may not exist at all. Therefore, we cannot rely on external examination to differentiate a sexed pair in a sales tank, except in the case where two specimens stay together, but apart from the other conspecifics.

NATURAL BEHAVIOR AND ECOLOGY

Despite their morphological similarities, the behavior of the Ptereleotridae is very different from the gobies. Most gobies perch on the sand or rocks, whereas dartfish hover in the water column, looking for drifting zooplankton. *Nemateleotris* spp. hover in a vertical position or at a 45° angle (with the head pointed up) while



Aioliops megastigma is a tiny but beautiful dartfish. Due to its fast metabolism, it usually arrives at stores with a sunken stomach. Once through acclimation, it is a beautiful addition to a nano aquarium.



Nemateleotris decora is a vibrant species that is sure to be noticed despite its small size.

keeping their position by little leaps forward to counteract the water current. The leaps are so quick that one can barely distinguish their fins moving. They seem to hover effortlessly without impact from either gravity or currents. The *Ptereleotris* swim horizontally over short distances, patrolling and hunting around a protected and well-defined territory.

All members of these genera are shy and always remain within “fin distance” of their shelters. Their territory is only a few square inches wide. In the wild, they are often found at the bottom of reef slopes, on coral rubble areas, or on the transition between the reef and the sandy bottom. They choose their territory with great care. There must be several shelters in the area, including (but not limited to) holes in the reef rocks, abandoned cavities dug by mollusks or worms, and burrows excavated by gobies or pistol shrimps. Although they do not seek any kind of association, the Ptereleotridae simply take advantage of opportunistic bolt-holes. A layer of sand can also be exploited in a rudimentary way for the fish to bury itself in case of emergency.

At the juvenile stage, most species live in groups of up to several hundred individuals. As the fish reach adulthood, they separate from the group to isolate themselves as monogamous couples that share the same hiding places and develop fierce aggression toward conspecifics, which are considered competitors.

SPECIES IN THE SPOTLIGHT

The most colorful members of the family, the *Nemateleotris* spp. are obviously the best represented in the trade. *N. decora* is widely

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Nemateleotris exquisita is now officially its own species. In 2013, it was distinguished from its mother species, *N. decora*. It is found in the Western Indian Ocean, from the Red Sea to South Africa.



Nemateleotris magnifica, commonly called the Fire Goby, is actually not a goby, but does indeed look like a fiery sunset!



distributed in the Indo-Pacific and grows to a maximum of 7 cm (2.75 in.), with an average length of 4 to 6 cm (1.57 to 2.30 in.). This species lives in the relatively deep areas of the reef, between 25 and 70 meters. The anterior part of its body is ivory, but the ivory transitions to a gray and then a deep purple color toward the caudal fin. The fins show a gradient from purple to bright red while the head sports a magenta cap that extends to the back of the fish.

A close-looking relative, the new species *N. exquisita* is found in the Western Indian Ocean. It grows larger than *N. decora*, with a maximum length of 9 cm (3.54 in.), and lives in the lower part of the reef, usually at depths of 35 meters or more. The anterior part of the body is more yellowish than ivory, and the first dorsal ray is much shorter than that of *N. decora*. These two closely related species share the same distribution in some parts of the Indian Ocean and frequently form hybrids in the wild.

The third species, *N. magnifica*, is (improperly) called the Fire Goby because of its flamboyant pattern. The body is off-white on the anterior and transitions to shades of orange, ending with dark red on the caudal fin. The dorsal fin shows a huge first ray, measuring

more than half the total length of the fish. It is a very common species on the reef, widely distributed from the African coasts to Hawaii. Its size is quite similar to *N. decora* (up to 8 cm or 3 in.), but it inhabits shallower areas, often between 10 and 30 meters.

The last species, *N. helfrichi*, is simply stunning eye candy! The body is pink to lilac, subtly transitioning to almond-green toward the posterior part of the body, as well as toward the dorsal and anal fins. The head is bright yellow or magenta depending on the geographic origin. On the Cook Islands strain, the head is magenta or pink, highlighted with bright-yellow eyes and punctuated with a black “eyebrow” and magenta freckles extending in a line to the back of the head. This species has a very small distribution area, present only between the Ryuku Islands, Papua New Guinea, Micronesia, and French Polynesia. It is usually collected in the Marshall Islands for the trade. One specimen was found by a professional collector along the Philippines coast, but this lonely specimen does not prove that the species is distributed there. This narrow distribution, along with its natural taste for the depths (40 to 70 meters), explains its relative rarity and high price of around \$100 per fish. This species is smaller than the other two species. It is also

Nemateleotris helfrichi (Marshall Islands) | Image by Kevin Kohen





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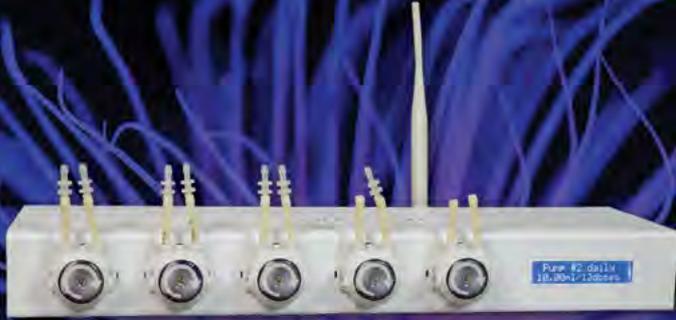


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A beautiful specimen of *Ptereleotris zebra*.



This well-fed *Ptereleotris evides* hovers peacefully in its familiar environment.



more sensitive to water temperature fluctuations due to its deep natural habitat. Care should be taken not to exceed 27° C (80.6° F).

Members of the *Ptereleotris* genus are generally less colorful, but their subtle patterns are nevertheless very attractive, and they will appeal to those who seek less common fish. *P. evides* and *P. zebra* are the two most readily available species in the hobby. *P. evides* shows a beautiful gradation of gray; it has a very light pearl gray on the anterior body, darkening to anthracite on the caudal fin. The eye is circled with iridescent blue. The adult size is about 12 cm (4.70 in.), with a maximum of 15 cm (5.90 in.). This species is usually found in sexed pairs and at shallow depths between 2 and 15 meters, mainly on coral rubble areas in protected inner reefs or lagoons.

The smaller *P. zebra* reaches a maximum size of 12 cm (4.70 in.). Widely distributed over the Indian Ocean and the Pacific Ocean like *P. evides*, *P. zebra* lives in groups instead of pairs, even in adulthood. They settle in very shallow areas (2 to 5 m) of the fore-reef that are facing into strong currents that bring zooplankton. *P. zebra* is a pretty fish; its grayish-silver, pearly body exhibits about 20 vertical, pink, candy-colored stripes, finely highlighted with bright blue. The branchial operculum and the eyes are also underlined.



CAPTIVE DARTS: TANK CONFIGURATION, SELECTION, TANKMATES, AND MAINTENANCE

Hosting *Nemateleotris* or *Ptereleotris* in a reef aquarium is a great idea. They are peaceful, colorful, fully compatible with all sessile or vagile invertebrates, and relatively easy to care for once acclimated. These fish will enjoy a peaceful existence in your reef aquarium if a few precautions are taken.

It will be necessary to introduce your dartfish strategically. Ideally, add two small specimens or an established pair into the system at the same time. The Ptereleotridae, as protogynous

hermaphrodites, mate after completing the juvenile phase, and this moment coincides with sexual differentiation. They choose their partner from among the group, and once the couple is formed, they remain monogamous until the death of one of the two. These pairs will vehemently quarrel with other conspecifics intruding on their territory. If an existing couple is not available to purchase, try to source the smallest specimens possible to increase the chance that the sex change has not yet taken place. If you acquire adults from a group in a shop, you take the risk of buying two fish of the same sex post sex-change. They won't live together peacefully for very long, and it will result in the death of the weakest fish unless the tank is large enough to be able to accommodate two territories.

In the same way, introducing a group is only viable if the aquarium is spacious enough for pairs and solitary specimens to find their own separate territories. This may seem like the most natural way to form real pairs and territories, but the pairing process might leave some "unwanted" fish, who will be chased until exhaustion or forced to escape...by jumping out of the tank.

Jumping is a dartfish behavior that warrants careful planning. The aquarium must be covered or at least equipped with tall protective panels to prevent fish from jumping out. These fish are, as we mentioned, very prone to jumping to escape any stressful situation. Don't forget that their common name is dartfish!

For this reason, these fish should be housed with calm fish of similar size: gobies, blennies, cardinalfish, jawfish, small basslets, or any small fish that tends to stay within its own territory in the tank.



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These *Nemateleotris helfrichi* from Polynesia are rare specimens in the hobby. | Image by Kevin Kohen

Don't overcrowd the tank and be conscious of each fish's territorial requirements. Dragonets, pipefish, small fairy basslets, fairy wrasses, and flasher wrasses are other excellent companions. Small but pugnacious fish such as dottybacks and clownfish can be too aggressive during their spawning cycles. Surgeonfish and other large, aggressive fish are too boisterous and frenetic and should be avoided.

It is essential to avoid any stress to your dartfish that might cause them to jump out of the tank or feel threatened so often that they stay hidden in their shelters, not daring to come out to feed.

The ideal aquarium will be a minimum of 30 gallons for a pair of dartfish. For two distinct pairs from two different species or a small group of *P. zebra*, 80 to 100 gallons would be good. The taller the tank, the better. Again, the aquarium must either be covered or at least partially surrounded by high panels to direct any jumping fish back into the tank. The rocky decoration should have many deep cavities as well as a sandbed at least 1.5 inches deep to offer a wide choice of retreats for the fish. Artificial burrows can be constructed from pieces of 1/2- or 3/4-inch-diameter PVC pipes unobtrusively hidden in the scenery.

Water flow should be smooth and laminar with a broad flow. The intensity of lighting doesn't matter unless you choose to recreate the natural habitat of deep-water species, such as *N. helfrichi* or *P. grammica*. It would then be preferable to go for a soft, bluish light.

The choice of motile and sessile invertebrates is left to your imagination, since all the Ptereleotridae are absolutely reef safe. With soft water currents and moderate lighting, the configuration is ideal for the husbandry of large-polyp stonies (LPS), sea fans, gorgonians, and even non-symbiotic inverts, if you want a challenge.

Mellow fields of *Acanthastrea*, *Trachyphyllia*, *Catalaphyllia*, or *Euphyllia*, punctuated by stands of *Pseudopterogorgia*, *Gorgonia*, or *Muriceopsis*, would all make lovely backdrops for these fish.

Dartfish, once acclimated to their new environment and companions, are robust and easy to keep. Feeding on pelagic zooplankton in the wild, they will readily accept any kind of thawed micro-crustaceans, *Artemia*, mysis, or chopped krill that will disperse in the water column. They will also eat small-sized pellets and flakes after some conditioning.

Consider some dartfish when the opportunity arises. You'll fully enjoy these little fish once they feel comfortable in their environment, thriving amongst quiet companions. They will show in the water column all day long, with their beautiful colors, their grace, and the harmony of their swimming, making a soothing and beautiful sight in the home aquarium. 



Nemateleotris magnifica lives in pairs as adults.



Preventing *the* **CRASH**

JARED BURBANK

The vast majority of system crashes happen either when the owner goes on vacation or when critical equipment malfunctions. Combine these and you have the perfect storm for impending disaster. We've all been there. You go out of town for a few days and get that call. "Hey, your tank is making a funny sound," or "Something doesn't look right."

Just this past week, a friend went out of town for a few days to visit family. Since it was only a few days, he decided to let his tank run on autopilot while he was gone. He contacted me the day he got back and explained that his system completely crashed because his return pump had failed. He believes the water temperature in his display must have been in the low 60s for days.

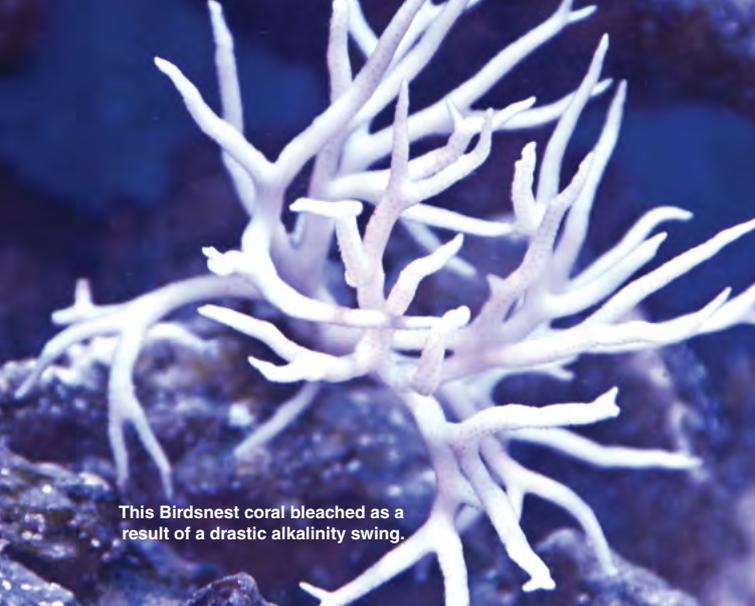
This morning, I got a frantic call from a tank sitter. "Something doesn't look right, and something is beeping under the tank," she said. "This is his baby, and I don't want everything to die." An hour's

drive later, I found that the tank sitter hadn't been told that she needed to refill the auto top-off container. The system was only hours away from the return chamber running dry, which could have resulted in a total system meltdown.

PREPARING FOR VACATION

When possible, hire a tank maintenance company to take care of your tank while you are out of town. These people set up and maintain tanks for a living and will be able to deal with most problems that might arise. The additional cost of hiring a professional is worth it compared to the potential loss of all your fish and coral.

If this service is not available in your area, try to find somebody from a local reef club who will take care of your tank while you're gone, preferably somebody who has a system that's nicer than yours. If they have a nice tank, it shows that they are experienced in the hobby and know what to do if something goes wrong.



This Bird's nest coral bleached as a result of a drastic alkalinity swing.



I lost this Pavona colony due to a heater malfunction.

Whether you're relying on a company or a friend, train them on your system beforehand. Make a list of everything that needs to be done and/or checked each day. For example, If you run a controller on your system, the tank sitter needs to know all the ins and outs of how your controller works. Walk them through every potential catastrophe and the various remedies.

If your tank sitter hasn't cared for your system before, make it as simple as possible for them. Try to keep the daily requirements to a minimum, such as feeding, topping off water, and emptying the skimmer. Don't leave them complicated tasks like changing your GFO (granular ferric oxide) or carbon. The less they need to do, the less chance of a mistake. When I go out of town, I even remove my filter socks to simplify life for the tank sitter.

Pre-measure food and reduce necessary feeding while you are away. Consider adding an auto-feeder to provide small supplemental feedings so your tank sitter doesn't have to feed as much. Overfeeding by itself can cause a total system crash, and this happens all too often with novices.

EQUIPMENT FAILURE

Have backups for all vital equipment ready to go. I keep extra pumps, heaters, and other equipment sitting in a cabinet, just in case something malfunctions. If your return pump goes out, do you have an extra one ready to take its place, or would it take 4 days or more to order a replacement online? Use true unions to plumb inline pumps, and have a duplicate (with attached plumbing) ready to be swapped in if necessary.

All external systems eventually leak (this includes hang-on-back equipment). Whether a hose fitting comes loose or a seal cracks, it will happen. Try to run everything you possibly can in the sump. That way, if it does leak, it is leaking into your sump and not onto your floor. I even run my calcium reactor in the sump.

What happens when a piece of equipment doesn't turn off when it should or fails completely? For example, let's say your heater fails or won't turn off. Will this crash your tank? Personally, I prefer to run multiple small heaters rather than one large one. That way, if one goes wacko, it won't completely nuke my tank. The temperature might be affected, but not as drastically as if a single large heater were to malfunction. Also, always have a heater in your display tank in case your return pump fails, so your tank will still be warm while the heaters in your sump are doing their own thing.

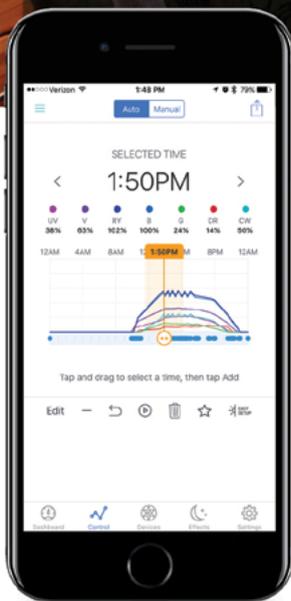
Another common problem is a dosing pump not cycling off. If that were to happen, would it dump a month's worth of kalk into your system, causing a total system meltdown? Consider using smaller



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A dosing pump failed to turn off and dumped 2 weeks' worth of alkalinity and calcium supplements into this system overnight.



Use strainers on all drains and returns.

dosing reservoirs, which could protect your system from a total crash.

Strainers are your best friends. Always use them on all drains and return lines and clean them often. The last thing you want is a wayward turbo snail clogging a drain or return line, causing an overflow in the display or sump.

Keep ready-to-use saltwater on hand at all times. Water changes are the solution to pollution. If your dosing pump accidentally overdoses the system or something dies in the tank, a large water change is the best medicine for your system. Adding carbon can help, but getting the bad water out and replacing it with good water can be a life saver. Make sure you review the water change process with your tank sitter before you go away.

Have a plan for an extended power failure. Purchase a battery-operated air pump (with plenty of batteries), an inverter for battery backup, or even a gas generator. While your system can go a few days without light, it will need to be kept warm (even if you have to wrap it with blankets), need some water movement, and require oxygen. I keep a generator, still unused and in the original box, in the basement, just in case.

Always remember Murphy's Law: if something can go wrong, it will go wrong. But an ounce of prevention is worth everything. 

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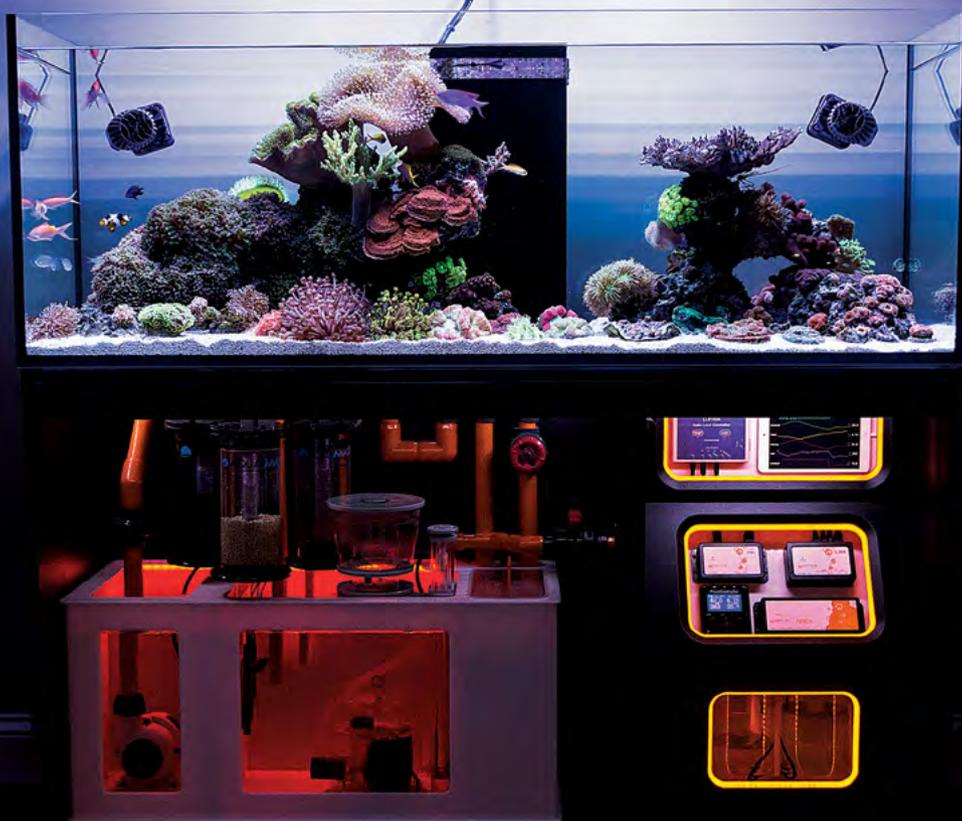
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TOBY BROADFIELD

CUSTOMIZING A REEF-READY SYSTEM

I first got into freshwater tanks about 35 years ago. My uncle owned a pet store specializing in aquatics where I hung out during summer breaks. Growing up, this gave me the opportunity to own a handful of various freshwater setups, but it wasn't until after I graduated college that I tried my first reef tank. In 1996, my local fish store started getting into reef setups, and I thought it was the most amazing thing ever. I quickly set up a 55-gallon reef tank with T12 VHO lighting. I failed miserably, but I didn't know much at the time. I was still too young and only cared about modifying cars, not to mention the internet in 1996 was pretty lackluster for reefing info. I tore the tank down less than a year in.

Fast forward to 2013; I had better income, more patience, and the internet was plumb full of info...probably too much info! After the long break, I decided to try my hand at an Innovative Marine

30-gallon nano. I had moderate success, but after a couple of years, I was nowhere close to where I wanted to be. I learned a couple of important things with that setup: there is such a thing as too much light, and having the latest and greatest equipment doesn't necessarily equate to a successful reef tank. Like many reefers out there, I decided that a larger tank was going to solve all of my problems.

In 2015, Red Sea released the Reefer line of aquariums. I loved the clean look of the tank/stand combo, and this gave me the opportunity to get into that larger-tank category. I went with the largest one at the time, the 450-liter (~119-gallon) model. An inviting feature of the Reefer series is that it comes with its own sump and plumbing. I liked this idea as it would get me up and running immediately, and I could swap those items out down the road for something more specific to my end goals.



A view of the display from the right end



Pseudanthias bartlettorum



Pseudanthias pleurotaenia

There were several things I wanted to focus on for this tank. First, I wanted my equipment and cables to be ultra-organized, something that I could show off. Not only did I want the display to look great, I wanted it to look good “under the hood” as well.

As for stocking the tank, my one requirement was a school of anthias. I knew that I would need to feed them often, so I needed a good form of nutrient export to prevent nuisance algae.

I do four simple things to keep the tank spotless and my anthias happy. I use a slightly oversized skimmer in the form of a Nyos Quantum 160. For media, I run granular ferric oxide and bio pellets. Lastly, I do a 15% water change every Sunday. This method has been working flawlessly for me on this particular tank for about 18 months.

Along with a nice selection of anthias, another goal was to have an equally nice selection of corals. Keeping with my ultra-clean theme, I wanted a minimalist rock scape for the corals to call home. I had used Marco dry rock on my nano and really liked it, so it was an easy choice for the Reefer 450. It’s nice to work with Marco rock since it’s so clean there’s virtually no die-off.

I’m the type of person who likes to operate a little against the grain in life. I like to try new things and experiment a bit. I had seen others have success doing an instant cycle as opposed to the age-old process of a natural cycle. I decided to use Dr. Tim’s One and Only and see just how fast the tank could complete the nitrogen cycle. This product claims to cycle a tank in as little as 7 days. I was

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An assortment of leather corals

pleasantly surprised to see it live up to this claim. Thanks to this quick cycle, I started adding coral fairly quickly.

When I stated earlier that my goal was to have a nice selection of corals, I wasn't implying that I would end up with a bunch of

expensive specimens. I wanted an impressive display, but not one that would make me go into debt. I prefer to add average-priced specimens that have a decent size. It fills out the tank quickly without breaking the bank. I can then add pricier frags here and there as time goes on.

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It should come as no surprise that I also experimented with various lighting choices to illuminate the tank. In as little as 18 months, I have tried four different lighting fixtures and have had success with all of them. First, I used brand-name LEDs, but I was getting a lot of shadowing and spotlighting. I had always wanted to try T5s, so I thought this would be a good opportunity. However, I did not want to give up the benefits of LEDs. Along with performance, I place a lot of value on cosmetics and craftsmanship. I settled on a Giesemann Aurora T5/LED hybrid. It gave me the full coverage I



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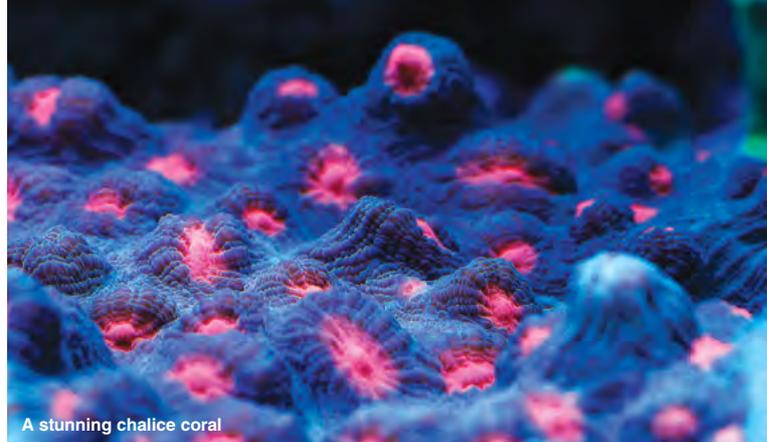
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was looking for, and the growth rate of my corals increased nicely. After 6 months of running this fixture, my curiosity got the best of me. Heck, I had never owned metal halides before, so I decided to try those! Sticking with the Giesemann brand, I purchased the Spectra T5/MH hybrid. It utilizes the same chassis as the Aurora, so I didn't have to give up that beautiful look. I can officially say I'm sold on metal halides. Add in the four T5 bulbs that the Spectra accommodates and you have a winner for sure. At the time of writing this, I have only had the halides on the tank for 2 weeks. However, I am already seeing improved growth and color.



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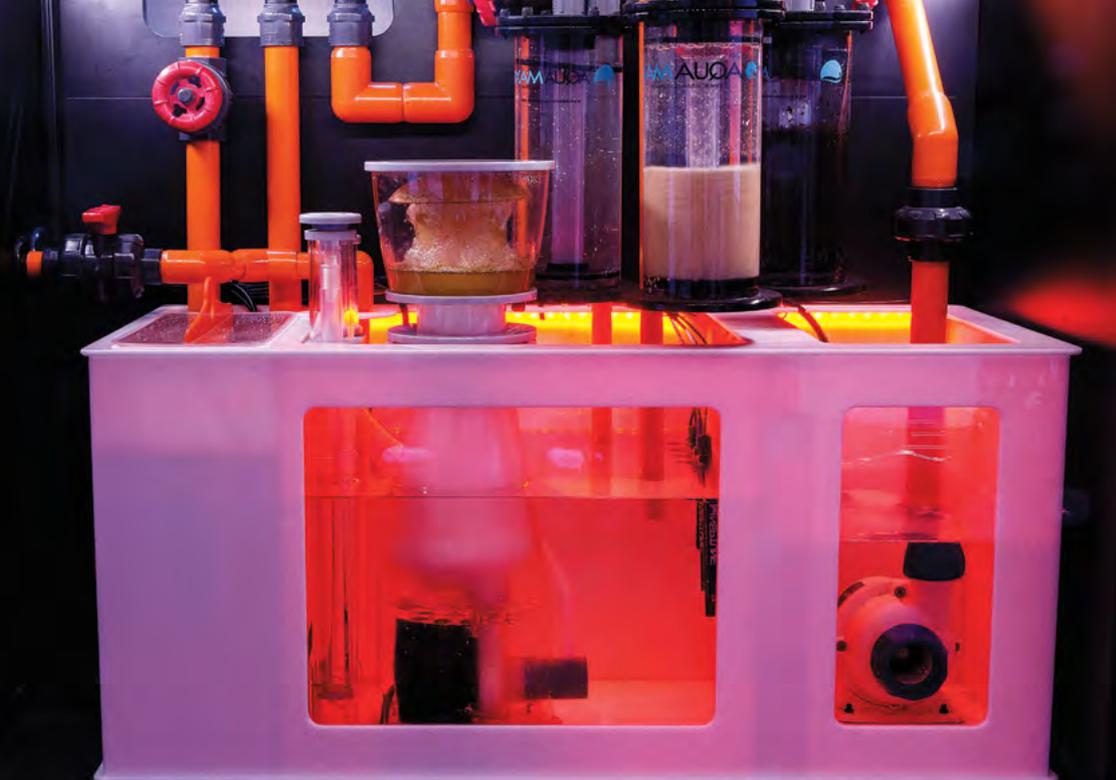
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me future options. I designed the manifold so the reactors would essentially hang from the underside of the cabinet while still giving me access to change the media and access to the other equipment. As for the display center, I hand crafted everything from scratch, utilizing various acrylic, wood, LEDs, texture coating, etc. I put in around 35 hours just in the fabrication of that area. All lighting and equipment is automated through the Apex system.

Future goals for this tank are pretty simple at this point. I would like to add some of the rarer corals that I touched on earlier and watch everything grow. Lastly, I plan to continue doing what I'm doing. The tank is having great success, and I feel blessed. I have been down the tough road of reefing failure before, so I don't take this current success for granted. 

My only other goal was an ultra-clean and cool looking way to display my equipment and controllers. I eventually swapped out the Red Sea sump for a slightly modified Elite Aquatics unit. I carried the white and orange theme into my plumbing and the display area for my electronics. The plumbing was a challenge because of space restrictions in the Red Sea cabinet. I wanted to have three reactors plumbed in to give

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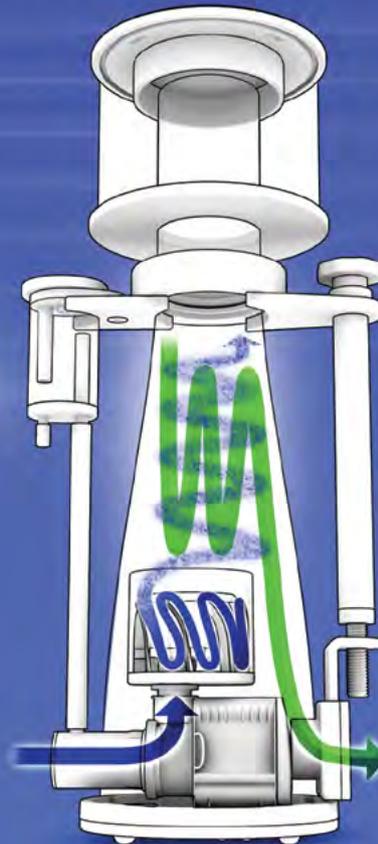
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