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Aquatic Use Pattern for Silvex Cancellation

E. O. GANGSTAD[1]

ABSTRACT

The cancellation of 2-(2,4,5-trichlorophenoxy) propionic acid (silvex) for control of Eurasian watermilfoil (*Myriophyllum spicatum* L.) and other aquatic plants is expected to reduce the level of control because some species of aquatic plants are resistant or semi-resistant to control with alternative herbicides, and because some of these alternative herbicides are too costly for operational use. Also, not all alternative herbicides which are available are registered or effective against alligatorweed (*Alternanthera philoxeroides* [Mart.] Griseb). The alternative herbicide expected to be used is 2,4-D (2,4-dichlorophenoxyacetic acid). In order to attain adequate control of saltcedar (*Tamarix pentandra* Pall.) with this alternative, 2,4-D must be applied every two months as opposed to once every three years with silvex.

Key words: alligatorweed, dicamba, diquat, 2,4-D, endothall, Eurasian watermilfoil, saltcedar.

INTRODUCTION

The use of silvex in aquatic areas may be broken down into its application against three types of aquatic weeds; submersed, marginal-herbaceous, and marginal-woody. These three types vary as to growing site, herbicide application rates, nontarget organisms which might be affected, and the species of aquatic weeds involved.

The following actions were taken by the Environmental Protection Agency (EPA) in 1979 as an emergency suspension order of silvex.

a. Immediate suspension of silvex products registered for forestry, right-of-way, pasture, home, aquatic and recreational area uses.
b. Initiation of cancellation proceedings for silvex products registered for the suspended silvex uses.

After legal court hearings and attempts to negotiate "out of court" for more than three years at a cost over 10 million dollars, The Dow Chemical Company withdrew from the proceedings and EPA initiated actions to ban silvex, 14 October 1983.

Because excessively large or dense populations of aquatic plants are highly detrimental and reduce the usefulness of a water resource for purposes of agriculture, recreation, wildlife management, fisheries management, potable water supplies and navigation, it is imperative for the operation of these resources, to consider suitable alternatives to silvex for vegetation management where required (14, 15, 16).

Over one million acres of waterways and reservoirs in the U.S. are estimated to be infested by submersed aquatic

[1]U.S. Army Corp of Engineers, Washington, D.C. The findings in this report are not to be construed as an official Department of the Army position unless so designated by other authorized documents.

plants (20). Of the infested acreage, it is estimated that, under normal expected growth condition, 20,000 acres are treated with silvex. This treated acreage estimate was arrived at by dividing the estimated available silvex for this use by the average application rate.

The removal of silvex from registration for control of Eurasian watermilfoil is not expected to seriously affect the present level of control in the southeastern states, but will limit control in the north and southwestern states. The alternative, 2,4-D, is a satisfactory substitute, but current registration is limited to TVA reservoirs. The alternatives are not as cost effective and may limit control in terms of cost (11, 14, 15).

The use of biological agents such as insects, pathogens, and herbivorous fish to effect control are being studied in detail, but have had limited success. Animals that are dependent on aquatic plants for food are of little value for the control of these plants (7, 8, 17, 18, 19).

The use of chemical, mechanical, and biological methods, in combinations for effective permanent control, can be achieved under a program of integrated control. Combined mechanical harvesting and biological control offers the most economical long term method of aquatic weed control, but is limited by the needs for immediate control in particular situations and often no legal biocontrols exist for many plants. Integrated control is currently largely limited to alligatorweed and waterhyacinth. Herbivorous fish are limited to control of submersed weeds in areas where they are not prohibited by state fish or game laws (1, 2, 4, 5, 6, 7, 8, 9, 12). To date, chemicals have been by far the most widely used control technique. When immediate solutions are demanded by the public, chemicals provide a predictable response on almost all problem species.

The chemicals commonly used instead of or in combination with silvex are 2,4-D, dicamba (3,6-dichloro-o-anisic acid), 2,4-D and dicamba, diquat (6,7-dihydrodipyrido (1,2-a:2′, 1′-c) pyrazinediium dibromide), endothall (7-oxabicyclo [2.2.1] heptane-2,3-dicarboxylic acid) and dichlobenil (2,6-dichlorobenzonitrile). Diquat, endothall, and dichlobenil are relatively more expensive, but are used under the special conditions which exist in some high-use water recreation areas.

PROGRAMS OF CHEMICAL CONTROL

It is estimated that 100,000 pounds *a.i.* of silvex were used in 1978 for control of marginal-herbaceous aquatic plants (20). It was also estimated that 60 percent of the use was to control alligatorweed at a rate of 4 to 8 pounds *a.i.* per acre. The remaining 40,000 pounds were used on other rooted submersed aquatic plants at a rate of 4 to 5 pounds per acre (Table 1).

Alligatorweed

The total estimated infested area is over 1.5 million acres (20). It is estimated (1978) that 60,000 acres of alligatorweed were present in the problem area (Table 1) and 30,000 acres were controlled with silvex. Approximately one-third of that acreage was sprayed each year. The alternatives expected to be used are 2,4-D and dichlobenil.

TABLE 1. ESTIMATED ANNUAL USE OF SILVEX IN AQUATIC SITES.[1]

Use site	Quantity (1,000 pounds)	
Total use	300	
Submersed	100	
Marginal-herbaceous	100	
Alligatorweed		60
Other rooted emersed plants		40
Marginal-woody	100	
Saltcedar		60
Other phreatophyte and riparian plants		40

[1]Adapted from "The Development of Data Required for Registration of Pesticides for Specialty and Small Acreage Crops and Other Minor Uses." The University-EPA-USDA ad Hoc Subcommittee, Edited by Dr. Richard J. Souer, Department of Entomology, Michigan State University, East Lansing, Michigan, 1973, updated to reflect 1978 data.

A wide range of chemical chemical alternatives is available for use against other rooted emergent pest species. The estimated 40,000 pounds of silvex used for this purpose is expected to be replaced by 2,4-D, or a combination of 2,4-D and dicamba at a moderate increase in chemical costs. The more expensive alternatives are expected to be used only under special conditions. In years when the environmental conditions were especially conducive to plant growth, the area sprayed with silvex ranged from 20 to 40 thousand acres.

Saltcedar

Saltcedar is a major pest species on approximately 300 thousand acres in aquatic sites in Texas, New Mexico, Nevada, Arizona, Utah, Colorado and California (20). Under average conditions, it is estimated that 60,000 acres of saltcedar were treated with silvex, at least once over a three year period. The problem of controlling saltcedar is limited basically to the southwestern states.

In order to attain adequate control with 2,4-D, spraying must take place every two months, as opposed to once every three years with silvex. These added applications greatly increase the cost of control. Mechanical control is also available at a cost competitive with 2,4-D. However, this control method is only applicable in easily accessible areas. The control of saltcedar in remote or inaccessible locations would necessitate use of a chemical alternative (10, 17, 18, 19).

The chemical alternative (a combination of 2,4-D plus dicamba) for use on other phreatophytes and riparian species is not as effective as silvex (7, 10, 17). It is expected that it would be necessary to retreat 10 to 30 percent of the acreage to attain adequate control. It is estimated that 2,4-D plus dicamba will be used annually on 20,000 acres out of the over 8 million acres where this problem exists.

More recently, glyphosate (N-(phosphonomethyl)glycine) (13) and triclopyr, (3,5,6-trichloro-2-pyridinyloxyacetic acid), (3) have been studied for control of woody plants in or adjacent to aquatic areas, but have not been widely used as of this date.

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