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Efficacy of Herbicide Active Ingredients Against Aquatic Weeds[1]

K. Langeland, M. Netherland, and W. Haller[2]

Only those herbicide products that are registered for application directly to water by the U.S. Environmental Protection Agency (EPA) and the Florida Department of Agriculture and Consumer Services (FDACS) may be used in Florida to control weeds growing in water. Active ingredients that are contained in aquatic herbicide products may also be present in products that are not approved for aquatic uses. However, it is not legal to apply an herbicide directly to water unless the herbicide label has specific instructions for application to water. Label instructions for aquatic use may restrict the use of water for a given period of time for various purposes, including, for some examples, irrigation and mixing agricultural sprays, domestic use, recreational use, watering livestock, or consuming fish from treated water.

It is legal to use a herbicide for attempting to control a plant species that is not listed on the label as long as the product is labeled for the site. A permit from the Florida Department of Environmental Protection is required for control of weeds in public waters and waters with multiple ownership.

Table 1 is a quick reference to the effectiveness of herbicide active ingredients for controlling common aquatic weeds. Sensitivity of the target weed to the active ingredient is only one consideration in choosing the appropriate herbicide product. Other factors that may be important in such a decision include water uses, other plant species present, toxicity to fish and other organisms, and additives in individual products. These considerations, as well as other important aspects of aquatic weed control, are discussed more fully in other publications. *Aquatic Pest Control Applicator Training Manual* is available from the IFAS Extension Book Store (800/226-1764, http://IFASbooks.ufl.edu). Weed Control in Florida Ponds, EDIS Circular 707, is available at the following Web site: http://edis.ifas.ufl.edu/AA238.

Specific product information should be obtained by consulting the product labels; label instructions must be followed for any lawful herbicide application.

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2. Ken Langeland, professor, Agronomy Department, Center for Aquatic and Invasive Plants; Michael Netherland, courtesy associate professor, Center for Aquatic and Invasive Plants, and William Haller, professor, Agronomy Department, and acting program director, Center for Aquatic and Invasive Plants, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, FL.

Anyone who applies herbicides commercially or for a public agency should be licensed as a Restricted Use Pesticide (RUP) applicator. Information pertaining to RUP applicator training and licensing can be obtained from your County Cooperative Extension Service office. It is recommended that private pond owners employ a reputable aquatic-plant-management company to maintain their pond(s). Individuals who choose to apply herbicides to their own ponds should attain a basic understanding of herbicide application and ecology through RUP certification training. (For more on this topic, see EDIS publication PI26, *Licensing of Aquatic Herbicide Applicators in Florida*, http://edis.ifas.ufl.edu/PI011.)

Some herbicide active ingredients are available in only one or a limited number of products, which are registered for aquatic use. Other such active ingredients are available in many different products. Some of these products are identical while others may differ in additives that can affect the performance of the active ingredient. Representatives for herbicide manufacturers and distributors can provide information on different products. Additionally, FDACS, Division of Agricultural Environmental Services (850/847-2130) maintains a list with reference to the active ingredients of all pesticide products registered for use in Florida (http://flpesticide.us). Specimen product labels can be obtained from the Crop Data Management Systems, Inc (http://www.cdms.net/manuf/manuf.asp) or from manufacturer representatives or their Web sites.

Table 1. Effectiveness of Herbicide Active Ingredients for Aquatic Weed Control

	Endothall		Diquat	2,4-D		Copper[1]	Fluridone[2]	Glyphosate	Imazapyr	Triclopyr	Carfentrazone	Penoxsulam[2]	Imazamox	Hydrogen peroxide
	Aquathol	Hydrothol		Granular	Liquid									
FLOATING														
Duckweed	*[2]	*	G	*	F	*	E	*	*	*	*	E	*	*
Watermeal	*	*	*	*	*	*	F	*	*	*	F	G	*	*
Water fern	*	*	E	*	*	*	E	*	*	*	E	E	*	*
Mosquito fern	*	*	E	*	*	*	E	*	*	*	E	E	*	*
Water hyacinth	*	*	E	*	E	F	*	G	E	E	F	E	E	*
Water lettuce	*	*	E	*	*	F	*	F	E	*	E	E	G	*
Frog's bit	*	*	E	*	*	*	*	*	E	F	*	E	E	*
Alligatorweed	*	*	*	*	F	*	*	G	E	G	*	F	E	*
SUBMERSED														
Bladderwort	F	F	G	F	*	*	G	*	*	*	*	F	*	*
Brazilian elodea	*	*	E	*	*	E	G	*	*	*	*	G	*	*
Coontail	E	E	E	G	*	*	E	*	*	F	*	*	*	*
Hydrilla	E	E	E	*	*	G	E	*	*	*	*	E	G	*
Parrotsfeather	E	E	G	F	*	*	F	*	*	G	*	G	F	*
Pondweed	E	E	G	*	*	G	F[4]	*	*	*	*	E[4]	G	*
Slender naiad	E	E	E	*	*	G	E	*	*	*	*	F	*	*
Southern naiad	G	G	E	*	*	G	G	*	*	*	*	E	*	*
Proliferating spikerush	*	*	*	*	*	*	F	*	*	*	*	F	*	*
Variable leaf milfoil	G	G	G	E	*	*	G	*	*	E	*	G	G	*
EMERSED														
American lotus	*	*	*	G	*	*	*	G	G	E	*	*	E	*
Cattail	*	*	G	*	*	*	F	E	E	*	*	*	E	*
Fragrant waterlily	*	*	*	E	*	*	G	E	E	G	*	F	E	*
Soft rush	*	*	*	F	F	*	*	G	E	*	*	*	*	*
Spadderdock	*	*	*	E	F	*	G	E	E	F	*	F	E	*
Water pennywort	*	*	F	G	G	*	*	E	E	G	*	E	E	*
Torpedograss[4]	*	*	*	*	*	*	*	E	E	*	*	*	*	*
ALGAE														
Macrophytic	*	F	F	*	*	F	*	*	*	*	*	*	*	*
Filamentous	*	G	G	*	*	G	*	*	*	*	*	*	*	*
Planktonic	*	*	*	*	*	G	*	*	*	*	*	*	*	G

[1] Copper can be applied with diquat at a rate of 2 lb metallic copper and 4lb diquat cation for difficult-to-control species, such as hydrilla.

[2] Submersed plants absorb fluridone and penoxsulam very slowly, and their efficacy is highly dependent on concentraion and contact time.

[3] * = Not recommended; G = Good; F = Fair; E = Excellent

[4] Certain species, such as *Potamogeton illinoensis,* are relatively tolerant to fluridone while others, such as *P. nodosus,* are sensitive.

[5] Re-growth occurs from underground plant parts and repeat applications are necessary.