

Select Aquatics of Erie, CO.

## A Cleaner Approach to Tank Maintenance

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Fish die, and worse, our best intentions contribute to their demise far more often than they should. Simple practices that have proven themselves aren't followed, and old habits that kept a great tank of guppies going when we were younger are hard to give up. Fish rarely grow to their full size and color, and batches of young are not what they should be. After recently starting a fish breeding business selling wild livebearers, I have adopted an approach that allows for natural, planted and attractive tanks, with fish that are responding to the changes with great growth and increased reproduction.

The evolution of this fishroom (100+ tanks) has resulted in procedures that are actually easier, cheaper and quicker than the fishkeeping habits we've learned., and in some ways this approach is dramatically different. Maintaining fish this way becomes essential with some of the rare and vulnerable species we keep, by creating cleaner and more stable tanks where the fish aren't stressed.

Like most older fishkeepers, I'd used all of the toys available at one time or another- de-nitrifiers, ultraviolet sterilizers, and every type of filter- wet/dry, liquefying sand, canister, hang-on-the-back, sponge, box, etc., exploring every new technological twist. Most of this equipment did all it said it would do, while stimulating my interest in gadgets, making things, and possibly doing things better than had been done before. Adding a new layer of complexity was generally believed to be a good thing. But the time and money spent did not seem to carry over to how well the fish did. Batches of fry weren't what they should have been, and it was a big deal after months of effort to show off a few fish that had been bred in my tanks.

I have bred specialty livebearers for many years, always trying to produce numbers of many species that other hobbyists may have had trouble with, or that I continue to find challenging to breed out in any quantity. To breed them on a scale to sell, it was clear I would need to change the way I maintained, raised and bred these fish. The old methods of a gravel bottom/ sponge or undergravel filter simply did not keep the water quality as consistent as it needed to be. I also knew that the fish would not do well in open, bare bottom, "laboratory-style" tanks. Many wild species did best in natural settings where they felt secure and safe, hiding in the plants and shady areas.

My first focus was to achieve a consistent cleanliness in every tank, such that every tank could be maintained simply and easily, with full control over what went on within that tank environment, but not by my having to devote any more time than was already being spent. This is not easy to achieve given how tanks are generally set up, and past experience has been that some accepted methods and equipment do not always benefit the fish. A common type of filter discussed next makes the point. The practice of fishkeeping was first taught to hobbyists by retailers through the equipment sold when purchasing an aquarium. Aquariums began to commonly appear in homes with the invention of the undergravel filter in the mid-1950's. These "glass boxes of fish" were expected to be miniature, beautiful escapes, a perfectly lit slice of the wild where fish darted in and out of plants over a gravel bottom. The undergravel filter kept the mechanics of the tank's filtration relatively unseen, while both filtering and aerating the water.

It claimed to help the plants grow, and more importantly, kept you from having to handle dirty filter medium. In fact, many saw it as maintenance free except for the couple times a year the tank needed to be taken apart (often because the fish had started dying), the gravel was rinsed, and it was started all over again. Plants rarely did well, but the fish lived a reasonable amount of time, and with minimal maintenance it generally looked good. The type of environment the undergravel filter created was felt to be acceptable, and most fishkeepers kept tanks with little concern or awareness of the biological load that existed in their aquarium.

But all of the solid waste produced in the tank was simply sucked into the gravel, then stored until it deteriorated or was physically vacuumed away, a disruptive process for both the fish and the hobbyist. Undergravel filters are still sold routinely and used by many, including research and university settings because they are simple, considered low-maintenance and inexpensive. In an aquarium without an undergravel filter, the organic waste will still collect in the gravel, as well as on any other items in the aquarium. Tanks set up with gravel require regular maintenance to be kept clean, and you must allow for the occurrence of routine inconsistencies in water quality that follows the cleaning

schedule.

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Many of the livebearers we keep are from flowing streams or balanced, stable bodies of water. None of these fish thrive naturally in small, crowded, confined spaces with water quality that swings with weekly maintenance. In the 1960's the value of water changes became appreciated, but there is only so much that can be done with water changes alone to maintain a consistent level of water quality.

The most important factor when considering a tank environment is this: The fish in the tank are using their physical resources to the best of their ability, and must use those resources against the obstacles presented to them. When forced to fight opportunistic parasites and infections, low oxygen levels and pH swings that are routine when water quality is poor, they use energy that does not go into development quality may also encourage aggressiveness and conflicts between the fish that can cause injury and disease.

My goal became to create a consistent and stable natural environment in each tank where the biological load was always low, within my control, and not likely to accumulate. Live plants for security and shelter for adults and fry would be provided in a stress-free environment with plenty of aeration and some water movement to ensure continued water quality.

At the Xiphophorus stock center in Texas, all of their tanks are non-mechanically filtered through water changes, low stocking, mild aeration, live plants and a thin layer of gravel that extends across only half of the aquarium bottom (mostly 5 and 10 gallon tanks). The gravel is very thin, at about 1-3 particles high. This thin gravel layer provides adequate surface area for colonizing bacteria that effectively provides biological filtration, helping keep ammonia levels low, while not collecting or accumulating excess waste. If there is to be gravel in a tank, this is a perfect use for it in an aquarium. Some species may require a layer of gravel to spawn, or they dig into the gravel to hide, and then it is provided, but most fish do not miss it. For the fish's sense of security when gravel is not provided, it is best to paint or cover the outside bottom of the tank.

Gravel collects unseen waste that creates unhealthy conditions in any tank. The first signs of damage to the fish are often an incidence of fin-rot or fungal disease, warning that the pollution levels were able to compromise the fish's immune system. So I do not use any gravel in any of my tanks. With new arrivals accustomed to harder water I may spread a thin layer of calcium carbonate, gradually removing it over time, but that is the only instance where a substrate is used. Interestingly, the tanks also grow less algae and look cleaner, as there is less stray organic matter. Though there is no gravel I certainly wish to take full advantage of all that live plants have to offer. I use a wide variety of floating and anchored plants, such as Java fern, Java moss, riccia and water sprite. Driftwood and occasional rockwork is arranged for a natural appearance. I also use a wide variety of potted plants that can be moved and cleaned around easily. Various Amazon swords and Crypts are used, potted in peat covered with a layer of gravel. About once a year the plants are removed and the soil refreshed. I have found that soil will accumulate wastes over time that can cause sickness in a tank. I use a very inexpensive but effective plant fertilizer ([selectaquatics.com](http://selectaquatics.com)), and all of my tanks have healthy populations of plants.

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Ironically, plants grow far better in this type of environment. I used to assume, as many people do, that plants assimilate the waste within the tank. I have even been told by some that fertilizer isn't necessary if the tank is dirty enough! In fact, plants respond to water changes and clean conditions just as the fish do, and plants do far better in a clean environment with appropriate light and fertilizer. I have bolbitis ferns that are 3 feet across, and Amazon swords that nearly fill a 50 gallon aquarium. Java fern anchored to driftwood, combined with potted swords whose pots are surrounded by Java moss or fern provide perfect places for fry to hide in natural looking settings.

For filtration I use 4" in-the tank box filters with polyester floss and a few stones to weight them down, and change the floss monthly. Any type of filter will work, as long as the filtration is effective and fish waste is regularly removed. Though inexpensive and low maintenance, I also avoid using sponge filters, again because the waste generally stays in the aquarium. A fair amount of waste is removed from the box filters when they are cleaned- the boxes will often be nearly solidly brown, and though a tank with only a sponge filter may appear clean, that same amount of waste has had to go somewhere. The hobbyists may siphon up some of it, but the remainder must break down into the water to be removed through water changes. With a floss filter the majority of the waste is regularly removed, and I believe that water changes are then less disruptive because the water removed is not as dirty. However, sponge filters are excellent for fry tanks. The fry will feed upon the infusoria that collects on the sponge surface, and the filter does not harm them, so they are still used occasionally.

There must be moderate aeration with consistent, gentle water movement and moderate light on 10-12 hours per day to stimulate and maintain bacterial activity. Another benefit is that even though the tanks look as busy and full of plants and fish as any tank could, everything can be quickly and easily removed to net fish out, and then put back with

relatively little disturbance. Water changes of at least 20% a week are essential, and mulm that accumulates on the bottom must be removed at that time. Others may choose to leave mulm in some of their tanks, I do not. By siphoning up any mulm that accumulates, the tank stays relatively clean, and again, weekly water changes are less disruptive, creating a degree of water quality stability. The more frequent the water changes, the cleaner and more consistent the environment becomes, as long as the biological seasoning of the tank is not compromised. Because of the "openness" of the tank space environment, the feedings, both in frequency and amount, can be increased. Live foods can be fed more generously, as the remains can be easily seen and siphoned up afterward. Basic water quality comes down to the cleanliness of the filter and frequency of water changes, a benefit when trying to address and solve the occasional problem. However, with this system I simply have not had an outbreak of disease. Lastly, set up tanks so that each can be maintained and worked on easily, so that they all are convenient to access and each can receive equal care.

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This approach comes down to control over each variable in the process, keeping the maintenance simple and consistent to maintain exceptional water quality. Provide clean bare-bottom tanks with good filtration where the waste is regularly removed, and be sure that moderate aeration provides gentle water movement throughout the tank. Moderate light should be provided 10-12 hours a day, with the use of a good fertilizer to keep plants doing well. Use plants in pots or that float, or that can be anchored to driftwood or stone to landscape. Do regular water changes on at least a weekly basis, siphoning up any mulm that collects on the bottom.

The irony is that these changes make fishkeeping simpler, less messy, cheaper and easier, with healthier plants, healthier fish and a fresh, natural appearance. The fish grow to their potential, and babies appear with no other effort than to be collected and raised up. I no longer have my hands in smelly brown fish water as used to be the case so often in the past, because waste is no longer given the opportunity to accumulate, and that alone was worth making the change!

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