

Digging a Fish Pond

Does digging by hand limit the size of the pond?

By Stephen M. Meyer

Q. My father and I are thinking about setting up a pond. It will be about 15 feet long, 9 feet wide and 3 feet deep. Can we dig this pond by hand? Renting a backhoe is very expensive. Also, can we find pond liners this large? Thanks, I find your magazine very helpful.

A. Well, I don't know if your father is going to like this answer, but yes you certainly can dig out this pond by hand. In fact, all four of my ponds were dug by hand. It takes time and patience — this kind of task is not a weekend project. It may take a month or more to get the hole the way you want it. Here in New England we often have to pry through large stone boulders.

I estimate that your planned pond should hold about 2000 to 2500 gallons depending on the shape. This is a good stable pond size. The 3-foot depth will make it very attractive for koi and goldfish.

You should have no problem finding a liner for your pond. The rule of thumb for estimating liner size is to add double the depth to the length and the width, and then add another 2 feet to each dimension. So you will need a liner that is 23 feet long (15+6+2) and 17 feet wide (9+6+2). Because I am a very cautious guy, I often add yet another foot to the final size, which would make your liner 24 feet by 18 feet.

Depending on your choice of material, the liner may cost between \$150 and \$500. The Permalon multi-ply liners sold by Reef Industries (Houston, TX) may last a decade or more and are priced at the lower end of the scale. These are very strong and easy to work with. Three of my four ponds use these liners.

PVC liners, such as those sold by Tetra, are also intended to last about 10 years and are priced in the middle of the scale. I have used these extensively and always with good results.

The new fish-grade EPDM liners are priced at the higher end. They are alleged to last 20 years, though this is a theoretical lifetime. Nevertheless, they are incredibly strong. Even at \$500 for 10 years the cost is an insignificant \$50 per year. You will certainly spend more on fish food alone.

I suggest you take a look at the three books I mention in the reply to the final letter. Tetra also puts out a handy little booklet — *Digest for a Successful Pond (ADI 52)* — that you can pick up at your local aquarium store. Good luck digging.

Golden Advice

Q. I have decided to try keeping goldfish again, and have purchased a 45-gallon tall tank. I have three medium fantails, one medium oranda, a small telescope eye and a small lionhead. The total "fish inches" is about 14, not including tail fins.

I have a number of questions. First, several books on goldfish claim that pH is really not important — is this true (my pH is 7.5)? Second, I leave the aquarium lights on about 14 hours a day. Will this stress the fish? Third, is the rule of thumb of 1 gallon of water per 1 inch of fish a good rule to follow? Fourth, what is the average life span of a lionhead or oranda? Finally, I would like to correspond with people who are successfully keeping fancy goldfish — any suggestions?

A. Dear Susan, pH is as much a factor in raising goldfish as it is for any other type of fish. Goldfish, as is true for many fish species, can adapt to a range of pH values, given time. In general, healthy goldfish can be reared in waters with a pH from 6.8 to 7.8. Goldfish certainly survive outside this range, but that is not the same as thriving. For example, a fantail may hang on for many months in water with a pH of 5.9, but in that period it will show signs of stress (e.g., blood-streaked fins) and it will soon die. Your pH is fine.

There really is no reason you should keep the aquarium lights on 14 hours a day. And yes, continuous overlighting can alter your fish's behavior. Photoperiods (the length of time the light is on) definitely affect goldfish breeding behavior and metabolism. And, to the extent that the lighting produces physiological and metabolic symptoms of stress, it may even affect immune system reactions.

I would reduce the lighting duration to 10 hours a day in the summer and seven to eight hours a day in the winter. If you

gradually increase the photoperiod in the spring it should help to bring your fish into breeding condition. If the tank is in a bright room already, there is no reason to have the tank lights on at all as far as the fish are concerned.

Does the 1 gallon of water per inch of fish make sense to you? Can you fit a 45-inch fish in that 45-gallon tank? How about one 23-inch fish and one 22-inch fish? And, if you could, how long do you think they would survive? This terrible rule — which can be found in many books — has been around a long time, and is best forgotten. Even the rule of 1 inch of goldfish per 24 square inches of tank surface area is of limited value, although it is still better than the first guideline.

The reason these rules are not reliable is because one 2-inch fish is not equivalent to two 1-inch fish. A single 2-inch goldfish will produce wastes equivalent to six to eight 1-inch goldfish. It will also need the amount of oxygen normally consumed by six to eight 1-inch goldfish. Thus a 10-gallon tank that might seem to hold two 1-inch fish comfortably will not be a good home for a 2-inch fish.

My rule is one goldfish of any size per 30 gallons of water in a well-filtered, well-aerated tank. Period! In my opinion, any other rule is just an excuse to overstock the tank. As you can tell, I think you have far too many fish in that tank. Consider that out in the wild, where water quality is infinitely better than in your tank, you would find the equivalent of one medium-sized goldfish in 500 gallons of water.

The average life span of a lionhead or oranda in a nice garden pond should be about 20 years or more. In an indoor tank it is probably around 10 years. In reality, most fancy goldfish don't last more than two years due to poor tank management.

Get in touch with the Goldfish Society of America (GFSA, P.O. Box 851282, Richardson, TX 75085). There are more than 750 goldfish enthusiasts waiting to correspond with you — and many live in Florida. (Also, try visiting the Community area of our Fish Web site. There you will find several message boards that will provide you the opportunity to correspond with other fishkeepers. — Ed.)

A Reading List

Q. I am building a new home this spring and would also like to build a garden pond for goldfish. I've been to several landscaping companies and everyone seems to think that their method of pond building and maintenance is best. Please help me.

I would like a list of sources for information, designs, plants, etc. I'd like to read about ponds before spring and make my plans so that I will be ready. My goal is to build the pond myself, but I cannot even seem to get a clear idea of what the best materials are, or how deep to make the pond. Any information you could give me would be greatly appreciated.

A. Joy, the options for building a garden pond are almost endless. So many variables come into play in making these decisions — yard layout, money available, your purpose in building the pond — just to name a few.

My general recommendation to anyone who is contemplating a "first" pond is to build a liner pond, not a cement pond. Almost without exception, pondkeepers find something they would like to change in their initial pond design within a year or two after it is built. Liner ponds let you make any change effortlessly and at a modest cost. In fact, I am still altering my ponds after 10 years.

You may find that what you originally thought would be a massive pond actually looks quite small when it is finished. Doubling and tripling the size of a first pond is a very common experience, or you may wish you had built a waterfall. In any case, your first pond should hold at least 1000 gallons and be 18 to 24 inches deep.

My second general recommendation is to think in terms of a heavily planted garden pond, rather than a fish-filled koi pond. The former requires no filtration — perhaps just a small pump for circulation and aeration. You can certainly undertake this project yourself, or hire a landscaper to dig the hole (the hard part).

A koi pond, however, would require substantial filtration and maintenance. Considerable more thought, effort and expense is involved in building a good-quality koi pond. For a first-time pondkeeper this is more trouble than it is worth, and may actually drive you out of the hobby.

You will find lots of useful information and ideas in the following books. Check your local bookstore or library. Still the best in my view is *Water Gardening* by Peter McHoy (Blanford Press), although this may be out of print. Two other first-rate books are *Ponds and Water Gardens* by Bill Heritage (Blanford Press) and *The Water Garden* by Anthony Paul and Yvonne Rees (Penguin Books).