



AQUATICA

THE ON-LINE JOURNAL OF THE BROOKLYN AQUARIUM SOCIETY
VOL XXVII MARCH ~ APRIL 2013 No. 4

Bubble Coral

Photo: John Todaro



**LIGHTING FOR SALTWATER
AND
REEF AQUARIUMS**

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102 YEARS OF EDUCATING AQUARISTS
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The **Brooklyn Aquarium Society Inc.** is a non-profit organization 501(c) (3) for people interested in the aquarium hobby and the study of aquatic life. The Society meets the 2nd Friday of each month except July and August at the Education Hall of the New York Aquarium at Coney Island, Surf Avenue at West 8th St., at 7:30 PM. Meetings are open to visitors. Refreshments are served. Membership is \$25 per year family / \$20 individual / \$15 for students under 14. Send inquiries or membership checks payable to:
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BROOKLYN AQUARIUM SOCIETY

CALENDAR OF EVENTS ~ 2013- 2014

MAR 8 Kevin Kohen - Superstar Fishes for Reef Aquaria ~ Marine fish, aqua-cultured corals, freshwater fish, plants & dry goods auction.

APR 12 Mark Denaro - Where Rare Species are Common ~ Marine fish, aqua-cultured corals, freshwater fish, plants & dry goods auction.

MAY 10 Giant Spring Auction ~ Freshwater fish, plants, marine fish, aqua-cultured corals & dry goods, including a 55 gallon tank & stand.

JUN 14 Laura Birenbaum - Coral & Marine Inverts' Tolerances for Dry Shipping ~ Marine fish, aqua-cultured corals, freshwater fish, plants & dry goods auction.

July/August - No Meetings

SEPT 13 Joe Graffagnino ~ Knowledge of Useless S - - t I Acquired Over the Years ~ Marine fish, aqua-cultured corals, freshwater fish, plants & dry goods auction.

OCT 11 Giant Fall Auction ~ Freshwater fish, plants, marine fish, aqua-cultured corals & dry goods, including a 55 gallon tank & stand.

NOV 8 John Coppolino ~ Modern Fish Keeping in Reef Aquaria ~ Marine fish, aqua-cultured corals, freshwater fish, plants & dry goods auction.

DEC 13 Holiday Party ~ Members, their families and friends, all you can eat sit-down dinner
• Fish Bingo & Prizes • BAS Awards presentations.

2014

JAN 10 Pat Donston ~ Marine/reef TBA ~ Marine fish, aqua-cultured corals, freshwater fish, plants & dry goods auction.

FEB 14 Chuck Davis ~ TBA Marine fish, aqua-cultured corals, freshwater fish, plants & dry goods auction.

MAR 13 Gene Ritter - Reef Diving in NYC ~ Marine fish, aqua-cultured corals, freshwater fish, plants & dry goods auction.

APR 11 Rachel Oleary ~ Freshwater topic ~ Marine fish, aqua-cultured corals, freshwater fish, plants & dry goods auction.

MAY 9 Giant Spring Auction ~ Freshwater fish, plants, marine fish, aqua-cultured corals & dry goods, including a 55 gal. tank & stand.

JUN. 14 TBA MARINE

July/August - No Meetings

SEPT 12 TBA Fresh

OCT 10 Giant Fall Auction ~ Freshwater fish, plants, marine fish, aqua-cultured corals & dry goods, including a 55 gallon tank & stand.

NOV 14 James Fatherree - topic TBA Marine ~ Marine fish, aqua-cultured corals, freshwater fish, plants & dry goods auction.

DEC 12 Holiday Party ~ Members, their families and friends, all you can eat sit-down dinner
• Fish Bingo & Prizes • BAS Awards presentations.



Tom Miglio, a long time BAS member, sent me this article he read when on a recent vacation to Mexico and thought we might be interested in reading it also.

It was published in the
Mexican Caribbean Edition of *USA TODAY* Friday, October 5, 2012
Written by *Merrilyn McDonald*

Xcaret Park in Mexico's Riviera Maya



PARK IN SOUTHEASTERN MEXICO EXHIBITS COLLECTION OF SINGULAR FISH

**BEYOND THE MEASURES ALL FISH HAVE IN COMMON, LIES
AN INTRIGUING MANIFESTATION OF UNIQUE AND EFFICIENT
DEVICES TO PROTECT INDIVIDUAL SPECIES AND FAMILIES.**

Seven-tenths of the Earth's surface is covered with water. For many years, it has constituted a vast inner cosmos as elusive as outer space. Although there are 20,000 living species of fish, more and more are being discovered as mankind reaches beyond the limits of depth and darkness. The more that is learned, the more intriguing they become, for they include some of the most brilliantly colored and cleverly designed creatures in the universe. Appearing to be frail and helpless in an eat-or-be-eaten world, they literally astound the mind with nearly every survival strategy imaginable.

The first fish have been traced back some 500 million years. Having neither scales nor fins, their backbones were durable enough to support the muscles

for swimming. Their round, fleshy mouth fed by sucking at food since it had no jaws, and their protection against predators consisted of a bony shield which protected both the head and gills. Over time, this four-inch, arrow-headed-shaped creature evolved into the magnificent assortment of gilled, cold-blooded vertebrates we have today. Most of them have scales, most are designed to pass smoothly through the water using fins in combination with agile body movements, but they all, like their now extinct predecessors, have at least one protective device for survival. Bottom-living species dig into mud or hide among rocks and seaweed, others change color, camouflaging themselves by blending in with their surroundings. Some wear armor; some carry

weapons; some emit poison, and in the open oceans, some are streamlined to swim at top speeds.

Nearly all fish, however, are designed to "feed" sound through a fluid-filled tube which runs along each side of its body, directly under the skin. When water is disturbed by approaching intruders, vibrations pass through the pores of the skin into the canal where tiny hairs around the lining begin to shake. This stimulates the sensory nerves, effectively transmitting a message to the brain of impending danger, and the fish instinctively turns away. A majority of fish also have a means of communication with their own kind. Some grind their teeth and use their mouths as a sound box to amplify the noise. The grunts and croakers emit sounds which testify to their



names. Others are able to vibrate bones and muscles as effective warnings.

Beyond these measures which all fish have in common, lies an intriguing manifestation of unique and efficient devices to protect individual species and families. The blowfish, for example, commonly called the "puffer," is slender and elongated, and looks like any other fish. Yet, when it is frightened, it draws water into its hollow body, inflating it to two or three times its normal size. Combined with extending spiny prickles, it not only startles its enemies, but makes it too large and difficult for most of its predators to eat. The butterflyfish and angelfish have thin, compressed bodies which enable them to slip between coral formations and maneuver through cubicles of shipwrecks. From the side, they appear disklike, but a quick turn to face their predator or prey, they seem to disappear. Additionally, the butterflyfish has a spot on its tail which resembles a large eye. Since fish attack one another on the head, its attacker becomes confused because it appears to have two heads. In the chaos, it swims away.

Nearly all fish have some method of using color in order to adapt to their surroundings. Darker fish appear in muddy bottoms and around rocks; lighter-colored fish appear closer to the surface where they are difficult to detect among the sun's penetrating rays. Others have counter-shading, with dark on the top and light on the bottom. Spots and mottled patterns assist still others to blend naturally into a speckled habitat of rocks and reefs. The elongated, silver-colored trumpet-like fish float vertically among the soft corals of reefs, effectively hiding from passersby. But even more interesting is the unspoken code which exists among fish, whereby the brilliant shades of black, yellow and red warn of poison or bad taste.

One of the most amazing defense mechanisms, however, is the ability of many species to change colors. The flounder undergoes chameleonlike changes as it approaches a sand-covered bottom or rocks, permitting it to blend with whatever is nearby. Since seahorses are poor swimmers,




they depend heavily on their ability to change their color quickly, concealing themselves among the eelgrasses and sargassum.

None carry quite the sting, however, as those who bear or brandish weapons. Stingrays slither along sandy bottom surfaces searching for food. When faced with danger, they frantically lash their tails back and forth which contain one to three poison-tipped, iron-hard, dagger-like projections, or it arches

its tail over its head to stab the threat from behind.

Regardless, either the venom or the sharp serrated edges on the trusty stingers is sure to restore its peace. The sawfish does something similar with its long, tooth-lined snout. It swims among dense schools of fish slashing its sword from side to side, killing, or at the very least, stunning its marked prey. The surgeonfish is smaller and less dramatic with sharp blades in its tail, and the cowfish has horns along with a hard shell, which almost completely encloses its body. The fields surrounding electric eels and electric catfish serve as efficient warning systems for approaching danger, and the jolts of electricity they emit are strong enough to stun.

Flying fish actually leave the water to escape a predator in pursuit. Other species successfully remain airborne for nearly a quarter of a mile, resulting from the vibrating action of their tails on the surface of the water. And the miracles go on and on. The Great Creator seemed to leave no holds barred when it came to the creation of fish. They amaze, inspire and delight.

My own desire to learn more was sparked in the Aquarium at Xcaret. They have fascinating exhibits of fish demonstrating a variety of camouflage and protective techniques. A casual stroll throughout is not only educational and fun, but interesting and enlightening, as well. There is much to be learned about these highly unique species which captivate and enthrall even the most educated minds. 



One hundred and two years ago,

IN FEBRUARY OF 1911,
THE BROOKLYN AQUARIUM SOCIETY WAS
FORMED AND TWO MONTHS AFTER THAT,
THE FIRST
BROOKLYN AQUARIUM SOCIETY *BULLETIN*
WAS PUBLISHED.

ONE HUNDRED AND TWO YEARS LATER THE
SOCIETY IS GOING STRONG AND
STILL CARRYING OUT ITS MISSION OF
EDUCATING AQUARISTS.

I THOUGHT YOU MIGHT LIKE TO SEE WHAT
THE FIRST *BAS BULLETIN* LOOKED LIKE.
IT IS REPRINTED IN FULL ON
THE FOLLOWING PAGES.

Brooklyn Aquarium Society

BULLETIN

Issued monthly to stimulate interest in the study of water life and organisms.



Headquarters and Society Rooms: Fairchild Building, 702 Fulton St., Brooklyn, N. Y.

Vol. I.

MAY, 1911.

Number 1

"Es ist das Kosmos in der Natur, das Geheimnisvolle, Unerforschliche, welches sie uns so anziehend macht."

GREETING.

EVER since the first awakening of conscience in the nations and the final simultaneous increase in all branches of culture, we humans distinguish two separate enjoyments of nature. Upon the one hand—in the open childish sense of the human being—the entrance into nature and the appreciation of its continual changes, which are going on as a systematic quiet advance, is most exciting; while on the other hand, enjoyment is derived by our acceptance of the order in the universe and the workings of its psychic forces.

Before us we have the unending infinite wonders of the Creator and, as we poor mortals view these wonders, we are overcome by an uneasiness created by their vastness which we try to evade, because we feel that our powers, both of body and mind, are too limited to appreciate and much less to understand them. Still, when we see how every motion seems to be regulated by the existence of everlasting and eternal laws, a secret inquisitiveness seizes us, a craving for knowledge to find that which is concealed from us, to study these unknown earthly mysteries, their conditions and their surroundings!

Of all the gods which have divided among themselves the ownership of the world, Neptune reigns by far over the largest territory. So great are his possessions, that were a giant hand to take the glorious and mighty Alps and place them into the depths of the ocean, they would disappear without a sign, hardly changing the surface of the waters; and thus, when we see the size and depths of these bodies, how can we help but ask what creatures are living within their unknown bosoms!

At the time of Plinius, only seventy-four separate species of fish were known, as the knowledge of the ancients was drawn only from the Mediterranean and a small part of the Atlantic ocean. They had no idea of the enormous quantity of funny inhabitants in either the Polar or Tropic regions, while we, today, can count upward of ten thousand species. Yet, there remains no doubt but that far down in the unknown depths there yet lives many an unnamed member of the fish family. "It is still unknown," says the great Humboldt, "whether the waters do not contain even a greater variety of animal life than the earth." And, thus driven by a craving for knowledge and an interest in animal and plant life, we, the BROOKLYN AQUARIUM SOCIETY, have banded ourselves together to increase our understanding of all fish, plants and inhabitants of the water as may be kept in private aquaria, both for study and for pleasure.

The further to show our good intentions and energy, we issue this monthly bulletin which shall be circulated over the globe, reaching to our friends in the *Nymphæa* in Leipzig, the *Isis* in Munich, the *Triton* of Berlin, the *Hamburg* and *Copenhagen*, New York, Philadelphia and other societies, to whom we also extend our fraternal greetings, a cordial invitation to exchange papers and attend our meetings and outings.

This is but our birth, and in our future life to come, we shall leave marks behind us not easily forgotten and which no wave shall eradicate! Just as our society name for closer friendship is *Myosotis*, the forget-me-not of the waters, we intend the BROOKLYN AQUARIUM SOCIETY shall be the forget-me-not of all lovers of aquaria.

—RUDOLF LIEBOW, D. D. S.

A PLEA FOR THE MICRO-AQUARIUM.

THOMAS I. MILLER.

WHAT a wealth of life there is in an aquarium!

The ordinary observer glories in the beauty of the growing water plants and the rare fish seen so close at hand.

The microscopist, however, is the only one who really sees the marvelous beauty of the miniature pond. Objects too minute for man's unaided vision are his delight. Verily he lives in a world unknown to most mortals.

Perhaps the chief charm lies in the fact that much of this life has no counterpart in larger forms. Get a microscope and enter the realm, and great will be your joy.

Do you know that the very first form of life which appeared on this earth belonged to the vegetable kingdom, and that it was a little one-celled plant called a diatom?

There are about 2,500 described species of diatoms and the beauty of their silicified skeletons has long made them favorite objects for the microscope. The study of these minute plants created the demand for better and higher powered lenses for the microscope, and without these lenses our present knowledge of bacteriology would have been impossible.

Every aquarium is full of these fairy plants, and yet perhaps the reader has never seen even one species. Many persons have mistaken ideas as to the expense of a microscopic outfit. For the beginner excellent microscopes can be bought for about fifteen dollars. It is by no means necessary to buy a new instrument. Bargains in second-hand instruments are often offered by the dealers.

Continued on page 2.

BROOKLYN AQUARIUM SOCIETY BULLETIN

THE "BALANCED" OR SELF-SUSTAINING
AQUARIUM.

ALL of us have seen and most of us have had at some time small glass globes in which we have kept gold fishes. In this article we do not care to consider such a method of maintaining them, inasmuch as it is not only cruel to keep our fish friends under such circumstances, but when we desire to study the lives and conditions of the creatures kept therein, the views obtained through these receptacles are distorted; therefore, we shall relegate such articles of torture to the background and give them no consideration, except to urge the discontinuance of their use.

The aquarium which we offer for discussion is rectangular in shape and may either be made all of glass or with iron, brass or tin frames. It is desirable that it be proportionate in size—that is, the depth should not exceed the length to any great extent nor the width be much smaller in proportion to the depth, as we must bear in mind that the aquarium ought to be ornamental as well as useful. A good medium sized aquarium should measure about 12 inches long, 9 inches wide, and 14 inches deep. This will hold about six gallons of water and under proper conditions, successfully maintain a balance with six fishes not more than three inches in length.

Of course the aquarist, if he desires, may use a larger or smaller aquarium. The larger the aquarium, the greater the number of fishes that may be kept in it.

As everyone knows, water contains oxygen. The fishes breathe the oxygen from the water through their gills, which are adapted to utilize it, and exhale carbonic acid gas (poisonous). Obviously, it is necessary to supply oxygen in the water as rapidly as the fishes exhaust it. How shall we do this? Does it necessarily mean that we shall have to use pumps and other complicated apparatus?

Fish are found in ponds which are not only without tide, but are destitute of all sources for supplying fresh water. The secret of it all is this: there are certain water plants which, under the action of daylight, absorb the poisonous exhalations of the fish and give off oxygen.

It is our desire to explain as clearly as possible, to avoid all technical terms whenever we can, and thus to make it an easy matter for the beginner to obtain the necessary plant life for the successful maintenance of fish life.

The following plants are good oxygenators and may be obtained from any aquarium store. The Floating Arrowhead (*Sagittaria natans*) is of exceptional value and very graceful. Another very useful plant is the Water-weed (*Utricularia canadensis*). With these two varieties, the aquarium may be set up and successfully maintained. Other good plants are the Fanwort (*Cabomba caroliniana*), and the Water-Milfoil (*Myriophyllum*).

It is advisable to have plenty of plant life in the aquarium.

On the location of the aquarium for proper lighting facilities, many aquarists differ. However, aquaria may thrive under any of the light conditions provided there is not too much or too little light. Experience only can solve this question and in our next issue we shall explain the arranging and stocking of the aquarium with fishes.

HOW TO START AND MANAGE A TERRARIUM.

HERMANN RABENAU.

THE terrarium, like the aquarium, is one of the most beautiful ornaments for the home. While the aquarium serves as a means to study aquatic life, the terrarium is used for the purpose of studying terrestrial life.

It is more or less difficult to observe smaller animal nature, such as reptiles and batrachians, in the open, but it can be done successfully in a terrarium.

Plants are rather hard to keep in the house, as the moisture and dry air with the dust under ordinary conditions, are not suitable for their cultivation. The terrarium maintains the moisture and keeps the dust out. It is the nearest we can get to nature in keeping plants in the home.

A terrarium is best made rectangular in shape with a cover made of screening which can be easily removed. The bottom should be provided with a drainage pipe leading to some kind of a vessel suitable to receive the residue water. The ventilation and drainage are two very important factors. The bottom of the terrarium should be covered to a depth of about two or three inches with loose material, such as flower-pots, bricks, cinders or charcoal, broken to about the size of pigeons' eggs. This should be covered with a layer of moss to prevent the soil from being washed down and stopping the drainage. The best soil is leaf-mould from the woods. After the soil is placed in, we have to appeal to our knowledge of landscape gardening to enhance the appearance of our miniature garden. Rock-work in the background will serve both as an ornament and a resting place for the inhabitants. A flat pan, two or three inches deep, with its edges covered with moss, may be sunk in the soil and so arranged as to resemble a pond. The larger plants should be placed in the background and the smaller ones nearer the front in order to permit a clear view. The places between the plants may be filled with moss. The whole arrangement should have good light, as we all know that light is essential to the growth of plants.

A number of snakes, newts, etc., may be kept this way, but care should be used in placing them together as their natures should be considered. For instance, snakes are very apt to eat frogs and toads, and it would not be advisable to put them together in a terrarium, unless the latter are too large for the former to swallow.

Our next issue will deal with the making of a terrarium and the maintenance of plant and animal life therein.

Continued from page 1.

The magnification of the lenses, or objectives, is generally stated in diameters. The statement that an objective gives a power of ten diameters, simply means that a line one-tenth of an inch in length would appear, when viewed with the microscope to be one inch in length. Three objectives giving powers of from ten to two hundred and fifty diameters are all that are required.

We are fortunate in having a most excellent text book entitled, "Aquatic Microscopy for Beginners," by Dr. Alfred C. Stokes. This book is full of useful hints for the beginner.

The micro-aquarium should have flat sides and is best made of plate glass having a thickness of about one-eighth inch. In size, it should hold not less than one gallon of water. Put some pond mud in the bottom and then add a few water plants. Fish and snails should be excluded as they devour many of the forms we want for study.

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BROOKLYN AQUARIUM SOCIETY BULLETIN

Brooklyn Aquarium Society Bulletin

Published monthly, except June, July and August, by the

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SOCIETY ROOMS AND HEADQUARTERS

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EDITORIAL.

THE BROOKLYN AQUARIUM SOCIETY, a society to promote interest in the study of biological subjects, encourage the maintenance of "balanced" or self-sustaining aquaria and terraria, mutually assist those so interested and to urge, as individuals and a society, a humane and considerate treatment of all creatures kept within confined areas, was organized February 14, 1911.

Through the courtesy of one of the members, Mr. Frank K. Fairchild, it occupies rooms in the "Fairchild Building," 702 Fulton Street, Brooklyn, N. Y., which are used for meetings and as permanent headquarters.

The members may at any time go there and obtain the best possible literature pertaining to such subjects in biology as may interest them and, also, view various aquaria and terraria containing biological life. The public is welcome to attend the regular meetings, which are held on the second Tuesday of each month, excepting the months of June, July and August. At these assemblages the routine of business is disposed of in the shortest possible time and the balance of the evenings devoted to lectures by people who are thoroughly familiar with the various branches of biological science. Discussions of experiences are encouraged and pertinent questions on aquaria and terraria are answered.

Society outings will be held from time to time for the collecting of wild fishes, plants and fauna, so that those who wish may obtain specimens for observation. In this work, it is not only our desire to confine ourselves to one special department, but to make it of interest to all those who are lovers of nature and wish to study water life and organisms.

The society in the furtherance of its plans, thought it an excellent proposition to publish a monthly bulletin which would not only advance its objects but give readers a clear and concise idea in the manner in which aquaria and terraria may be easily maintained. It offers this, its first effort, and trusts that the readers may find articles of interest and help.

The BULLETIN is composed of five departments, exclusive of its editorial department, which are in charge of men of considerable practical experience.

Mr. Geo. H. Plimpton, who has had a great number of years successful experimenting in the maintenance of fancy gold-fishes and balanced aquaria, will submit

articles for this paper, which will not only be a source of reliable information, but will greatly assist those who wish to set up and maintain aquaria and gold-fishes in their homes.

Mr. C. J. Heede is an authority on foreign fishes of the live-bearing species and will donate items of interest in the various issues of this paper.

Mr. Thomas I. Miller is connected with the Long Island Biological Survey, a branch of the Department of Zoology of the Brooklyn Institute of Arts and Sciences, and is thoroughly conversant with the many forms of microscopical organisms which are found in the waters about our great state and other vicinities.

Mr. Hermann Rabenau will furnish, from his own experiences, valuable articles on the keeping of terraria.

Mr. Myron A. Rice, our advertising manager, is a young man of exceptional ability, who will carefully look after the interests of those who may wish to use this paper as a medium of bringing the public's attention to the quality and value of the merchandise which they may have for sale.

Our "Query Department" shall endeavor to answer, in the following issues of this publication, all questions pertaining to aquaria and terraria. Kindly address all such communications to the "Query Department," The Brooklyn Aquarium Society, 702 Fulton Street, Brooklyn, New York.

'Phone, 2991-J Bedford.

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BROOKLYN AQUARIUM SOCIETY BULLETIN

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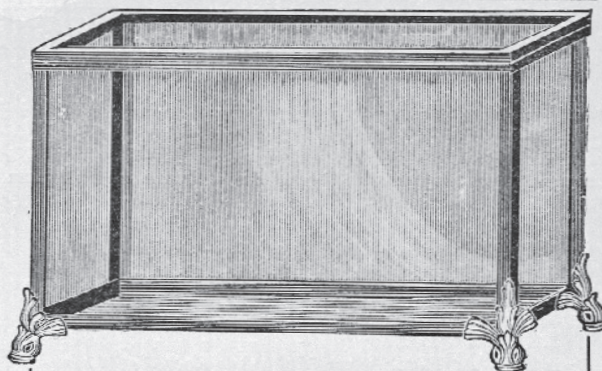
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The Practical Plant

Chapter 6

Hi, everyone. I hope you are all ready to plant this dream tank we've been working on. Good, because that's this month's topic. But before diving in headfirst, I strongly recommend that you first develop some kind of layout or blueprint of your intended design, the same way you would have your landscaping plans or blueprints before going to the garden center. It's important to have a plan because it is far better to plant the entire tank all at once. If you try to plant the tank a little at a time, you are inviting failure.

The problem with the piecemeal approach is that a few lone plants in your tank cannot consume nutrients fast enough. The excess nutrients, combined with twelve hours a day of high intensity lighting, lead to an impressive display of algae's reproductive powers. The few plants in your tank will become covered with the stuff, and eventually die. So plan out what you like and fully plant the entire tank in one day or two so you can avoid an incident of the algae kind.

If you are not sure what you would like your tank to look like and need some layout ideas, take a look at the website run by the AGA (Aquatic Gardeners Association) at www.aquatic-gardeners.org. Every year they hold an international aquascaping contest, and you can view spectacular

entries from previous contests.

First I'm going to devote a little space to discussing the purchase of plants. The same way you would inspect a prospective fish, you should inspect plants as well. Select plants that are in good shape overall, but most importantly, they should have firm white roots. If the roots (or stems) are discolored, or getting mushy, stay away; the plant is most likely doomed. If it is a really hard to find specimen that you absolutely must have, you may attempt a heroic rescue. Stem plants usually rot from the bottom up. This may leave you with enough material to take a healthy cutting from the top. Remember you need at least two nodes to plant into the substrate, and a couple of nodes with leaves above the substrate. If it is a rosette plant which is afflicted, examine it



carefully. If it has a couple of healthy leaves and roots you may have a shot. Carefully use a scissor and cut away the affected roots and leaves as close to the crown as possible. Good luck; sometimes it works. I saved a sword plant this way.

One thing you should be made aware of is that the plant you purchase may end up looking totally different after some time in your tank. So just like fish, it helps to know what you are buying so there are no surprises. Many of the plants that we keep in our aquariums are really bog plants. The leaves of these plants may look totally different depending if they are grown submersed (underwater) to emerge (above water).

Because these plants grow faster above water, that is how the nurseries grow them. In your aquarium the new growth will adopt the underwater growth pattern and the old leaves will likely die off.

No matter where you get your plants from, snails and other critters may be hitchhiking along on them. If you wish to keep these hidden invaders out of your tank you need to disinfect the plants first.

To disinfect your plants, prepare a bucket with a solution of one part bleach to nineteen parts water. Make sure you are using plain bleach, without any scents, detergents or other additives. Prepare a second bucket with water and a double dose of dechlorinator (Novaqua, Amquel, etc.). Dip your delicate plants for about one minute, and tougher plants for two. Remove from the bleach and rinse off in water, then soak for a while in the dechlorinator. This treatment will eliminate snails, pathogens, insect larvae, and algae. It's a good habit to get into.

There are actually a number of plants commonly kept in aquariums that are North American natives. If you wish to collect some wild plants yourself, more power to you. Just check the pertinent laws first. For the rest of you, I have a few suggestions. If you are planting a large tank, and need lots of plants, you may wish to go the mail order route. The big plus of mail order is selection. If you surf these sites you can see some really unusual, if not outright rare

plants. The mail order prices are usually very competitive as well. The big down side is the shipping costs, and not being there to pick it out. But if you need a lot of plants, shipping is no big deal. I've done business with two of these companies and have been very satisfied. The two that I'm familiar with are azgardens.com and aquabotanic.com. Both delivered the products as advertised. I like Azgardens because in addition to some interesting plants, they also offer (in fact I'd say it's their specialty) unusual freshwater invertebrates. Freshwater shrimp are great in planted aquaria, but that's another article. What I like about Aquabotanic is that they directly import a lot of

plants and sometimes come up with some really rare and oddball stuff. The noteworthy news for all you wet thumbs out plant shopping is that **Brooklyn Zoo and Aquarium** has become an authorized dealer for Aquabotanic.com. To the best of my knowledge, he is the only dealer around here. So if you live in the area, you are better off using the website

One thing you should be made aware of is that the plant you purchase may end up looking totally different after some time in your tank. So just like fish, it helps to know what you are buying so there are no surprises.



as a catalog, and then have Mike at Brooklyn Zoo and Aquarium order it for you as part of his next order (and save the \$20 shipping to spend on more plants, what else?). If you only need a few plants, or if you wish to supplement your incoming shipment with local finds, Brooklyn offers many great choices. Obviously, Brooklyn Zoo is high on my list. The chain stores will sometimes come up with something interesting, but they tend to deal in the more common/traditional aquarium plants. If you are out trolling Brooklyn for plants it's always worth a look in the Asian owned shops. There are a few spread out along 86th Street, and there is another grouping of them on Eighth Avenue. They must deal with different suppliers and/or distributors because they often stock plants I do not see elsewhere.

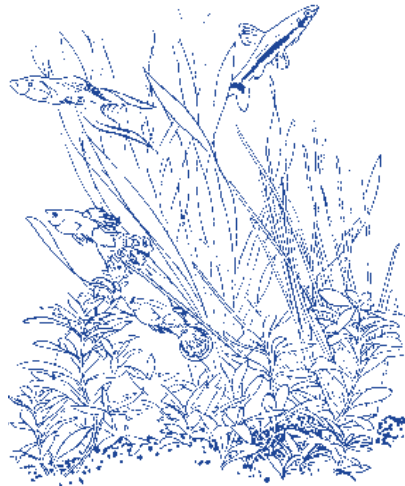
Before going on your plant quest, there are a few things you will want to have waiting for you back at home. You are going to need a long pair of stainless steel tweezers and scissors. These are available in 10" lengths, and are must have items for aquatic gardeners. The tweezers come in both a straight tip and an angled tip. I like and use them

both, but if I had to choose just one, I'd take the angled tip. You want to have all your decorations ready as well. I like my tanks to have a fairly natural appearance, so the bubble ornaments and sunken ships are out (but if you like them fine; I'm not here to judge). If your tank is small, say under fifty gallons, you won't have room for a lot of rocks and things, so go light on these. Driftwood looks great in planted tanks. There are a few different types of driftwood commonly available for sale. You are most likely familiar with the kind that comes attached to a piece of slate. For reasons listed in my last article, this is not my favorite kind. But I do admit it has a different look from the other driftwoods, and confess to having used it. If this is what you plan to use, you need to soak it in water for a couple of weeks so it will sink. The other kinds of driftwoods are much denser and will sink without being presoaked and/or nailed to a slab. One of these I see marketed as Malaysian driftwood. It has a dark brown color and a heavily weathered appearance. The other kind I have seen marketed as Swahala or Mopani wood. It is two toned, a dark brown contrasting with lighter areas. Both are very nice. These last two options I described are going to turn your water brown. It is temporary and harmless, caused by tannins leaching out of the wood. If this bothers you, avoid it by presoaking these as well. Because they are not buried in the substrate to hide a hunk of slate, they are easily moved during maintenance.

Now that you burned a tank of gas visiting half the pet shops in Brooklyn, and have a car full of plants, it's time to do it. Before you went plant shopping, you had the aquarium all ready and waiting. The tank is half full and any clouding has settled out. I have tried to do this as per **Mr. Amano's** recommendation, to fill it with much less water during planting. His stated reason is that this is better because the stem plants will not float out of the substrate as easily while you do your planting. My problem with his method is that with such a small volume of water in the tank, I can't see what I am doing. It also makes it harder to visualize what the finished work will look like. I also do not share his problem with the stem plants floating up. Sure it

happens occasionally, but it is not a rampant problem for me.

Now unpack your plants and disinfect them with bleach as outlined earlier. As you unpack them you will notice that most aquarium plants come in two basic forms. You have rosette plants and stem plants. The rosette plants have all their leaves radiating upwards from a central point (crown), and from the same point the roots radiate downward. They are commonly potted in rock wool, or just bare roots. The rest of the plants are stem plants. As the name implies, these plants are basically one long stem. Spaced fairly evenly along the length of this stem are points called nodes. These nodes will grow leaves above the substrate or roots below it (at least mostly below). Stem plants are usually sold in bunches, held together with a lead weight or rubber band. This is how they got the nickname "bunch" plants.



Most planting schemes break the tank into three planting zones. The first zone we will plant is the background. This zone roughly represents the rear third of the tank. This is where our tallest plants will go. Never let any of the plants dry out - work out of a bucket or tray of water. Let's start with our rosette plants. If they are potted, remove the plastic pot by cutting it down the sides and peeling it away. A strong pair of utility scissors will easily cut the plastic. Gently remove as much of the rock wool as you can; be careful not to damage the roots. If the roots are long, cut them off about halfway down. This will encourage new root growth, and make them easier to plant. Now this works best with two hands. Hold the plant on one hand, just above the crown. Make a hole or depression in the substrate with your free hand. Hold the plant in the hole, and cover it up with your free hand. Planting depth is very important with these plants. Do not plant so deep that the crown is covered by substrate. This will cause rotting and kill the plant. Many of the taller background plants will be stem plants. They are handled a little differently. Carefully remove the rubber bands or lead weights holding them together. Most likely they will not have any roots worth talking about. Cut off an inch or two from the bottom of the stem. This is where the bunch was held together, and



is usually too damaged to use. Prepare the plant by removing the leaves from the nodes on the lowest couple of inches. Do not plant any leaves under the substrate; this invites rotting. Depending on the plant species, the number of nodes per inch can vary greatly. Make sure you are planting at least two nodes deep, preferably more. The more nodes you have under the substrate, the more robust and extensive the root system will be. Stem plants are very buoyant; if you try to plant them with your fingers, they will float out of the hole 9 out of 10 times. This is where the tweezers come in. Grab the stem plant you just prepared by the lowest node with your tweezers and gently insert it into the substrate. This is another point on which I find myself at odds with Mr. Amano. He advocates planting stem plants very densely. He will even plant them two to a hole. I find that when planted too closely together, the lower regions of the plants suffer from lack of light. This causes the lower leaves to die. Also keep in mind that most stem plants will branch prolifically and, given a little time, fill in on their own. Stem plants are a love/hate relationship for me. I love the relative ease of propagating them, and they represent some of the most colorful plants you can find. The hate part comes from the unsightly roots that can form at the lower nodes. These are best handled by concealment with a well planned midground. This can be done with driftwood, rock or shorter plants. Anything that blocks the lowest portion of the background stem plants from view will work. This is what constitutes your midground. On really small tanks, you may need to skip the midground for lack of space.


The last zone is the foreground. Depending upon the look you are after, there are a couple of interesting options for this zone. You can plant the foreground with very short plants. There are a number of really nice ones like Four Leaf Clover, Dwarf Sag, Japanese Pearl Grass and others. These foreground plants will form a nice living carpet across the front of your tank. Some of these plants, like the Japanese Pearl Grass, are composed of fine

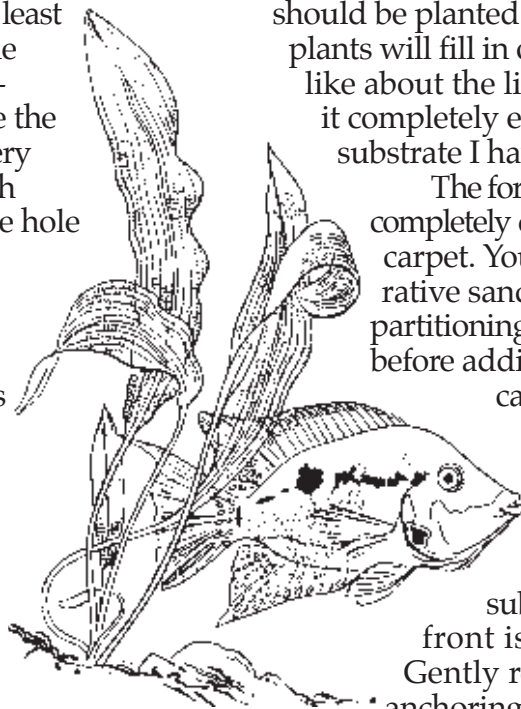
stems. This is when I plant like Mr. Amano and put two or three stems in one hole. Some of these plants, like the Dwarf Sag, are miniature rosette plants. Treat these like their larger cousins.

Whichever plant you choose for your foreground, it should be planted in a checkerboard pattern. The plants will fill in on their own. What I really like about the living carpet foreground is that it completely eliminates the last vestiges of substrate I have to vacuum.

The foreground also lends itself to a completely different look from the living carpet. You can try no plants, just decorative sand. The way this is done is by partitioning the tank with cardboard strips before adding the substrate. Hold the cardboard upright and in position with small rocks. Allow enough room behind the cardboard for the background and midground zones. Fill this area with nutrient rich substrate of your choice. The front is filled in with your sand.

Gently remove the rocks that were anchoring the cardboard and fill in substrate as necessary. After the rocks have been removed and the levels of the two substrate have been made as even as possible remove the cardboard strips. This is done by gently sliding the cardboard strips straight up. Obscure the boundary with small stones and you have a sand foreground. This technique looks nice, but does require a well thought out planting blueprint. I would not recommend this for your first endeavor.

Well, that about covers it for this installment of *The Practical Plant*. I hope that you join me next month as we enter the world of supplementation and fertilization. 



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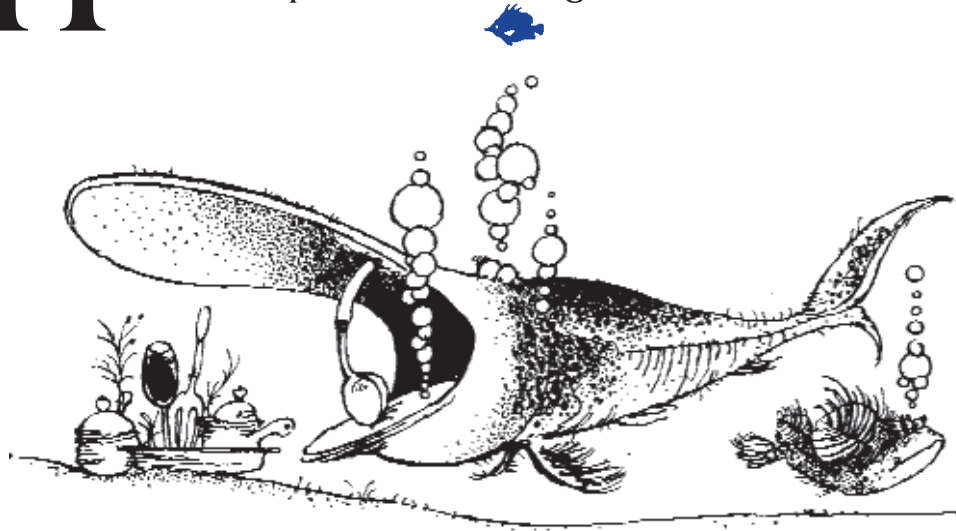
John Todaro - BAS

From the Brooklyn Aquarium Society's publication
SCRUMPTIOUS MEALS & LIVE FOOD TREATS
 Compiled, Edited & Written by John Todaro, BAS

Spinach Delight

Vegetarian Fish Food

Here is an inexpensive supplement meal for fish like Goldfish, Koi, Mollies, Silver Dollars, Pacus, and marine fish that require additional vegetable matter in their diet.



R E C I P E

INGREDIENTS:

2 pkg. chopped frozen spinach
 1 pkg. Knox® unflavored gelatin
 8oz. hot water
 1 tsp. cod liver oil
 Minimum amount of Gerbers® baby cereal to thicken.

OPTIONAL:

1/2 tsp Epsom Salt (See below).

PREPARATION:

1. Dissolve unflavored gelatin in the hot water. Mix until all gelatin is dissolved.
2. Blend thawed chopped spinach with gelatin water.
3. Add cod liver oil and enough baby cereal to soak up any extra liquid.
4. Cool mixture and place in Ziploc® bags and flatten to 1/4" inch and freeze.

FEEDING:

To feed, break off hunks, let thaw for a few minutes then feed to your fish. Note that a strictly vegetable diet can cause constipation in fish. Feed Spinach Delight only several times a week. Feeding frozen brine shrimp several times a week takes care of this constipation problem. Otherwise, a small amount of Epsom Salt could be added to the mixture. Never feed more than your fish will eat in 5 to 10 minutes.



Patrick Donston
Owner of Absolutely Fish Inc.,

which is one of the largest retail fish stores in New Jersey. We house over 9,000 gallons of marine fish and invertebrates, as well as 5,000 gallons of freshwater fish from around the world. Absolutely Fish is exclusively an aquarium center, and carries no live animals except fish.

This article is from the [Absolutely Fish.com](http://AbsolutelyFish.com) web site and written by the staff and is reprinted with the permission of Pat Donston.

PROPER ACCLIMATION

For Freshwater Fish



Float the sealed bag on top of your aquarium for 15 -20 minutes.

Open the bag by pulling on the loose end to pop off the rubber band. While still floating the bag, hold it upright and roll down the edges slightly. This is to make it stay upright by itself. You can hook the edge of the bag on the corner of the aquarium if this helps to keep it upright.

Check to make sure the top of the bag is staying open so the fish can get air.


Now add one cup of your aquarium water to the bag. Repeat this by adding one cup of aquarium water every five (5) minutes for the next thirty to forty-five (30 - 45) minutes, six to nine

(6-9) times. This will ensure that the fish get used to their new water environment.

If you find that the bag gets too full before finishing, take some water out and discard it - but not into your tank!

After this, you are ready to introduce your fish into the tank. If you have aggressive fish already in your tank, it may be wise to feed them first, and then turn off the aquarium light until tomorrow. Gently lift the fish out of the bag with a net or wet hands and place them in your tank.

Before discarding the bag, make sure the fish appear to be adjusting well. If they sink to the bottom like rocks and don't move, carefully put them back in the bag and repeat the above process for a while longer and try again. Watch your tank carefully to be sure the new arrivals are not being harassed by the older tank mates. If they are, you may need to separate them with a tank divider for a few days. If you follow this advice, you will cut down on unnecessary fish losses, and get more enjoyment from the hobby!

*The Drip Method described for marine fish can be used for any freshwater fish, and is the preferred method for large or delicate ones. 



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PROPER ACCLIMATION

For Marine Fish



The safest way to introduce new marine fish to your tank is to use the "Drip Method".

To use this method, you need a clean bucket, (a five (5) gallon bucket pail is perfect) and a drip-line. You can make your own drip-line with some airline tubing, some 3/16" rigid tubing, and a plastic air valve, or you can purchase one from your dealer already made (ask for details).

As soon as you get your new fish home, float the closed bag in your tank for fifteen (15) minutes to make sure the bag water temperature is the same as your tank. After this time, open the bag and gently pour the water and fish into your bucket. Hang the drip-line by inserting the U-shaped rigid tube into the aquarium.

Lightly suck on the other end with the air valve to start a siphon. Quickly lower the line into


the bucket and observe the flow rate of the siphon.

Adjust the flow using the air valve so that there is a light stream coming out (open valve just past a drip). Let the tank water mix with the bucket water in this manner for one (1) hour.

You should remove and discard excess water whenever it is three inches above the fish. This will ensure that they get enough oxygen, as they are always close to the surface.

After one (1) hour is up, gently remove the fish with a small container (Tupperware or the like), or wet hands (if the fish is not venomous or dangerous!) and place them into the aquarium.

It is good practice to feed the old tank mates while dripping the new fish. It is important that you then move the tank decorations around (you can always put them back the way you like after a couple of days). This will disorient the old fish, and they will be less likely to defend their territories against the newcomers. If they still harass the new arrivals, turn the light off until tomorrow or separate the new ones with a clear tank divider for a couple of days.

Don't try to feed the new fish the first day, and don't get too alarmed if they don't eat for several days. If you have any concerns, ask your sales person. Remember, marine fish are sensitive to environmental changes - give them every chance to thrive. 



LIGHTING FOR SALT WATER AND REEF AQUARIUMS



Lighting for aquariums can be a very confusing topic. There are many opinions out there; some are based upon hard data, others upon personal experience. Which lighting to choose: Normal fluorescent (NO), Very High Output (VHO) fluorescent, metal halide (M/H), compact fluorescent (CF) or a combination thereof? How many fixtures? What wattage bulb(s)? All of these questions must be answered before you go out and spend a lot of money on a lighting system that may or may not be adequate for your tanks' inhabitants.

By asking yourself the following questions, you will, in the long run, save lots of time and money.

1. What type(s) of organisms do I want to keep?

This is the prime factor to consider when purchasing a lighting system. If you are going to try your hand at a reef tank containing primarily mushroom anemones and soft corals, VHO lighting, even in a deeper tank, may be sufficient (although CF or MH lighting would be even better). If you are going to keep predominantly stony corals, especially SPS (small polyped stonies) corals like *Acropora*, *Stylophora*, and the like, compact fluorescent or metal halide lighting are perhaps your best options, especially if you wish to keep the in-

tense color seen in many of these species. There is one last option, that being that you will want to light the tank simply to view the inhabitants, in which case Normal fluorescent lighting will be sufficient.

2. How long and wide is my tank?

If you are using fluorescent lighting, the number of bulbs needed becomes more complex as the limiting factor becomes with width of the tank. In order to achieve the intensity required by some stony corals, you may need three or more VHO fluorescent bulbs (Normal fluorescent bulbs are not advised except on extremely shallow aquaria or tanks where no hermatypic corals are



to be kept). Compact fluorescent lighting comes pre-set for various tank widths and lengths, and there is little guess-work when using this type of fluorescent lighting. Whenever possible, compact fluorescents should be utilized in place of VHO lighting. When dealing with metal halide lighting, the number of lights you will need depends, in part, on the length of your tank. In general, it is safe to say that if your tank is 2' long or less, one metal halide fixture should do. However, if your tank is longer (3' or better) you should have at least one metal halide fixture per two foot length (i.e., for a six foot long tank, three metal halide fixtures should be sufficient). If the tank is overly wide ($> 2'$), you will need to take that into account as well, and add an additional lighting fixture or two to compensate for the added width.

3. How deep is my tank?

This is THE most important to know when deciding on a lighting source. Forget about using the old adage of "watts per gallon," since with today's variety of lighting sources it has, in my opinion, little validity. My personal rule of thumb is this: that if the tank has a depth $< 16''$, you might consider NOrmal or VHO fluorescents, depending on what it is you want to keep. If the tank depth is $16''$ to $20''$, VHO or compact fluorescents should be used to achieve light penetration to the bottom of the tank. Anything greater than $20''$, use either compact fluorescent or metal halide lighting, depending upon the depth. A good guide to choosing the proper wattage is that for tanks $16''$ or less in depth, anything from a 110 watts to 220 watts will be sufficient. For deeper tanks, use either 250 watt or 400 watt bulbs.

From research I have done, it has been noted that NO and VHO fluorescent lighting do not penetrate as far as and with the same intensity of equal wattage of compact fluorescent and metal halide lighting. In fact, it was noted that half the intensity of NO fluorescent lighting was lost within the first $6''$ of depth while with VHO fluorescent the same loss occurred within the first

$12''$ of depth. Power compact fluorescent lighting lost half its intensity at approximately $19''$ of depth. With metal halide lighting of equal wattage, this same loss did not occur until $23''$ of depth. This is mainly due to the fact that any fluorescent light source is considered to be as line light source, and produces a diffused light. Metal halide, on the other hand, is considered a point source light. Water is a diffusing medium, so by using an already diffuse light source over a diffusing medium, you are further diffusing the light (i.e., making it less intense). This situation, while it does occur with metal halide, it not as obvious as a point source light has greater "punching power." This is not to say that metal halide lighting has no place in tanks $< 16''$ deep. Quite the contrary. It has been noted that using low wattage metal halide, even in shallow tanks, increases coral growth and promotes color intensity, results that are not always seen with other lighting sources.

4. What type of housing should I use?

There are several varieties of bulb housings available to the hobbyist, with each style providing a different area of coverage and reflection rate. Each fixture throws off its own "cone of light," and this needs to be taken into consideration when choosing fixtures. Also, each shape has its own reflective properties that are a consideration as well. When using metal halide, you should purchase fixtures that are parabolic in shape if possible. This type of fixture will direct most of the light down into the tank. Pendant metal halide lighting is a good example of this. The disadvantage to this is that light is focused into a somewhat narrow area. There are wider curved fixtures that throw a somewhat focused beam of light into the tank, and these work out well for the majority of uses. Boxlike fixtures will also work providing you can replace the (usually) flat reflective surface with a curved one. With NO or VHO fluorescent lighting, you have little choice in the fixture style. The shapes most commonly available appear to be adequate to the task at hand. Compact fluorescent



lighting, on the other hand, provides fixtures which, while not as good as parabolic reflectors, provide more focusing of light than do other reflectors used with fluorescent lighting. In order to get maximum reflection into your tank, make sure the reflective material used in fluorescent fixtures is made of polished metal or an equivalent material. Plastic reflectors tend to yellow over time, and reflect less and less light as they age.

5. What type(s) of bulbs should I use?

When choosing any type of lighting, you should use a bulb whose Kelvin rating is no less than 6500 K. Lower Kelvin ratings will provide you with a light that is yellow to very yellow, and will throw off the color rendering a bit. With reef tanks, you will find that you may need to supplement this lighting with actinic 03 bulbs to correct the spectrum. It is my opinion is that bulbs of 6500 K to 10,000 K are adequate for most situations, although some hobbyists, including myself, have used 5400K bulbs with great success. There are 20,000 K bulbs available, but they tend to be quite blue and, as in the case of a <6500 K bulb, the color rendering may be thrown off. If you decide to go with a 20,000 K bulb, you may find that you will need to supplement with one or two NO or VHO full spectrum bulbs to help improve the color rendering. 20000K bulbs have much less red in them than do the lower Kelvin bulbs and tend to make things look very blue. When choosing a compact fluorescent system, you should attempt to find bulbs of a color temperature of 6700K and 7100K (if you like info on this, I can post that as well). A 1:1 combination of these bulbs is ideal for reef tanks.

5.1. Are actinic bulbs necessary? (reef systems only)

The next question that comes up is if supplementation of actinic 03 radiation (that is, lighting that ranges from ~380 nm to ~480 nm, with a major peak at ~420 nm) is needed with the higher Kelvin bulbs. In my opinion, if you are using a bulb 10,000 K or greater, supplementation

is not absolutely needed. HOWEVER, the increase in coral growth and color provided by this supplementation makes it well worth the additional expense. Supplementation is advisable if you are using bulbs of 6500 K or less, and especially if you are using lighting of 5500 K or less. When using fluorescent lighting, you will need to use a combination of bulbs in order to get both proper spectrum for the corals and a good color rendering for you. Usually a 1:1 ratio of actinic to full spectrum should be sufficient for most purposes. If you decide to use compact fluorescent lighting, a 1:1 ratio of 7100K and 6700K bulbs is, in my experience, your best choice for reef systems as this combination closely resembles that of the absorbance spectra for *zooxanthellae*.

In clear reef environments, the wavelengths of maximum penetration fall between 440 nm and 490 nm. This may explain, in part, the spectral peaks of chlorophyll b and some carotenoid pigments. This is not to say that other wavelengths are not represented or utilized by *zooxanthellae*, just that their energy relative to the above-mentioned range is not as great, especially as one goes deeper. It must be remembered that the greatest absorbance occurs within the relatively narrow range of ~ 450 nm to ~ 460 nm. So, where does this leave the reef hobbyist? While the actinic 03 bulb is adequate to the task, the 7100K compact fluorescent tubes appear to be superior since it peaks at ~ 460 nm (with a smaller peak at ~ 420 nm), matching more closely the absorbance spectra of *zooxanthellae*. Utilized with a compact fluorescent of 6700K, the spectrum matches very closely that of the absorbance spectra for *zooxanthellae*, with peaks in both the ~400 nm to ~550 nm range and a smaller peak in the ~ 650 nm to ~ 700 nm range. In theory, then, the *zooxanthellae* are able to utilize a greater portion of the light hitting them than they might using an actinic 03 / full spectrum bulb combination. Practical experience has shown me, as well as a host of other hobbyists, that the use of these bulbs in combination allows for superb stony and soft coral growth and color, matching those produced by metal halide lighting of similar wattage.



6. Should I use a reflector with my lights?

The answer to this is a resounding yes, no matter what type of tank you are keeping. Fortunately, most fixtures come with a reflector already built in. You want to use a reflector that is made of polished metal, as this will provide the highest amount of light reflection. Many reflectors are painted white which, while it does reflect light (not as much as polished metal, though), tends to diffuse the light as well and so is not as desirable as a reflective material. If at all possible, you should place the reflector so that it is parabolic in shape, as this will provide maximum reflection. Next best is a simple curve. The least effective is a flat surface although it will do if no other option is available.

7. What about fluorescent bulbs with the built in reflectors, or "twist" type bulbs. Are they really that much more effective?

While both are indeed more effective, they are not that much so and may not be worth the additional cost. In the case of a "power twist" type bulb, you may get an increase in intensity of 10%. This means that with a 40 watt bulb, you will get an output equivalent to that of a 44 watt bulb. Bulbs with built in reflectors also provide additional intensity, but perhaps not as much as is thought. While light is indeed "lost" to the tank from the top of the bulb (unless a reflector is used), it must be realized that this light, bouncing off the reflective material, is then passed AGAIN through the bulb. By then, there is a slight loss of intensity. So, the desirability of such lights is really up to the individual hobbyist, but in my opinion a good in-fixture reflector is far superior to a bulb with a built in reflector.

8. How high should my lights be above the tank?

This really depends on the type of light you are using. With fluorescent lighting of any type, you will want the fixture as close to the tank as possible so that way the maximum

amount of light will reach the organisms. With metal halide lighting, generally speaking, 6" above the water is sufficient. Remember that for every foot above the tank, you will lose half the intensity. The closer, the better. HOWEVER...if your corals are not used to the more intense metal halide light (going from VHO to metal halide, for instance) or if you are changing bulbs, going from a lower Kelvin rated bulb to a higher one or just changing the bulb after 2500 hours of burn time, you may want to bring the lights up a bit higher, perhaps 12" to 18" off the tank, to give the organisms time to adjust to the increased UV output. Then over a period of a few weeks (how long will depend on how your corals react to the new lighting), lower the lights until they are once again 6" above the tank.

9. What about using UV shields on metal halide lamps?

Is this a necessity? In my opinion, no it is not. Most shields will block out a good portion, if not all, of the UV and possibly the actinic 03 radiation put out by the bulb. In some corals, especially the more colorful species, it is the UV that provides the need for UV protective pigment production. It is these protective pigments that provide the intense colors we see in our corals. Without the UV, I find that the colors tend to fade with time. If you decide to go sans shield, you MUST protect the bulb against direct water contact. A slight bit of water spray, such as from an airstone, will usually not bother the bulb, but a direct splash may indeed shatter it.

10. How long should the photoperiod be?

Under normal circumstances, a photoperiod of 8 to 10 hours should be sufficient. More, and you run the risk of an algae bloom and/or stressing your corals due to an extended photoperiod. With less, your corals and freshwater plants may not do as well due to a lack of sufficient photoperiod. The easiest way to regulate photoperiod is to place your lights on a timer. This allows for an




automatic day/night cycle without you needing to be there. Some reef hobbyists have arranged their lighting so that the actinic 03 bulbs come on first, then the metal halide(s), this being done so as not to “photoshock” the corals. It should be remembered that although blue light may not appear bright to us, it IS bright to the corals so there may be no benefit to doing this. One problem that faces hobbyists is that they are not home a good portion of the day. To compensate for this, they leave the lights on well past the 10 to 12 hours actually needed. Here again, the timers come into play. It may be to your advantage to set the timers so that the lights come on at 10:00 a.m. or 11:00 a.m., and go off anywhere between 8 pm and 11 pm. This way, the organisms in question get the light they need, and the lights are on when you are home to enjoy the tank.

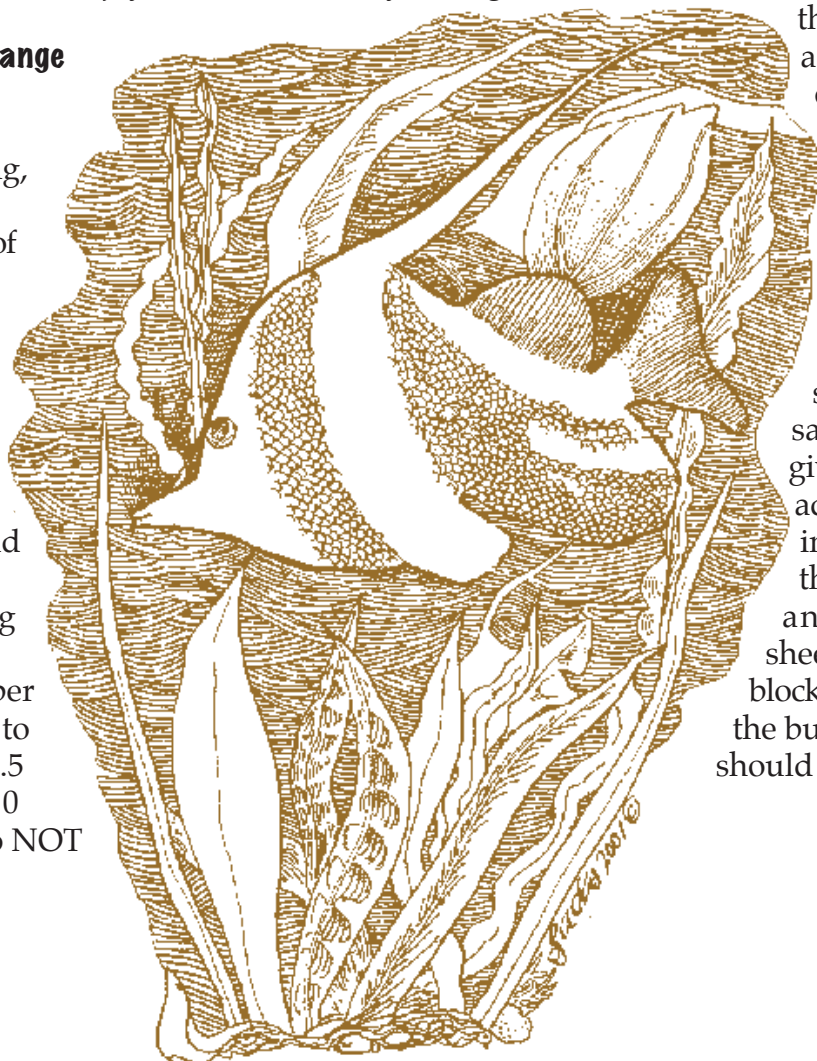
11. How often should I change my bulbs?

Generally speaking, ANY bulb should be changed after 2500 hours of burn time (3000 hours at most). Much after this, the intensity decreases dramatically, and you tend to have a spectral loss at the blue/UV end. Changing bulbs at a regular interval will avoid this. As an example, suppose you are burning your lights 10 hours a day. Assuming 30 days per month, you would want to change the bulbs every 8.5 months at minimum or 10 months at maximum. Do NOT

assume that just because a light is bright means that it is still valuable as a light source. This is not always the case. Our eyes are far more sensitive to the red/yellow/orange areas of the spectrum, whereas the greatest loss occurs down at the blue/UV portion (a portion of the spectrum to which our eyes are not as sensitive. That’s the reason high Kelvin bulbs look dimmer to us).

Over time, as the bulbs dim, your corals become accustomed to the lower spectral intensity. Suddenly, as you change the bulbs, these animals are blasted with higher levels of UV radiation as well as visible light. This is the primary cause of “coral burn” or coral bleaching in captive specimens. In order to avoid this, whenever you install new lighting, or when changing from a lower intensity bulb to a higher intensity bulb, you might want to raise the fixture higher over

the tank. Then over a period of a week or two, slowly lower the fixture back to its original height. This applies mostly to metal halide lighting, as other lighting sources do not seem to produce the same effect. This will give the corals time to adjust to the greater intensity. If raising the lighting is not an option, placing a sheet of glass or UV blocking acrylic between the bulbs and the corals should suffice. 





EDITOR'S NOTE: Dominique Isla was a member of BAS back in the 1990's; unfortunately for the hobby, he passed away in 2008. He was an avid livebearer aquarist and wrote a series of short articles on *Goodeids*. He moved to Florida around 1997 to work at a fish farm in Homestead which was wiped

out by a hurricane.

He relocated to New Orleans for a couple years and then moved to Denver to establish a large fish breeding facility in the Denargo Park section of the city.

Here is another of the articles he wrote for the BAS.

Dom's Livebearer Corner

CATEMACO LIVEBEARER

Xiphophorus milleri

Reprint from *Aquatica* 3/1991

Xiphophorus milleri is the smallest member of the *Xiphophorus* Genus the popular name is the Catemaco livebearer. *Xiphophorus milleri* is a wild species of swordtail from Lake Catemaco (and its associated streams) in Veracruz, Mexico.


Xiphophorus milleri was first described by Rosen (1960). The fish was named after Robert Rush Miller, who has done considerable scientific work on Mexican livebearers. This striking livebearer is found in one of the richest biotypes for livebearers in Mexico, Lake Catemaco. Located in the state of Veracruz, this huge lake is an irregular-shaped lake that is 6.8 miles wide by 4.9 miles long and is full of unique endemic livebearers and other fish.

X. milleri makes up for its lack of size with the bright yellow dorsal and caudal fins of the males (2.5 cm). They color up, especially when kept in a group. This gives the males a chance to display typical *Xiphophorus* courtship behavior, which I find to be one of the extra bonuses of keeping wild-form swordtails and platies. The colorful hybrids available in stores are great, but



they have lost a lot of their mating ritual behavior. Just watch two or three *X. milleri* asserting their rank in an aquarium and then see the dominant male flare and dance for the female. I find as much going on, as if I were watching cichlids.

Since this is a small and shy fish, I keep mine in a heavily planted ten-gallon tank with another shy Livebearer, *Ataeniobius toweri*. I have found that keeping one species of Goodeid works well as long as one has experience with the fish involved. Keep a constant eye on them, and provide plenty of plants and good food.

X. milleri's brood record is 42 fry which is hard to believe since the females are 4.5 cm. Twenty is more like a normal brood. This fish, like its roommate, is threatened in the wild because their habitats are endangered. If they do become extinct in nature, scientific institutions and serious hobbyists may be their last chance for survival. They are sensitive to water quality, and do not like drastic pH changes, (pH 7.5) and require good clean water. 

Family: Poeciliidae

Common Name: Catemaco Livebearer

Species: *Xiphophorus milleri*

Range: Lake Catemaco Mexico.

Habits: Peaceful. Kept with other peaceful species with similar demands.

Size: Up to 2 inches

Water Conditions: pH of about 7.3 to 7.7.

Temperature: 75 - 82° F

Diet: Prefers live and frozen food. They will usually

accept most food sources.

Breeding: Easy. *X. milleri* are livebearers. They give birth to their young among plants. The female can be isolated a few days before she gives birth and should be removed from the isolation tank once she has given birth to the fry

Remarks: *X. milleri* should be kept in a densely planted aquarium with open areas to swim. Always keep more females than males.



Brad Kemp

TheShrimp Farm.com is the place to go for freshwater shrimp. The owner, **Brad Kemp**, has a new address: The Shrimp Farm USA, 11936 West 119th St., #197, Overland Park, KS 66213, U S A and has set up an Aquarium Shrimp Forum <http://theshrimpfarm.com/forum/index.php>. You can go to this forum and ask questions, talk to other shrimp nuts and discuss anything and everything related to Aquarium Shrimp. Brad is the *Aquatica's* Shrimp Editor.

BLUE VELVET SHRIMP



Scientific Name:
Neocaridina heteropoda

Common Name:
Blue Velvet Shrimp,

Origin: Taiwan

Found in the wild: No

Ideal pH 7.2

Temperature Range: 65° - 85° F

Ideal Temperature: 75°F

Hardness Range: 3-15 dkh


Ideal Hardness: 8 dkh

Life Span: 1 - 2 years

Size: 1/2 inch

Gestation Period: 30 days

Diet: Omnivore

Special Notes: This algae eater is a good species for aquarium algae control. As with all aquarium shrimp, it is important to make sure copper does not get into the aquarium. Copper is toxic to all Dwarf Shrimp. Many medications contain elevated levels of copper, so it is recommended not to medicate an aquarium with Dwarf Shrimp in it. 

We also utilize what I personally consider one of the most prime ways of shipping live shrimp. We are using a specially designed Styrofoam container that has a self-sealing lid. Once sealed, this box is superior at keeping temps stable inside the container.

Our DOA rate is next to "0."

Brad

We also now have a Facebook page:

- <https://www.facebook.com/pages/The-Shrimp-Farm/196582057021072>

A brand new Shrimp Forum:

- <http://theshrimpfarm.com/forum/index.php>

And a Pinterest Page:

- <http://pinterest.com/theshrimpfarm/>
- The Shrimp Farm.com
- Shrimp Farm Facebook
- Shrimp Farm Forum



Exchange Editor's Report

The Exchange Editor's job is reading publications from different clubs and suggesting items of interest to our members.



I'm going to level with everyone. Volunteering for this or any fish club is thankless work. Each month a small group of individuals work to bring together a memorable speaker, an outstanding *Bulletin* and publication, an auction that has extremely reasonable prices for livestock, plants, tanks, dry goods and more. Those individuals put in a number of hours each month without any thought of their own time and "neglect" of their own family. They consider BAS part of their "family." Take a moment and thank them. And by all means help out and volunteer your time and expertise. You might even have fun doing it. Especially the Board meetings!!

(Thanks, Frog)

- **CICHLID CHATTER**, Greater Chicago Cichlid Association, (Illinois), Jan/Mar 2011. *Pseudotropheus* sp Msobo Breeder Report, by **Don Weger**. *Everything You Read About Fish Keeping is BS – Including This Article*, by **Mike Garibaldi**. *Power Consumption in the Fish Room*, by **Shawn Kopinski**. *Visit to Scott Womack's Fishroom*, by **Radek Kowalski**.

- **PARADISE PRESS**, Long Island Aquarium Society, March 2011. *Go For It!* by **Vinny Kreyling**. This is a great article on the need for GFIs (ground fault interrupters) in a fish room. Lucky, by Vinny Kreyling. He discusses pet superstores vs. Local fish shops. *It's a Fact of Life in the View ...*

From The Other Side of the Tank, by **Margaret Peterson**. Margaret tells of losing a large number of *frontosa* when they sprayed the ceiling with lacquer spray prior to painting. Be wary of toxic fumes.

- **FISH TALK**, Atlanta Area Aquarium Association, Georgia, Apr. 2011 *Exciting News from Ken Seiders at the Lettuce Box....*By **Ken Seiders**. (topic: *Ceratopteris thalictroides*). *Rockin' In the Rift Lakes* by **Michael A. Risko, Jr**. *South Side of the Sky – The Southern Lake Malawi biotope aquarium*. *Breeding Pelvicachromis subocellatus*, by **Ken Seiders**. *Vinegar Eels, Their Culture and How to Feed the Little Guys*, by **David Ramsey**.



- **FINCINNATI**, Greater Cincinnati Aquarium Society (Ohio), May / June 2011. Albino Bushy Mouth Pleco, *Ancistrus* sp. Spawning Report, by **Jerry Riegel**. *Crenicichla Regani*, by **Steve Smith**. *Cynotilapia Afra* "Hai Reef", by **Jerry Riegel**. *Steatocranus casuarius* "Buffalo Head Cichlid", by **JJ Smith**.

- **THE DARTER**, Missouri Aquarium Society, Inc. Jan / Feb 2011. *Fish Stories* by **Tony McMillan**: *The Mosquito Fish worth their weight in gold...or put the @#\$%^&* fish in the @#\$%^&* pond! Oh is for Oscar, The trials and Tribulations of an Oscar Breeder*, by **Dave Ayres**. *Controlling Insect Pests in the Fish Room*, by **Kevin Kelly**. *Keeping and Breeding Brachyrhaphis* sp. "Costa Rica", by **Wayne Toven** GAAS.

- **FINFORMATION**, Greater Pittsburgh Aquarium Society, Inc. (Pennsylvania), May 2011. *The Big-Eyed Shell Dweller, Neolamprologus similis*, BAP article, by **Susan Everett**.

- **CICHLIDAE COMMUNIQUÉ**, Pacific Coast Cichlid Association (California) Mar / Apr 2011. *Keeping and Breeding Placidochromis* sp. "phenochilus Tanzania" – *The Star Sapphire Cichlid*, by **Sam**

Borstein. *Ask Pam* #99, by **Pam Chin**. Pam answers questions in her regular column about cichlids with great expertise.

- **CICHLID BLUES** #175, Pacific Coast Cichlid Association (California), May 2011. *Entirely Lost: Inane Ramblings of a Novice Fishkeeper*, by **David Fraguglia**. *Reflections: Save the California Cichlids!*, by **Ron Coleman**. *The Last Word*, by **Kevin Plazak**. **Michael Pyle** (first printed in CC#156). Michael writes about his success with *Julidochromis regani* "Sumbu", a Lake Tanganyika cichlid. *Ask Pam* #98, by Pam Chin again. Pam again answers questions in her regular column about cichlids with great expertise.

- **THE GRANITE-FISHER**, New Hampshire Aquarium Society, Volume 20, Number 4 April 2011. **Jonathan Farrand** writes an article titled "Progression of a Planted Tank, Tank growth and Development: Stage One." He notes how a lot can change when you decide to keep aquarium plants. Especially when you let Mother Nature do the work.

- **THE GRAVEL GOSSIP**, Diamond State Aquarium Society, Volume 48, Nos. 8, September 2011, *The*



Amateur Hour by **Bob Berdoulay**. Another nice story of Bob's reintroduction to the aquarium hobby by his son. He started with a variety of tetras and a few cory cats. Later he attacked the rainbow dwarf cichlid or "krib," known in past times as the *Pelmatochromis kribensis*.

- **TANK TOPICS**, Greater Akron Aquarium Society, (Ohio). *The Dirt on Soil-less Worm Culture*, by **Joe Reich**. Joe gives directions and has photos of how to set up a worm culture in a plastic food container with plastic needlepoint canvas and dry cat food pellets. *Cryptocoryne usteriana*, by **Dave Williamson**. Dave writes about propagating this aquarium plant.


- **TANK TALES**, Aquarium Club of Lancaster County (Pennsylvania). March 2011. *My Dream Tank: On a Fixed Budget*, by **Scott McLaughlin**. Scott describes and creates his cichlid tank...great photos. *Selecting Your Aquarium*, by **Michael Steffen** (Twisted Fisher). Michael gives advice on the placement of your aquarium. Is there electricity close by? Is there access to a water supply? Is there a window nearby? Is the floor level and sturdy? What equipment is needed? (tank, hood with light, filter, substrate, decorations, etc.) Good article. *Michael's Frog Farm: Spawning African Frogs*, by **M.J. Shrom** (reprinted from March 1989). M.J. writes about spawning *Xenopus* species of African frogs and how to tell the difference between the dwarf frogs and the regular sized frogs. This is a must read article if you are raising African frogs.

- **SPLASH**, Milwaukee Aquarium Society, Inc. (Wisconsin), August 2010. *Marosatherina ladigesii*, by **Eric Rogne**. Eric describes this Celebes Rainbowfish and reports on its spawning behavior and raising the fry. *How Things Work, Glass Aquar-*

iums Part 2 and Part 3, by **Andy Hudson**. In these two articles, Andy explains how aquariums are made, covering the following topics: The glass, frames, silicone and construction.

- **SPLASH**, Milwaukee Aquarium Society, Inc. (Wisconsin), December 2011. *Paramecium*, by **Ted Judy**. Ted tells us how to culture this protozoan as live fish food. *How Things Work, Aquarium Filters Part 2*, by **Andy Hudson** who tells us all about sponge filters.

- **SPLASH**, Milwaukee Aquarium Society, Inc. (Wisconsin), February 2011. *How Things Work, Aquarium Filters Part 3*, by **Andy Hudson**. Andy describes how power filters work. Some need to be "primed" to create a vacuum to pull water through them, some are with bio wheels, some that go inside the aquarium. Very interesting reading. *Spawning the Bolivian Ram*, by **Eric Rogne**. Eric does a great job describing the spawning behavior of this South American dwarf cichlid.

That's it for now. See you all next time.
Happy fish reading everyone. 

Stu



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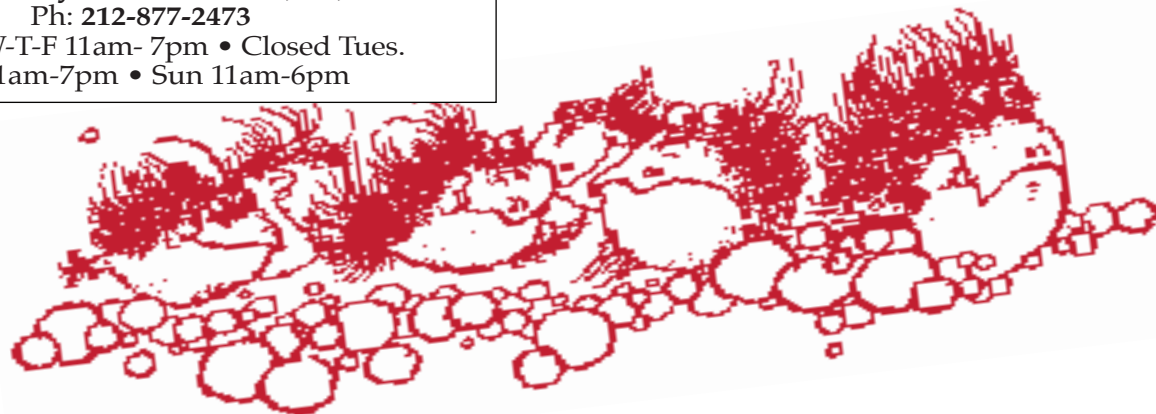
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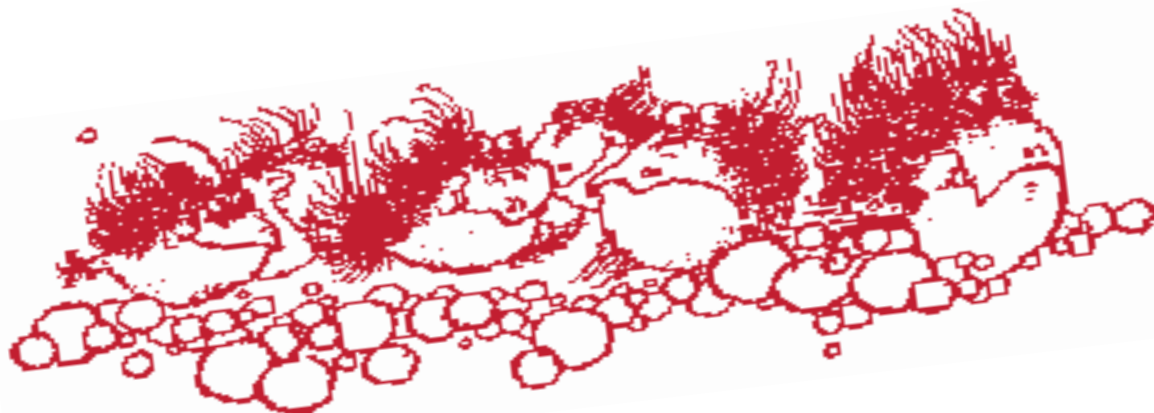
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P.O. BOX 290610, BROOKLYN, NEW YORK 11229-0011



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1yr. \$25	2yr. \$45	3yr. \$63	4yr. \$85
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(UNDER 18 YEARS)

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1 _____ 2 _____ 3 _____

4 _____ 5 _____ 6 _____

Number of tanks [] marine [] freshwater [] Do you breed fish?
 [yes] [no]

If yes, what types do you breed: _____

Special interest (if any) _____

How did you hear about BAS [friend] [dealer] [flyer] [Aquatica] [mag ad] [online]
 other _____

To volunteer check [yes] [no] A board member will contact you if you check yes.

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