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The Tetra and Barb Aquarium

Whether you are starting with a new tank or want to add to an established aquarium, you should give thoughtful consideration to the habitat you will be providing and the selection of species you will add to it. As you consider and plan, you ought to understand the special features that are strongly recommended for the aquarium that incorporates tetras, barbs, and their relatives.

Most tetra and barb species may be relatively hardy and good fishes for beginners, but they do have needs that are often overlooked. Here we look at some features that should be considered for any aquarium used for tetras and barbs—be they in a single-species tank or part of a community display.

One of the most common questions asked by those starting their first aquarium is "How many fish can I put in my 10-gallon aquarium?" This starts the discussion with the most important considerations: the dimensions of the tank and the number of species and the total fish population to deploy.

Most species of tetras and barbs need a long tank more than a tall one.

The Long Tank

Horizontal space is the most important dimension for the tetras and barbs. Most of these species—and particularly the danionins—are relatively restless. In contrast, most of the other groups of fishes that are common within the home aquarium are quite content within a relatively small footprint, which would be confining to the tetras and barbs that would share the same tank.

Almost all tetras, barbs, and their relatives prefer a long tank. The dimension "long" refers to the side-to-side measurement of the tank as you look at it from the front. Length is a particularly important dimension for the schooling species that spend much of their time swimming in a generally linear direction. Give those species a reasonably lengthened runway.

The second important dimension is the front-to-back "depth." Together, the length and depth create a "footprint." An important aspect of the footprint is the amount of total horizontal area available within the aquarium. Generally, more is good. Yet the shape of the footprint also makes a difference. Generally, longer is better.

A longer footprint, as opposed to a more squarish one, spreads out the terrain and spacing of species. More territories can be formed, and more distance can be established between competing territories. Territorial behavior, which adds personality

to any display, is more likely to emerge in species with that disposition (the emperor tetra, *Nematobrycon palmeri*, or many splash tetras, genera *Copella* and *Pyrrhulina*). A long footprint provides more relief from a relentlessly territorial fish (such as the male tiger barb, *Puntius tetrazona*).

The final tank dimension is "height." Generally, this is the least important dimension for tetras and barbs. As pointed out in the "Habitats" chapter, most species prefer to occupy a particular stratum within the water column. As a result, an extension of the horizontal swimming space—or of the aquarium's footprint—is more appreciated than is an extension of height.

Height does contribute two benefits. First, as long as the footprint is not reduced, an increase of height increases a tank's gallonage. The higher the gallonage, the more an aquarium is chemically and biologically stable and resistant to fishkeeping mistakes. Second, a taller water column allows the various swimming zones to expand and to segregate from the other strata. This is important in a community tank, not only in distancing the mid-level fishes from bottom-dwelling ones but also in allowing the mid-level swimmers to segregate into multiple mid-level strata—a phenomenon observed in nature.

So what about today's tank-size options? If I am keeping fishes that school or that claim territories, or if I am developing a display community, I start with the 30-inch (75-cm) 20-long (about 70 liters), as opposed to the 24-inch (60-cm) 20-high (about 75 liters), and expand the size from there depending on the fishes' sizes and number of species. For example, to bring out the true schooling behavior of cardinal tetras (*Paracheirodon axelrodi*) or of rummy-nose tetras (*Hemigrammus bleheri*), I would not use anything shorter than 30 inches (75 cm).

Unfortunately, when many enter the hobby, they invest in the least expensive and so-called "starter" size, the 10-gallon (40 liters). Often they have the expectation of stocking it with the affordable tetras or barbs. The tendency of the new fishkeeper naturally is to overstock this small tank, which then falls short of being an accommodating habitat for a functional community of fishes.

Tetras and barbs are social fishes; plan on keeping each species you want in sufficient numbers.

The Right Number of Tetras and Barbs

Many beginning aquarists naturally want to start with as many species as possible. After all, they've just discovered fishkeeping and each species is something new to add to their excitement. But with limited space (such as that 10-gallon tank) the keeper is tempted to acquire more species by purchasing only one, two, or maybe three of any species.

Most tetras and barbs are responsive to those of their own species, so they should be purchased in groups. For these fishes it is better to acquire more specimens of fewer species. The best number to be displayed together will vary depending on the size and behavior of the fish being considered, the dimensions of the aquarium, and the assembly of other fishes in it.

In addition to overstocking a tank with too many fishes, a common mistake is having too few fish represent any one tetra or barb species. With few exceptions, tetras and barbs are meant to be kept in at least small groups, not singly or in pairs. Below are my recommendations as to how many fish to stock per species. Once the numbers of a schooling species drop below five specimens, or when the grouping species drop to just a pair, the effect of that species's behavior is lost in the display tank. At that time consider either replenishing the number for that species or retiring the remaining specimens to an auxiliary tank.

Another common mistake is in having too many fish in total for the tank's size. If your tank does not have room for another species with my recommended minimum, don't add it.

For the species that form tight schools, such as rummy-nose tetras and cardinal tetras, keep them in schools of no fewer than seven individuals.

Species That Form Tight Schools

With these fishes, the school swims in near synchronization, as if in a swarm (example: cardinal tetras, rummy-nose tetras, harlequin rasbora). Start with no less than seven specimens, increasing the number in a sizable tank to more of a crowd. One to two dozen, or more, form an impressive sight. For example, a school of cardinal tetras could reasonably exceed two dozen in a 55-gallon (210-liter) aquarium.

Species That Group

These fishes rove in packs, and individuals frequently spar or display to one another (example: most deep-bodied tetras, small playful barbs, and danionins). Start with no fewer than five specimens. Unlike the schooling species, keep these as a small group (5–9) and shy of the crowd size. With too many individuals the group dynamics can lose its personality.

Species That School Loosely

Here the members of the group stay near each other but neither school tightly nor constantly interact individually with each other (example: hatchetfishes, slant-swimming pencilfishes, many tetra and rasbora species). Start with at least five, preferably seven or more. Larger numbers (such as a dozen or more) are not as impressive as they are with the schooling species, but the social behavior does not degrade as it can with species that show pack behavior.

Species That Can Be Territorial

Territorial species, or species in which an individual will show a bullying attitude, will at times school loosely without synchronization (example: tiger barb). Start with one male and one to three females. You may start with more if the footprint and lack of territorial competition allows it. Consider playing it safe with just a few at first. Species with territorial males do not need a sizable school.

It is acknowledged that

Many of the rasboras—*Rasbora borapetensis* in this photo—form loose schools.

aggression can be reduced by crowding the tank with many fish of a territorial species, thus making it difficult for any one fish to claim a territory. But this is suppressing their natural urge to be territorial. Consider going sparse within a sizable footprint and observing their natural, instinctive behavior.

Smaller Tanks

Because many fishes desire horizontal space and aquarists desire keeping several species, I have recommended a starting footprint maintained by nothing less than a 20-long (70 liters). Yet the smaller tanks, such as the standard 5- (20 liter) and 10-gallon (40-liter) sizes, can responsibly maintain and display tetras and barbs. The key is to choose species that do not need as much horizontal space, and to limit the fishes and species in terms of size and number.

Many small fishes, such as those 1.5 inch (4 cm) or shorter, tend to stay near plants and appear more content with smaller habitats. These could be naturally small fishes, or they could be juveniles of larger species. (Of course, eventually the juveniles will need to be moved.) The key to keeping small fishes content in a small tank is to aquascape with plenty of refuge opportunities. Hardy low-growth plants (such as Java fern, Java moss, and *Anubias*) are ideal for the small tanks. Arranged well, driftwood and rocks will also contribute to a fish's sense of security.

The other consideration is to limit the number of fishes. When it comes to tetras and barbs that should be kept in groups, any more than one or two species swimming in the middle level of a 10-gallon (40-liter) tank could be too many fishes competing for the same niche. Of course, it depends upon the size and demands of each species. Keep in mind that the bottom dwellers, such as a miniature cichlid, catfish, or *Badis* species, often serve as good tankmates because they tend to complement rather than compete with the mid-level tetras or barbs.

Can you be content showcasing a single species per aquarium? Consider a nicely aquascaped 10-gallon (40-liter) aquarium displaying a single interactive group of serpae tetras, silver-tip tetras, or cherry barbs. Even the small 5-gallon (20-liter) tanks can be a wonderful showcase for the miniature species, of which adults are generally an inch or shorter. Quite often less is more!

Finally, if you decide to upgrade to a larger aquarium, don't discard your small starter tanks. As you advance in the hobby, you will come to appreciate the role of auxiliary tanks for things like quarantining, temporary holding, and even breeding.

Aquascaping for Tetras and Barbs

Most of the aquarium tetras and barbs are not high on the food chain. In nature they choose habitats that tend to be relatively shallow, close to the shore, and near aquatic shelters such as plants and submerged roots or branches. They expect a habitat that offers security. These fishes should not be kept long-term in wide-open, non-aquascaped aquariums. Add plants and driftwood and you will see colors and behaviors emerge as your fish forget they are in captivity.

Granted, tetras and barbs often do fine in bare tanks used for quarantining or temporary housing—as long as the bottom does not look out into open air. But the goal of the aquarist is more than just keeping fishes alive; our goal is to induce them into their natural beauty and behavior.

Substrate

Gravel or a similar substrate is essential for creating a natural habitat. Pay attention to both color and size of the substrate. Many tetras tend to darken over a completely black bottom and pale over a nearly white bottom. Medium to medium-dark earth tones seem to elicit the most natural response. However, if driftwood, rocks, and plants cover much of the bottom, a more extreme tone in the substrate has less effect on the fishes and can create a visually appealing contrast.

Although larger-sized gravel is easier to clean, I recommend using a finer grade of gravel than a coarse one—particularly for the smaller species. A good rule of thumb is to start with about an inch (2.5 cm) of depth in front, with the depth increasing backwards and/or to the sides. A depth of 4 inches (10-cm) or more is not detrimental, though terracing such a slope can be challenging.

Backing

As a rule of thumb, the back of the tank should not be left as clear glass. An opaque backing will

Gaudy or Naughty?

For some reason, many who are just getting their hands wet for the first time are drawn to bubbling toys and bright colors. It happened to me. In one of my first tanks I bought blue gravel to match my home's interior. But neither the toys nor the bright colors are natural. Almost every seasoned aquarist comes to recognize and appreciate the beauty of natural aquascaping materials—they prefer rocks instead of an animated treasure chest, or gravel that is earth-toned instead of blue.

add a sense of security for the tank's inhabitants and prevent visual distractions for the viewer. Many aquarium stores sell waterproof backing in rolls that can be cut and applied to the back of the tank. Be tasteful for yourself and your guests—do you really want a scene that is unnatural to the freshwater habitat such as a mermaid or a saltwater environment? I myself prefer dark and natural-colored solids over any still-life scenes. In practice, I spray the back and sides of my display tanks with black paint that adheres to glass.

Dark substrates tend to bring out the colors of fishes better than light-colored ones.

There are times that a tank is to be viewed from both front and back. If this is the case, you will not use backing, of course, but you should compensate by providing adequate aquascaping that provides refuge and a sense of security for the fish.

Aquascaping Basics

The more interesting parts of aquascaping typically include rocks, driftwood, and plants. Don't feel daunted here. While there clearly is an art to each—particularly with plants—there are easy approaches to creating a workable aquascape.

Before we talk about each of the aquascaping materials, take in an overview of basic layout principles. You don't know how intimidating layout can feel until you start planning. Truly, aquascaping is an art, and one that has enlivened the ongoing practice of many serious aquarists. But the average aquarist does not need to study or expect advanced aquascaping. Learn a few basic principles and you will be amazed at how good your aquarium will look. Don't be surprised if you find aquascaping to be a very enjoyable and rewarding aspect of the hobby.

Basic Aquascaping

- Place tall items in the back and optionally along one or both sides, short items in the front.
- Plan for a major open swimming area in the foreground. Don't crowd this area of the tank with tall plants or driftwood.

- Driftwood or sizable rocks work well for creating a visual terrace between the open swimming area and tall background plants.
- Rocks and driftwood can create a terrace of multiple substrate levels.
- Don't feel a need to use many different types of materials or plant species.
- A natural look does not lay out the materials in straight lines or in symmetry.
- If you can, hide heaters and any filtration devices behind the aquascaping.
- A planted tank always looks better once the plants have grown in the tank for a few months than when they had just been planted.

Practice. Don't be afraid to experiment and rearrange.

Rocks

Rocks are the easiest material to use. They require no maintenance unless they need a scrubbing because algae has gotten out of control. Rocks help demark territories. They can be used to create pockets of tank space that are visually hidden from others.

Be aware that many rocks turn the water alkaline and thus are inappropriate for the tetra and barb aquarium. Limestone, corals, and seas shells are the worst offenders. Drop a bit of vinegar or other acid onto any material you are considering—it will bubble if the stone will leach alkalinity into the water, typically raising the pH reading higher than what our fishes are used to.

Generally, choose rocks that look like they came from the same place. This means they have similar texture, color, and grain. Vary them in size and position within the aquascape. Large rocks (half or two-thirds the height of the water column) can be dramatic, but be cautious—large rocks can add a lot of extra weight to the glass bottom, and they can displace a lot of water.

Driftwood

Driftwood is another great aquascaping material. Branchy varieties, which are currently popular, can add interesting twists and turns within the water column.

Driftwood does offer the aquarist some challenges. Most types float until they have

Large rocks make dramatic aquascaping elements, but they can greatly increase the weight concentrated on the bottom of the tank.

become waterlogged. Aquarium stores offer pieces that have been attached to slate, thus providing a weight and anchor to allow them to be used right away. To handle floating driftwood yourself, weight it down under water for weeks or months until it is adequately waterlogged to stay put. The types of wood that are dense and sink right away often leach tannins, tinting the water brownish-red. This gradually disappears as frequent water changes are performed. But not every type of wood is safe; some contain agents toxic to fishes, and even some of the safe woods, if collected from local freshwater sources, can harbor pathogens and parasites.

Plants

The most interesting and most valuable aquascaping items are aquarium plants. They add patches of green or red to the display, and they can provide interesting aquascaping across all levels of the water column. In nature the niches of tetras and barbs are usually tied in some way to the location of plants. Often tetras and barbs will not utilize the upper portion of the aquarium unless plants rise into that area. Nothing seems to make fishes feel more secure than a cluster of plants.

Plants have additional benefits within the aquarium. They absorb carbon dioxide and release oxygen. Their leaves provide a broad surface for good bacteria as well as shade and refuge spots that our fishes—and particularly the tetras and barbs—appreciate. Plants consume a portion of the wastes in the water and in the substrate. Live plants are clearly an all-around benefit and an important component of the complete freshwater aquarium.

Of course, the challenge of plants is keeping them alive. Some aquarists give up right away and use plastic plants. These are better than leaving a tank bare, but they fall quite short of the beauty of live plants. Fortunately, the hobby provides some very durable plants that almost any beginner can keep successfully.

Any aquarist should be able to keep these three types of aquatic plants: Java fern (*Microsorum pteropus* and related species), Java moss (known in the aquarium hobby under the names *Taxiphyllum barbieri* and *Vesicularia dubyana*) and related species, and the

Browsing Among the Plants

Need some ideas to help you create an interesting aquascape? Browse the Internet for photos to see how others have aquascaped. Not all examples will be worth copying, but you'll gain some ideas and learn what you like and don't like.

various *Anubias* species. They do not require special water chemistry or special lighting. In fact, they will survive weeks without light. Between them, they offer three types of shapes.

Java moss (foreground) and Java fern (background) are two common and hardy plants suitable for keeping with tetras and barbs.

If you want tall clumps of leaves that have body from the roots up, use ferns. You can plant the roots into the substrate, but do not to bury the rhizome (the lateral stalk from which the leaves branch out). Try tying the rhizome to a piece of driftwood with thread, and soon the roots will attach to the wood. Small plantlets can be left to float at the surface if floating plants and shade are desired.

If you want broad leaves that group within a certain stratum, consider an *Anubias*, each species having its own size and height. These work well when planted just in front of driftwood or tall rocks. As with ferns, you may anchor the roots into the substrate, but don't completely bury the rhizome.

Tetras and barbs love Java moss. They often choose it for spawning in. It grows as a tangled mass that you can shape, and it usually rests along the substrate. But, like the others, it will gratefully attach itself to driftwood, creating an attractive effect.

If you are new to aquatic plants, start with these recommended low-light plants, but I encourage you also to explore into the next level. Invest some time with an aquarium plant book to learn more about aquatic gardening and what other plant species may be suitable. The finer points of aquascaping build the beauty of the aquarium and greatly reward the aquarist. Be forewarned that these new levels rapidly become challenging and demand more practice and developed skill. Indeed, aquatic gardening has become one of the most advanced practices within the aquarium hobby.

If you want to include a plant with broad leaves, one of the species of *Anubias* will fit the bill. This is *A. barteri*.

Putting It All Together

Remember that in nature the number and diversity of fish species correlates to the complexity of the habitat. The more complex the habitat, the more species it attracts. An open tank with nothing but a flat substrate is worse than just boring— it runs counter to the preference of our aquarium fishes. Aquascape. Extend it well up into the water column. Make it interesting. Create many nooks for resting and refuge.

Lighting

The Right Color: Most aquarium fixtures use fluorescent tubes. You want tubes with a color rating from 5000K through 6500K. These are daylight values that enhance plant growth as well as viewing pleasure. Any bulb less than 5000K produces a color spectrum that is inefficient for aquatic plants to consume. Algae, on the other hand, will welcome those lower values.

The Right Amount: Increasing the number (or size) of bulbs over a tank increases the intensity of the light. A quick way to estimate intensity is to add up the wattage of bulbs over the tank. One watt per gallon of water is considered adequate for low-light plants, while four watts per gallon is considered a rather high intensity. Hardy plants—such as the recommended Java fern, Java moss, and *Anubias* species—do fine with low intensity light. The more challenging plants, and particularly the reddish species, usually require higher light intensities.

The Right Time: Typically eight to twelve hours is all you want. Install an electric timer to automatically turn your lights on and off.

Carbon Dioxide

Yes, a CO_2 injection system does require an additional investment, but the application of CO_2 is the threshold into the high-tech planted aquarium. Next to getting the right color-rated lighting, this is the best thing you can do for a planted aquarium. It almost

Best Practices for the Basic Planted Aquarium

Because plants are such a valuable contribution to the tetra and barb aquarium, keepers of these fishes benefit by learning and following a few of the best practices regarding aquatic plant keeping. These involve lighting, the value of CO_2 injection, and an appreciation of plant nutrition

ensures success with hardy species, it promotes good plant growth, it fights algal growth. Also, CO_2 is almost always the missing factor for growing the more challenging plant species.

Nutrition: Avoid Buildups

Conduct regular water changes to keep the aquarium from accumulating high levels of unused nutrients that can feed algae.

Nutrition: Cautious Use of Fertilizers

If you inject CO_2, you will want to study the role of macro and micro plant nutrients and consider adding what your water is missing. If you are not adding CO_2, you will need little to no fertilizer. Without adequate carbon in the tank, these fertilizers will feed the algae more than they feed the plants.

The Softwater Aquarium

Fishes that come from extreme softwater conditions will strongly prefer an aquarium habitat of soft and acidic water. This is not the typical tap water setup, but it entices the blackwater species to show better colors and to behave more naturally. Some delicate species such as the clown rasbora (*Rasbora kalochroma*) virtually require these extreme conditions. But be aware that many species, including many from the tetra and barb groups, prefer water that is closer to neutral and moderately hard. Such species will be stressed in the softwater aquarium. These are two different habitats. Know your species' preferences, and keep them accordingly.

In some parts of North America, the water is naturally quite soft and acidic, but for a good portion it is not, and to make it so requires some additional effort. Home water softening systems do not produce the water we want. The artificially "softened" water from home softeners is probably not any more detrimental to the fishes than the original tap water, but it is certainly no better for species that desire truly soft water.

Serious aquarists who keep these blackwater species invest in a reverse osmosis (r/o)

Special Water Needs

Most of the tetras and barbs found in aquarium stores do well in most tap water, such as a pH within the range of 6.0–8.0 and a hardness within the range of 3°–18°. After all, if the commonly available species didn't do well in common tap water, they probably would not be offered.

However, the tetras and barbs generally prefer the acidic and softer ends of these ranges. In such water they will show better color and are much more likely to spawn. A few species, such as the larger rasboras and danionins, are reasonable dither candidates within the hard and alkaline water of tanks for hardwater cichlids, but such suitable species are the exception within the tetra and barb groups.

Many tetras and barbs come from very acidic and very soft waters. Acidity can span pH readings from the 5s and even down into the high 3s. Hardness is just a few degrees or even below 1° (less than 17ppm). Fishes from these areas are bound to do better in such water.

These extreme conditions are typical of blackwater rivers and marshlands. Many small and colorful tetras (such as the cardinal and rummy-nose tetras) come from the blackwater systems along the Rio Negro and other South American rivers. Blackwater swamps are widespread in the Malaysian Peninsula and the nearby islands such as Borneo, and these waters are home to many of the banded barbs and most of the smaller rasboras. These are fishes worth keeping.

system that can produce authentically soft water that naturally drifts into the acidic range. These units connect to the water pipes and can produce from 3 gallons to over 100 gallons per day.

Many people who have just one or a few small aquariums are hesitant to invest in an r/o system. An alternative is to soak one's water in sphagnum peat moss for a couple of days. (This is obtainable from most garden stores. Make sure it does not contain fertilizers.) Peat moss significantly darkens the water as it changes the water's chemistry. It removes some of the water's metallic ions and (unlike the water softener units) also acidifies the water. This organic process is basically the same as when nature transforms rainwater into black water.

The softwater habitat does not need to be tainted brown, but the fishes don't mind if it is. Such an aquarium brings out the beauty of some of the rarer blackwater species,

which are mistaken as delicate when kept in harder tap water.

The clown rasbora will thrive only in soft, acidic water.

Roles in the Aquarium

In order to make an aquarium interesting to observe, one ought to consider the various roles that fish provide within the display. Have you ever thought about what these roles are? Each species has its particular qualities in the way it looks and behaves and in the particular roles it plays within the community.

Species Roles: Appearance

The appearance of fish is a major consideration when choosing specimens for your aquarium. This can involve several concepts.

Color: A well aquascaped tank will show the green of plants, the brown of driftwood, and the tone of the substrate, but it is the fishes selected that carry the bursts of color that define the display.

Size and Shape: Each species contributes its own size and shape

Water Softeners

Home water softeners do not really make the water soft. These systems are effective because they remove metallic ions (calcium or magnesium) that have a charge of +2 and replace them with metallic ions (sodium or potassium) that have a charge of +1. The result is that the water feels soft, lathers well, and does not leave calcium buildups. This is what many homes need, but it is an artificial softness that still presents fishes with the same osmotic challenges as natural hard water. It is not the same type of softness that we find in tropical waters. Our test kits mistakenly indicate very low hardness of such water because these simple kits are not designed to detect the sodium or potassium.

I'd Like to Help You, But...

Several years ago I asked a friend who ran an aquarium store to bring in some of the uncommon and colorful tetras that I see in books. He stopped me to point out the reality. We both live in an area with relatively hard water (16°). For these species to display well and to show their natural colors, he would have to display them in a specialty tank of very soft water. However, the average person visiting his store has just one or two tanks, has not invested in a reverse osmosis system, and does not understand why his fishes will turn drab or even die in their tap water. My friend would love to bring in these rare beauties, but most clientele are not set up to provide for the extremely soft and acidic aquarium. It was then when I realized that a good portion of tetras and rasboras are not fishes for beginners.

to the diversity that makes up the whole. Finnage also varies greatly, providing more options for the overall display.

Novelty: Some species have features or behaviors that are so different or unusual from other commonly kept fishes that an aquarist keeps and displays them for their oddity. This can be anatomical, like the eyeless blind cave tetra (*Astyanax fasciatus mexicanus*); visual, like the light- reflective markings on glowlight tetras (*Hemigrammus erythrozonus*) or the transparency of *Xenagoniaties bondi*; or habit, like headstanders, which swim heads-down. The novelty role is recommended as an accent feature only. Add novelty species sparingly—typically just one such species per display.

Species Roles: Behavior

Like appearance, behavior is important to consider when stocking your aquarium.

Schooling: Some tetras and barbs swim in parallel and turn in near unison. This synchronization builds a visual impact so that the group is much more important than the individual. Tight schooling is seen with neon and cardinal tetras, the rummy-nose tetra, and other species. Other species school much more loosely, drawing weaker attention as a group. The aquarist should plan for no fewer than seven of the same species, and preferably a dozen or two. If the observer has a hard time counting how many are in the school, the visual impact of a school is greater than the sum of its individuals.

Grouping (Packs): Other species group together

in packs, drifting and darting among favorite locales. Individuals may chase each other or the males may challenge with displayed fins. Such behavior is common in the rosy tetras (such as bleeding hearts, phantoms, and serpae tetras) and in many barbs.

The contrast of the bright red nose against the darker body colors makes *Hemigrammus bleheri*, one of the species known as "rummy-nose tetras," an excellent choice for providing color to an aquarium.

In contrast to schooling in which the emphasis is on the group's unison, the amusement here lies in the interaction between the individuals within the pack. Invert the rule-of-thumb for schooling fishes-in other words, choose a number of fish that you can individually count and pay attention to when they are in their pack. Five to seven specimens yield an effective group size. This size will bring out the individual-to-individual interactions and allow the grouping behavior to be at its most interesting.

Territoriality: A role that adds interest to a display is the assertion by a fish that some portion of the aquarium is his. All intruders are kept out of this claimed territory. In the tetras and barbs, it is the male that defends the territory, and the intensity with which it asserts and defends a territory varies. The male emperor tetra (*Nematobrycon* species) does no serious harm to its rivals. Many of the barbs are territorial, and the tiger barb is so much so that it has the reputation of sometimes being a bully. Territorial behavior seems to emerge only when the tank is not stocked heavily. The author has witnessed non-spawning *Pyrrhulina* stake and defend territories in a 20-gallon long aquarium—but only once their numbers dropped to five. When this species was kept within a denser population, the fish gave no indication that each preferred its own territory.

Predation: Almost all tetras and barbs that are commonly sold are peaceful or harmlessly assertive, but a few are predators. The keeping of predatory fishes is

challenging. Typically one keeps them in a single-species tank. If they are not fed well enough and do not have a large enough tank, the number of their tankmates will be whittled down. Many piscivores can be maintained on a diet of nonliving foods, but they never lose their love of the hunt. A handful of species, however, are extremely difficult or impossible to wean over to any food other than live fishes. To sustain such species, the fishkeeper needs to invest in at least one "food" tank and make a disciplined commitment of time and money to regularly buy and keep feeder fish. The most commonly known predacious tetras are the piranhas. *Exodon paradoxus* is an attractive tetra that prefers to hunt its prey as a pack. The wolf fish and its close relatives (*Hoplias* and *Erythrinus* species) are occasionally imported and typically are kept one fish per tank. Specimens from the genus *Lebiasina*—of the same family as the pencilfishes—prefer live foods such as small fishes.

Community Roles: Niches

Different fishes also play different roles in terms of where they fit into a community.

Aquarium Strata: Some species do not restrict themselves to any one level within the aquarium, but most do show a preference. A well-planned community tank will display a visual balance of species owning each of these levels.

Most tetras and barbs are horizontal swimmers occupying the middle of the aquarium.

Cardinal tetras form tight schools in the aquarium, making an impressive display.

This makes them popular choices for cohabitating with popular substrate-loving fishes like many catfishes and most dwarf cichlids. A couple of important tetra groups are often deployed to play the role of top dwellers, such as hatchetfishes, which nearly hug the surface. Still others gravitate near the bottom, like the darter tetras.

Biotope Aquarium: A recent movement in the organized hobby is to stock display tanks with species originating only from one area, or biotope. The most challenging and rewarding goals are small in focus, such as recreating an Asian jungle stream or a blackwater Amazonian rivulet.

Habitat Aquarium: In contrast to the biotope aquarium, which represents a geographical area, the habitat aquarium reflects a microhabitat and any species that might be associated with the characteristics of this habitat. As a result, species from all over the world may be represented within a habitat tank—as long as each is naturally found in the conditions replicated by the aquarium setup. The important features to consider are aquascaping/vegetative cover, strength of current, water depth, and isolation from predators.

Social roles

Various tetras and barbs can serve in various social functions within the community.

Dither: Very insecure fishes too frequently seek refuge, seldom showing themselves within the aquarium. One way to add a sense of security that relaxes the cautious species so that they no longer feel the need to always hide is to provide dither fishes—species that are not shy and that swim openly in the water, their nonchalant behavior showing tankmates that the habitat is safe. Many tetras and barbs play the dither roles well.

Target: Sometimes a pair or group of fish needs to feel a threat from outside so that they do not fight among themselves. Classically, this is seen in a pair of cichlids defending their spawn. The pair behaves as if they are on edge, and if they do not sense an external threat to focus against, they may turn on each other or on their progeny. So we provide a phantom threat. Robust characins, barbs, and danios are often chosen for this role. An effective technique is to deploy a small group or school. The aggressive fish will lash out at the dispersing group, and because the targets are fast swimmers, they are seldom harmed.