CHEMICAL FACT SHEET:

2,4-D

Manufacturers and Formulators

There are approximately 1500 products containing 2,4-D registered with the Environmental Protection Agency. Most of the products are labelled only for agricultural and non-crop use to control terrestrial broadleaf weeds and are very unsafe as well as illegal to use in aquatic environments.

The active ingredient of 2,4-D is 2,4-dichlorophenoxyacetic acid. Some of the major U.S. manufacturers are: Agrolinz, Inc., BASF Corp., DowElanco, and Rhone-Poulenc Ag Company. Other companies purchase 2,4-D from the manufacturers to formulate their own products. The following 2,4-D formulations are registered with the Department of Agriculture, Trade and Consumer Protection (DATCP) for aquatic use in Wisconsin:

Product Name	% Active Ingredient	Formulation	Application Rate
Aquacide	17.5%	pellets (sodium salt)	108 - 175 lbs/acre
Weedtrine II	18.8%	granular (iso-octyl ester)	100 - 200 lbs/acre
Aqua-kleen	19.0%	granular (butoethyl ester)	100 - 200 lbs/acre
Visko-Rhap A-3D	33.9%	liquid (dimethylamine salt)	1 gal/acre
See 2,4-D	40.9%	liquid (iso-octyl ester)	2.5 - 4.5 pints/acre

Note: Follow herbicide label directions for specific application rates

Herbicide Effectiveness and Selectivity

2,4-D is a systemic herbicide which moves throughout the plant and interferes with normal cell growth and division. Plants begin to die within a few days following treatment with liquid formulations and within a week to ten days with granular formulations. It takes several weeks for the plants to decompose.

Aquatic formulations of 2,4-D are selective herbicides - they are only effective on certain species of aquatic plants. In Wisconsin, 2,4-D is most commonly used to control watermilfoil (*Myriophyllum* spp.). 2,4-D will also control species that may be desirable such as waterlilies (*Nymphaea* spp.), watershield (*Brasenia shreberi*), and bladderwort (*Utricularia* spp.).

Use Considerations

Any person using aquatic herbicides for control of aquatic plants in Wisconsin waters must obtain a permit from the Department of Natural Resources. If an independent contractor is hired to perform a treatment, the contractor must be currently certified by the DATCP. In addition, all liquid applications, restricted use pesticides, or any herbicide treatment of more than 1/4 acre must be performed by a certified chemical applicator except on private ponds. A private pond is a body of water located entirely on the land of a permit applicant, with no surface water discharge or with a discharge that can be controlled to prevent chemical loss, and without access by the public.

2,4-D needs to be applied to plants that are actively growing. Effectiveness of granular formulations may be reduced if applied to soft organic bottoms; granular products work best on firm sediments. If granular products are used on floating-leafed plants, care must be taken to ensure that the product is in contact with the leaves for a minimum of 24 hours before it is washed off by wave action or blown off by wind.

If 2,4-D is applied to a pond or enclosed bay with abundant vegetation, no more than 1/3 to 1/2 of the surface should be treated at one time because excessive decaying vegetation may deplete the oxygen content of the water and kill fish. Untreated areas should not be treated until the vegetation exposed to the initial application decomposes.

Individuals applying 2,4-D products should have appropriate application equipment and protective clothing. Other important safety precautions appear on the label and must be followed.

Water Use Restrictions

There are no established waiting periods in the state of Wisconsin for recreational activities such as swimming and fishing in waters treated with 2,4-D formulations. However, 2,4-D may cause an off flavor in fish for several days after application.

2,4-D products are not to be applied to waters used for irrigation, animal consumption, drinking, or domestic uses such as cooking and watering vegetation.

Registration Status

Federal law requires pesticides to be registered with the Environmental Protection Agency (EPA) before they can be sold or used. Due to significant changes in the federal pesticide laws, the EPA is reassessing the potential hazards arising from the currently registered uses of the pesticide.

This re-registration process will determine if additional data on health and environmental effects is needed, and determine whether the pesticide meets the "no unreasonable adverse effects" criteria of federal law. "Unreasonable" means the risk of using a pesticide exceeds the benefits. EPA registers pesticides based on information submitted by product manufacturers, not on EPA's own tests.

The distinction between "EPA registered" and the terms "approved" or "safe" is important. Registration by the EPA means only that the benefits have been determined to outweigh the risks. Because product use is not without risk, the EPA does not define any pesticide as "safe".

2,4-D is currently undergoing the re-registration process. In 1980, a 2,4-D Industry Task Force was formed to jointly provide the new data. It will take several years to complete the required tests and the re-registration process.

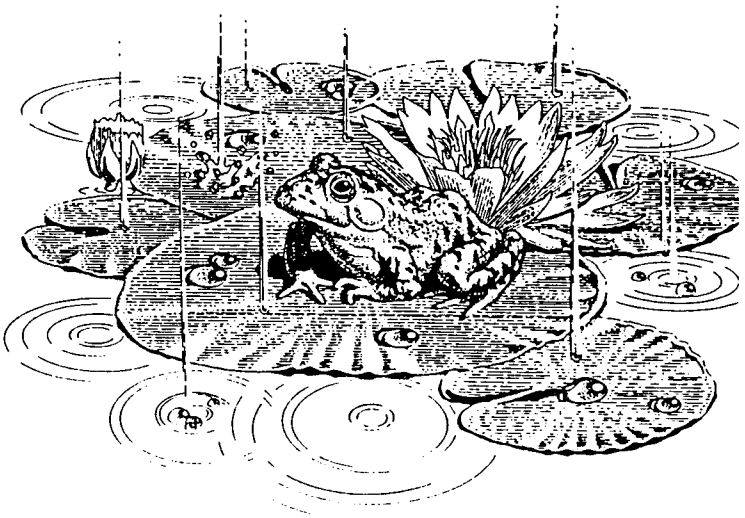
Impacts on Fish and Other Aquatic Organisms

Because of limited ecological effects data, the EPA has not conducted a complete hazard assessment of all the various 2,4-D formulations. Laboratory tests have indicated that the formulations approved for aquatic use are toxic to the fish species tested only in dosages above the labelled rates. However, certain species of important aquatic organisms such as Daphnia (water fleas) and midges may be adversely affected by some formulations, especially liquid esters, at label application rates. Direct toxicity as well as loss of habitat are believed to be the causes. These organisms only recolonize the treated areas as vegetation becomes re-established.

In natural systems, 2,4-D interactions with other chemicals and different environmental conditions may alter the ability of organisms to tolerate 2,4-D. In addition, fish and other aquatic organisms are sometimes sensitive to the inactive ingredients contained in 2,4-D formulations. It is important to follow the label carefully for application restrictions and rates.

Available data indicate 2,4-D does not accumulate at significant levels in the bodies of fish that have been tested. Although fish that are exposed to 2,4-D will take up some of the chemical, the small amounts that accumulate are evidently eliminated a few days after exposure to 2,4-D ceases.

Certain plant and animal species listed on the federal and state endangered resources lists and the habitats they need may be affected by herbicide use. A permit to use 2,4-D may be denied or conditioned if these resources are present in the proposed treatment area.



Herbicide Degradation, Persistence and Trace Contaminants

In water, the concentration of 2,4-D is reduced through dispersal by water movement, breakdown by microorganisms, and by adsorption to sediments. Degradation studies have indicated half-lives (the time it takes for half the active ingredient to degrade) generally range from a few days to occasionally several months.

Laboratory tests have indicated that 2,4-DCP, a breakdown product of 2,4-D, appears to be toxic to some organisms. In natural systems, application of 2,4-D formulations results in low levels of 2,4-DCP that remain in the water for up to two weeks following treatment. Adverse effects to aquatic life in the field from 2,4-DCP have not been documented.

2,4-D occasionally contains dioxins as contaminants. Dioxins are unwanted by-products that occur in the manufacturing process of some pesticides. 2,4-D has been combined with another compound, 2,4,5-T, in some herbicide mixtures, most notably in the defoliant Agent Orange used in Vietnam. A highly toxic dioxin, 2,3,7,8-TCDD, had been found in 2,4,5-T, but has not been detected in 2,4,-D. The questions of how much (if any) and which dioxins may be present in 2,4-D are unanswered at this time. In

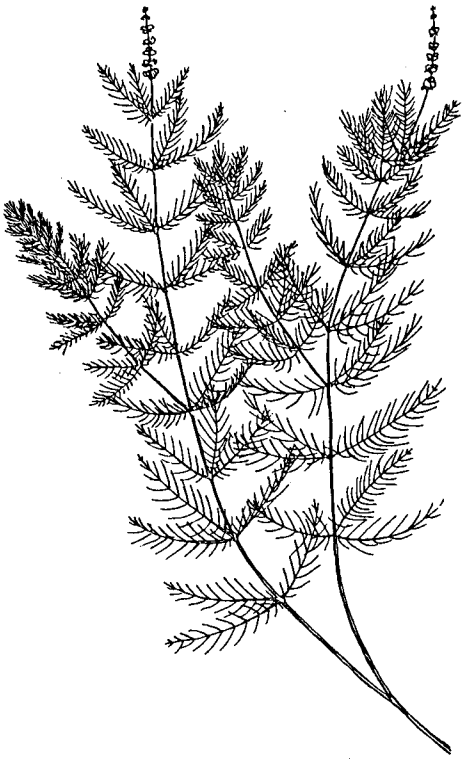
addition, little is known about the toxicity of dioxin to fish and other aquatic life and much uncertainty remains about the effects of low level dioxin exposure to people.

Carcinogenic impurities, n-nitrosamines, have been detected at low levels in certain samples of 2,4-D. A risk assessment on nitrosamines done by the U.S. National Academy of Sciences indicates that the amounts found in 2,4-D formulations tested present negligible risk to human health. However, the EPA is requiring analytic data from manufacturers to identify and quantify nitrosamines and dioxins in 2,4-D products.

Human Health

Since their introduction, 2,4-D and other related herbicides have attracted considerable public and scientific attention. Recent epidemiological studies have linked 2,4-D use among agricultural workers with an increased cancer risk. However, the evidence is controversial, and the EPA has determined that the available data are currently inadequate to classify 2,4-D as a carcinogen. Further studies are in progress and will continue to be evaluated. The EPA may initiate a special review a later time depending on the findings of the studies in progress.

Adverse health effects can be produced by acute and chronic exposure to 2,4-D. Persons who mix or apply 2,4-D need to protect their skin and eyes from contact with 2,4-D products to minimize irritation, and avoid inhaling the spray. In its consideration of exposure risks, the EPA believes no significant risks will occur to recreational users of water treated with 2,4-D.



For Additional Information

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Industry Task Force on 2,4-D Research Data
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NOTE: This fact sheet is published in accordance with chapter NR 107, Wis. Adm. Code. No endorsement of any chemical pesticide or plant control method is stated or implied. The DNR accepts no liability for damage or injury that may result from use of chemical pesticides under NR 107.

Applicants for permits under NR 107 are required to provide copies of applicable chemical fact sheets to any affected property owners' association and inland lake district. Copies of chemical fact sheets are also available upon request from the DNR.

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DEPARTMENT OF NATURAL RESOURCES