# Elodea

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*Elodea (canadensis* and *densa)* is also known as a waterweed and is a common plant in home aquariums. It is a perennial plant which grows completely submersed in the water. The leaf is veinless, averaging about one-sixteenth of an inch in width and approximately three-eighths to one inch in length. The leaf margins have microscopic teeth which cannot be seen without the aid of a hand lens and are attached to the stem in a whorled arrangement. While elodea is normally a rooted aquatic plant, large masses of these plants often break loose and float on the water surface, remaining alive for long periods. Male and female flowers may be produced on different plants or both may be present on the same plant. Usually, plants with female flowers have the leaves crowded toward the tips of the stems, while those with male flowers have comparatively few leaves. Male flowers break loose or grow to the surface to shed their pollen. Female flowers grow to the surface after fertilization and produce up to five spindle-shaped seeds. This plant is most prolific and can become an impenetrable mat, particularly along the shore line. Elodea infestations create the greatest problems in shallow water. Tremendous problems in Dade County are found in 15-20 ft of water, and it has been found in 47 ft attached to the bottom.

It is not the purpose of this paper to make an definite recommendations for the control of elodea, but merely to point out what work has been done and which chemicals and methods are the most effective in its control. The term "control of aquatic weeds" has been bandied about until one wonders just what is meant by control. Usually, the term control appears to mean the current removal of the existing crop of weeds from a body of water. A cautious hope is expressed that the removal of this crop of weeds will be followed by a reduction in the standing crop in succeeding years and that control will eventually extend over a considerable period of time. More often, however, the opposite appears to be the case. Mechanical control is still being attempted in many locations. A graphic example is Citrus County, Florida(1). The growth of elodea had become such a problem in the summer of 1963, that the county commission purchased an underwater mower. During the spring and summer of 1964 mowing was almost a continuous operation due to the phenomenal growth. Some die-back occurred during the winter of 1964 but regrowth in the spring was rapid, extending over even greater areas than before. The use of underwater cutting bars, aquatic weed harvesters, tractors and chains or cables to drag the vegetation from the water, draglines or the simple pulling of weeds by hand is not practical. Mechanical operations, generally, are expensive and only reduce the weed crop for a relatively short period of time.

Several chemicals have been tested as possible eradicators of elodea. Ware(3) used copper slphate as a method of partial control. Copper sulphate crystals were applied to two test plots, one acre in area, approximately five feet in depth. A third plot was treated with Diquat. Plot number one was treated with fifty pounds of copper sulphate per surface acre. Within twenty days, 75 percent of the plants were eliminated, the remaining 25 percent appeared to be green and quite healthy. Approximately 50 percent of the original density had regrown ninety days after treatment. Test plot number two was treated with 100 pounds of copper sulphate. All of the elodea appeared to be decomposing ten days after treatment. Healthy chlorophyll-bearing plants were no longer present. Elodea was not present in the test plot and there was no indication of regrowth on the 90 day inspection. Test plot number three was treated with two gallons per acre of Diquat. The Diquat was mixed with twenty gallons of water and sprayed over the water surface. Approximately 75 percent of the elodea was decomposing at the surface ten days after treatment. However, only the plants at the surface appeared to be affected, as plants collected six inches below the surface of the water appeared to be green and healthy. Twenty days after treatment approximately 40 percent of the plants at the surface had been eliminated but the elodea occurring one foot below the surface was green and healthy. Some regrowth of the elodea was found 90 days after treatment. It was estimated that approximately 30 percent control was obtained. Based on these findings, it can be assumed that copper sulphate at 100 pounds per surface acre is an acceptable method of partial control of elodea.

Phillippy's test(2) with sulfuric acid in the head water of Crystal River are not conclusive and additional testing must be completed before the use of this acid as a control for elodea can be recommended. Phillippy stated, "the use of sulphuric acid as a herbicide for control of submersed aquatic vegetation may be limited to water areas similar to the conditions in Crystal River. Neutralization and dilution by the waters of the many springs, tidal effects, and extensive deposits of calcium carbonate combine to contain the action of the acid within an area in proportion to the magnitude of the problem. Its use in static water situations such as lakes, ponds, reservoirs, and canals with deep cut gliding channels may create more problems than it solves."

Extensive work with acrolein has been accomplished successfully in Florida by trained applicators, licensed under Southern Mill Creek Products—the sole distributor of this chemical. All of the common submersed aquatic weed species and algae appear to be susceptible. Floating forms, such as water hyacinth, water lettuce, water primrose and water cress can be controlled by the use of higher dosages. Emergent species such as cattails and tules are not affected. Although acrolein is a highly reactive chemical, submersed weed control can be safely and effectively obtained. The available application equipment permits the introduction of acrolein with a minimum of handling. Acrolein is a general-cell toxicant which reacts with various vital enzyme systems. The dead plant tissues gradually disintegrate and sink to the bottom. In warm water (80 degrees F) the effect on the

weeds can be seen within minutes, noting the cessation of oxygen evolution. Microscopic examination shows that the interior of the cells are completely destroyed before the plant collapses. This collapse takes place in a matter of hours in warm water. In cool water, the effect may not be apparent for one or more days. The weeds disintegrate slowly and disappear over a period of three or four days to two weeks, depending on the temperature. All properly applied treatments with acrolein at rates of 4 to 9 ppm have been successsful.

## LITERATURE CITED


1 Blanchard, Jay L. 1966. Aquatic weed harvester operational report. SWC Proc. 19:477-480.

2 Phillippy, C. L. 1966. Some observations on the use of concentrated sulfuric acid for control of elodea. SWC Proc. 19:480-491.

3 Ware, F. J. 1966. The use of copper sulphate as a method of partial control of elodea (*Elodea Densa*) in Lake Thonotosassa, Flirida. SWC Proc. 19:491-495.