

	Aphids	Spider Mites	White Fly	Beetles	Leaf Rollers	China Mark Moth	Muck Midge	Lily Leaf Spot	Snails	Tadpoles	Mosquito	Ostracods	Leeches	Anchor Worm, Gill Flukes, Fish Lice
* ~~~ Aphid X Repellent	X		X	X	X	?	?				?		X	
* ~~~ Blade Runner	X	X	X	X	X				X					
* ~~~ Dylox (Trichloracide)									X		X	X	X	X
* ~~~ Herbal Aphid Control	X													
* ~~~ Manual Removal					X	X	X	X	X	X				
* ~~~ Mosquito Dunks/Bits (BTI)							X				X			
* ~~~ Pre-Strike											X			
* ~~~ Gambusia	may be prohibited in some states										X	X		
* ~~~ Lacewings	X	X	X	X	X	?								
* ~~~ Lady Bugs (Lady Beetles)	X	X		X	X	?								
* ~~~ Paradise Fish											X	X		
* ~~~ Parasitizing Wasps	X			X										
* ~~~ Worm Castings			X											

~~~ Approved for use in water.

\* Consumer friendly

**It is the responsibility of each individual to apply products only in the manner intended. Read and follow the entire directions for use, general information and conditions of sale before using any product.**

|       |                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-------|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| * ~~~ | Aphid X Repellent         | Apply to plants in Spring & Summer once a week to keep Aphids, Beetles, Caterpillars, Whiteflies, Mites, Leaf Rollers, Mealybugs and a variety of other pests from invading plants. Make sure to liberally cover plants for best results. It becomes odorless shortly after application. Repels up to 7 days. Safe for aquatic and terrestrial plants.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| * ~~~ | Blade Runner              | Created by nature 30 million years ago, Blade Runner is composed of tiny silica shells that cut insects. It is extremely safe for fish plants, humans and animals. Effective against most soft-bodied insects such as aphids, caterpillars, mites, slugs, silverfish, cockroaches, beetles, etc. Apply evenly as a dust or mix approximately 3 oz. Of Blade Runner with approx. 32 oz. Of water including 3 or 4 oz. Of vegetable oil to act as a spreader sticker. Manufactured by Clear Pond.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| * ~~~ | Dylox (Trichloracide)     | Trichlorfon is the active ingredient for the product most recognized as Dylox. It is marketed under several trade names including Trichloracide. It was removed from the ornamental fish market many years ago but has recently been allowed for use again. Highly toxic to invertebrates. After treatment perform a 50% water change and wait 72 hours before re-introducing invertebrates to the environment.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| * ~~~ | Herbal Aphid Control      | Extremely effective for the treatment of Aphids. A contact killer so it is important to spray all the effected surfaces. Rinse plants after use to wash off residue and Aphids. A few plants like Taro and Water Lettuce do not tolerate it well and will show some foliage burn.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| *     | Manual Removal            | A highly underrated option. Often in small spaces, manual removal of effected foliage, pests or disease is adequate for control. Make certain to place insects or foliage in a sealed container away from the pond or holding areas.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| * ~~~ | Mosquito Dunks/Bits (BTI) | <i>Bacillus thuringiensis</i> subspecies <i>israelensis</i> - BTI is the active ingredient in in both Mosquito Dunks and Mosquito Bits. BTI is not effective against China Mark Moth. It is effective against a fly larvae commonly referred to as the Muck Midge. It is a tiny worm, clear in color to whitish and approximately ¼ in length and about the diameter of a straight pin. It chews a distinct random pattern on the leaves of Water Lilies (Nymphaea). The larvae hide themselves in a sheath of tissue at one end of the random line of destruction and make difficult to find. Most of the damage occurs in late summer and early fall. A heavy infestation can easily defoliate lilies in a short amount of time and severely weaken the plants if left untreated. The Mosquito Dunks are a better preventative treatment, but if an infestation occurs we find the Mosquito Bits are better for the quick kill. These naturally occurring bacteria will not harm anything else in the pond except mosquito larvae. Not a bad side effect. For large nurseries BTI can be purchased from Summit Chemical under the brand name of Aquabac in 40-pound bags. |
| * ~~~ | Pre-Strike                | Pre-Strike kills developing mosquitoes before they become breeding, biting adults. It is easy to use in areas where mosquitoes may breed. Nothing to mix or spray. Pre-Strike will not adversely affect humans, animals, fish or vegetation. Available as granules (21 day control) or the Mosquito Torpedo (60 day control). PreStrike larvicide is ideal for backyard use in birdbaths, water gardens, ornamental fountains and for farm use in animal water troughs. It contains S-methoprene insect growth regulator.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| * ~~~ | Gambusia                  | These hungry little fish are often referred to as Mosquito Fish. They are said to consume between 100 and 300 mosquito larvae per day. They are livebearers and the mature size is between 1 and 3 inches. Gambusia can out compete native species of minnows and are noted to be blamed for California's declining amphibian populations. Note: some websites reference that California offers them free to interested parties for the control of mosquito larvae in old swimming pools and areas of standing water that are not adjacent to natural habitats. Since small fish can be transferred by unsuspecting boaters, birds, etc. the Gambusia fish has become quite controversial. Although I could not find any definitive information Gambusia may be prohibited in some states. They require a permit for release in other states and should never be released in natural habitats. Originally native to the eastern United States they tolerate a broad range of extreme temperatures and have prospered throughout most of the country.                                                                                                                        |

|                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| * ~~~ Lacewings                              | Attacks several species of aphids, spider mites (especially red mites), thrips, whiteflies, eggs of leaf hoppers, moths and leaf miners. Small caterpillars, beetle larvae and the tobacco budworm. They are considered an important predator of long-tailed mealybug in greenhouses and interior plantscapes. The larvae are sometimes called aphid lions, and have been reported to eat between 100 and 600 aphids each. Appears to have some natural tolerance to several chemical insecticides although there may be considerable variation. Each adult female may deposit 200-300 eggs and they have 3 or more life cycles per season.                                                                                       |
| * ~~~ Lady Bugs (Lady Beetles)               | Most lady beetles found on crops in gardens are aphid predators. If aphids are scarce, lady beetle and larvae may feed on the eggs of moths and beetles, and mites, thrips, and other small insects, as well as pollen and nectar. Female lady beetles may lay from 20 to more than 1,000 eggs over a one to three month period. Lady beetles are voracious feeders and may be numerous where prey are plentiful and broad-spectrum insecticide use is limited. The convergent lady beetle may eat its weight in aphids every day as a larva and consume as many as 50 aphids per day as an adult. Sevenspotted lady beetle adults may consume several hundred aphids per day and each larvae eats 200 to 300 aphids as it grows. |
| * ~~~ Paradise Fish (Macropodus opercularis) | These small but colorful tropical fish (zone 9) are effective control against Ostracods and mosquitoes. Adults consume between 3 and 4 hundred mosquito larvae per day. Non-native (origin - Eastern Asia) and should never be released into natural habitats.                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| * ~~~ Parasitizing Wasps                     | Different species of Wasps are known to be effective against aphids, moth larvae and corn borers. Most effort to date has been directed against the European corn borer. Only two pests are known to be attacked under field conditions but in laboratory studies, 13 species of Lepidoptera were parasitized. They produce between 20 and 80 progeny. Adult wasps are at great risk from insecticide applications and most will be killed by applications of broad-spectrum materials.                                                                                                                                                                                                                                           |
| * ~~~ Worm Castings                          | According to some sources earthworm castings are an effective control against whitefly. I learned this from Anita Nelson from Nelson's Water Gardens. We have experimented using the recommended 1-2 tablespoons sprinkled on the top of the container with excellent success. No published studies have been released. It only appears to be effective on plants that are not submerged in a larger body of water.                                                                                                                                                                                                                                                                                                               |

~~~ Approved for use in water.

* Consumer friendly

www.nyaes.cornell.edu/ent/biocontrol

Provided most of the information on Lacewings, Lady Bugs & Parasitizing Wasps.

Sources

www.clearpond.com Blade Runner

www.organiccontrol.com Beneficial Insects & Earthworm Castings

www.aquariumpharm.com Herbal Aphid Control (discontinued - contact Aquarium Pharmaceuticals and inquire if they will place it back on the market)

www.winstoncompany.com

www.defenders.co.uk/sundries.htm Housing for Beneficials

| | |
|--------------------------------------|---|
| Aphids | Small soft-bodied insects. They prefer new growth over more hardened foliage, stems or branches. Often the damage from the little sap sucking insects will cause the foliage to deform. Contact insecticides may not be effective on deformed foliage. Aphids may be black, green, brown, orange, red or yellow. |
| Spider Mites | Spider mites pierce individual plants cells to extract the contents. The damage is most noticeable once the infestation is out of control. The foliage will most often appear gray or dusty, especially when the population is high enough that the spider mites begin to form heavy webbing. Greenhouse populations can often be controlled by cutting back the effected foliage and moving the plants outside where natural enemies and rainfall deter their proliferation. |
| White Fly | Found on the undersides of leaves on most crops making them difficult to control. They fly up in mass when the plants are disturbed. Adults fly freely from plant to plant allowing infestations to grow rapidly. Entire leaf surfaces become quickly covered with the nymphs. |
| Beetles | Flea Beetles and Japanese Beetles are the most destructive in the water garden environment. Most injurious to plants while in the adult stage. Foliage damage is primarily very unsightly but does not usually lead to the death of the plant. |
| Leaf Rollers | Most common on Cannas and frequently found on Lotus when in close proximity to Corn fields. Obvious on cannas due to the threads used to keep the leaves from unfurling. Easily controlled by hand when populations are minor. |
| China Mark Moth | Also known as Sandwich Man because of way it conceals itself between two pieces of chewed off leaf bits. Overwinter as larvae hooked on to old stems. They let go, pupate and two weeks later eggs are laid. It is critical to kill young larvae from the first hatch before they lay eggs. Future outbreaks will be significantly reduced if the first hatch is treated successfully. |
| Muck Midge | A fly larvae that originates in the bottom silt or muck in the bottom of the pond. The tiny almost hair-like larvae surfaces to feed on the foliage of water lilies and related plants. It is most recognizable by the narrow random lines it chews through the leaf surface. The larvae itself is difficult to see and is hidden in a casing of leaf debris. |
| Lily Leaf Spot | Starts as red or brown spots on lily leaf surfaces. Progresses to include a yellow rings around the initial spots. Ultimately spreads to surrounding leaves and can defoliate the plant if left untreated. Manual removal of all effected foliage can generally deter the spread. Usually occurs in spring during very rainy periods and in the summer during high humidity. |
| Snails | Most snails do not reach population levels that are devastating to plants. The Golden Pond Snail and Apple Snails can, in the absence of predators, destroy water lily foliage very quickly. Snail damage commonly leaves behind the main vein structure of the leaf. |
| Tadpoles | Although tadpoles do not usually represent a problem, if population levels are out of control they can be quite destructive. Toads are the most likely candidates to lay enough eggs to cause damage. Egg removal is the easiest way to deter population explosions. |
| Mosquito | Mosquito larvae are not damaging to plants but included because of the ease of control. |
| Ostracods | Microscopic crustaceans like lobsters or crabs. Most do not exceed 4 mm. They exist in most aquatic and semi-aquatic environments in both fresh and salt water. When present in large numbers they have a tremendous appetite for tropical night blooming water lilies. Often the damage from Ostracods is mistaken for damage done by snails or tadpoles. They will skeletonize the foliage. |
| Leeches | Nasty little bloodsuckers, need I say more. |
| Anchor Worm, Gill Flukes & Fish Lice | None are damaging to plant material but are easily controlled by some products listed. |