

Simple Questions

Dealing with pond plants and other considerations.

By Stephen M. Meyer

Q. I have two simple questions. First, can I grow all my emergent plants in ordinary gravel without soil? Second, is it really necessary to use a recirculating pump and biological filter in order to have a healthy pond?

When I planted my pond I followed my instincts and ignored local advice. My pond has the proportions of emergent, floating leaf and submergent zones you suggested in your series on natural ponds last year. The terrestrial zone includes prairie grasses that shade the pond from midday sun.

I grow miniature cattails, irises, sedges, pickerel weed and arrowhead in garden soil covered by gravel. In your article you mentioned that some emergent plants can be grown bare root or in inert substrate to limit nutrients entering the water, thereby controlling algae. Will this work with all my pond plants?

This past summer was my pond's second year. It was warmer this summer and my fish ate a lot. I fed my six bluegills 30 garden worms every day. They got quite large before they, their offspring, and three of my five koi died. I never found out what the cause of death was. The pond tested okay for nitrates and ammonia. Treating with Paracide Green did not stop the deaths. The demands of my pond's 2000-plus-gallon ecosystem must have been too large.

I have started to change 5 percent of the water every week. Do I really need to add a circulating pump and biological filter? I have learned a lot from your articles. How about writing a book?

A. I have reprinted most of your letter because I believe you have touched on a number of important points that all pondkeepers should review at this time of year. First, congratulations on your planting scheme. I am sure it is both beautiful to look at and fascinating to watch develop.

Some aquatic plants, such as yellow iris, are quite good at removing nutrients from the water directly. They do not seem to mind being in inert substrates. In fact, they grow and flower prolifically this way. I suspect that pickerel weed, cattails and arrowhead may grow well this way also, but I have not experimented with them myself.

Other plants, such as water lilies, however, will never grow properly sitting in gravel alone (at least, not in my experience). This difference may be related to fine root structures. Some plants may not be able to develop the fine root systems needed for nutrient absorption if they are merely sitting in water.

My suggestion at this point is that if your plants are doing well, leave them alone. Should you decide to add more plants later, you can try some bare root and some in gravel and then compare the results.

Ideally, to maximize natural plant growth, you would want to have an open substrate (at the appropriate depth) covering the bottom of the pond, rather than planting in containers. This allows development of crucial horizontal roots that weave just under the substrate surface, enabling the plant to draw nutrients from the top layer of the substrate and the water. (Of course, bare-root plants consider your entire pond their container.)

A less radical strategy is to place all pond plants in very wide containers — each several feet in diameter. You could, for example, purchase several fiberglass pond forms and place them in your pond. Surround them with stone for support and fill them with soil, or gravel. These now become natural planting islands.

Now, on to the unfortunate deaths of your fish. The parasite medication you gave your fish failed to help them because they did not die from parasites. I know of no instance of an ornamental pond being rapidly wiped out by parasites, even when left untreated. Months, yes; weeks, or days, no.

Your fish almost certainly died of either nitrite poisoning, insufficient oxygen, or both. If your pond had negligible ammonia and nitrate readings, then you may well have had very high nitrite levels. Nitrite is very toxic to fish. Bacteria living in the pond convert ammonia to nitrite. When the system is balanced, other bacteria convert nitrite to nitrate, which is safe for fish. But in the spring and early summer, this second chemical transformation lags behind the first by weeks or months in ponds. Consequently, nitrite accumulates, while ammonia and nitrate are barely measurable. A sign of nitrite poisoning is

lethargy. Rapid breathing and "piping" (sucking air) at the surface are also warning indicators.

Alternatively, the fact that you lack any circulation in your pond at all suggests that an oxygen deficiency is equally as likely. When the weather is warm and the air is still, dissolved oxygen levels in ornamental ponds can drop very rapidly <197> especially at night. This is because algae in water switch from photosynthesis to respiration in the darkness. Thus, at night there are fish, bacteria and plants removing oxygen from the water. The signs of low oxygen levels are the same as those for nitrite poisoning.

Then, again, it could have been the two together. Nitrite is especially toxic under low oxygen conditions. This is because when it enters the fish's bloodstream it hinders oxygen uptake. If the amount of available oxygen in the water is already low, the effects of nitrite poisoning are far more deadly.

Test kits for nitrite and dissolved oxygen are inexpensive and readily available. Nitrite tests should be done every other day in the spring until it is clear the nitrification is balanced. Oxygen tests should be done after midnight and before dawn. This is particularly important in ponds with significant amounts of algae of any kind.

I want to emphasize that springtime is an especially dangerous time of year for pond fish. The fish, the pond, other critters in the pond (including parasites) and the near-pond environment are all undergoing rapid seasonal changes. Daily observation of your fish and pond water characteristics are crucial to good fish health.

Lastly, thanks for the kind words. An AFI pond book might appear some day.