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Building a Koi Pond Veggie Waterfall Filter by [David Hopes](#)

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Keeping the koi pond water quality good with a heavy fish load can become expensive using large biological and mechanical filtration and UV sterilization. Many people that build a koi pond will have to upgrade their filter systems as they add more koi and the koi grow larger. When they first built their pond, they did all the right things to make the koi pond function properly. They included a skimmer to catch leaves and other debris and a waterfall filter for extra biological filtration and adding oxygen to the water. A bottom drain may have been installed to keep sludge from building up on the bottom of the pond. There may be plants included for a more natural look. When the koi are small, the water quality is great and the water is crystal clear. But as the pond matures, more koi are added, and the koi grow larger the water quality begins to suffer. The solution is to add more filtration.

A veggie filter is the simple use of shallow water plants to filter the water. The plants will naturally remove ammonias and nitrates from the water while adding beauty to the koi pond. The best plant to use in a veggie filter is the yellow flag water iris. This plant will not go completely dormant in the winter and continues filtering year round. The roots will extend up to 12 inches in the water column and can be planted on a grate with 1 - 2 inch openings. This plant is restricted in some states and other hardy water iris can be substituted. A plastic milk crate turned upside down will serve as a structure to plant the water iris allowing the roots to hang down in the water column. Before building the veggie filter, it is best to purchase the plastic milk crates. Milk crates come in different sizes and we need the dimensions of the milk crates before building the veggie filter. For this example we will be using 4 milk crates for the veggie filter. Once purchased, lay the milk crates side by side and measure the total width and length and height. Add 3 inches to the length and width and 4 inches to the depth from the water line. The water line will be the spillway for the veggie filter. The sides should be 4 inches above the spillway. If there is a waterfall filter, it will be removed and the veggie filter will take its place. Allow 8 - 12 inches between the filter and the waterline edge of the existing liner. Now it is time to dig a hole to the dimensions that have been determined with squared edges. Once the hole is dug, dig a trench to install a bottom drain. We will be using a 2 inch bottom drain by United Aquatics that easily connects to the liner. Install the bottom drain and pvc pipe and add a ball valve for draining the sludge that will build up on the bottom. This will be the only maintenance that will have to be performed on this filter except for cutting back the foliage of the plant in the fall. Install the liner allowing for a 1 foot overlap around the edges. Seam the liner to the existing liner using liner seam tape. Installed the liner to the bottom drain and install a flanged connector for the water inlet. Install the milk crates and the spillway rock. Flagstone can be used for the spillway and should be at least 16 inches wide. Use black waterfall foam sealer to fill the voids between the rock and liner. Start the pump and check for leaks before back filling the bottom drain and inlet pipe. The only thing left is planting the water iris. Place the water iris on the milk crate and cover the roots with gravel or rocks larger than the openings in the milk crate to hold the plants in place.

The veggie filter will become a robust filter in a short time. The more plants planted in the beginning will increase the filtration faster. Remove any dead leaves and cut back to about 6 inches in the fall to keep the dead leaves from decaying in the water. This type of filter is inexpensive, easy to maintain, and adds beauty to the pond.

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