CHEMICAL FACT SHEET:

SIMAZINE

Manufacturers and Formulators

Aquazine is an aquatic algicide and herbicide manufactured by Ciba-Geigy Corporation for use in farm and recreational ponds. The active ingredient of Aquazine is 2-chloro-4,6-bis(ethylamino)-s-triazine, commonly called simazine. Aquazine is sold as a water-dispersable granular formulation and contains 90% simazine and 10% other ingredients.

Herbicide Effectiveness and Selectivity

Aquazine is a relatively selective herbicide and algicide which will kill a variety of algae and many species of submersed and floating plants by interfering with photosynthesis. Plants susceptible to Aquazine include duckweed (*Lemna* spp.), watermeal (*Wolffia* spp.), coontail (*Ceratophyllum* spp.), naiad (*Najas* spp.), pondweeds (*Potamogeton* spp.) and watermilfoil (*Myriophyllum* spp.). Among algal species, blue-green algae are generally the most sensitive to Aquazine.

Death of treated algae occurs within 3 to 14 days after application, while death of submerged plants occurs in four to six weeks depending on temperature. Control of coontail and watermeal takes longer (9 to 10 weeks respectively).

Use Considerations

Any person using aquatic herbicides in Wisconsin waters must obtain a permit from the Department of Natural Resources (DNR). If an independent contractor is hired to perform treatment, the contractor must be currently certified by the Wisconsin Department of Agriculture, Trade, and Consumer Protection (DATCP). In addition, all applications of liquid or 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 an applicant, with no surface water discharge or with a discharge that can be controlled to prevent chemical loss, and without access by the public.

Aquazine may only be used in ponds which have little or no outflow of water following treatment. The herbicide may be applied to the bottom of drained ponds or in ponds containing water. Treatments must include the entire pond; spot treatments are not effective. Ponds which have bordering trees with roots extending into the water or which have desirable floating or emergent species should not be treated with Aquazine.

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Aquazine can be mixed for use in a bucket to form a thin paste or slurry and poured from shore at various points around the pond. Lower concentrations of Aquazine are used to kill many algal species, while higher concentrations will destroy many aquatic macrophytes; consult the label for specific rates.

Treatment with Aquazine can result in dissolved oxygen loss from the water due to the decomposition of decaying vegetation. Oxygen loss can kill fish and other aquatic organisms. To reduce the potential for oxygen loss, simazine should be applied early in the growing season when 5 - 10% of the pond surface is covered with algae, or while submersed aquatic plants are actively growing but before they reach the surface of the water. Since higher temperatures cause rapid decay of dead plants and algae, removing oxygen from the water faster, Aquazine should only be used before the water temperature exceeds 75 degrees Farenheit.

Individuals mixing and applying Aquazine should wear protective clothing and gloves to avoid contact of the herbicide. Other safety precautions appear on the label and must be followed.

Water Use Restrictions

The following waiting periods must be observed if using water treated with Aquazine:

Activity	Waiting Period
Swimming.	4 hours
Fish consumption.	no waiting period
Domestic purposes, animal consumption, drinking, irrigation	12 months

The EPA has established a tolerance of 12 parts per million (ppm) for residues of simazine in fish. For potable water, the tolerance is 0.01 ppm.

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 its review of 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".

Ciba-Geigy is currently undergoing the second phase of the re-registration process for simazine. The first phase involved conducting additional studies of simazine's environmental fate, residue chemistry, and toxicity. The results of these studies have been submitted to EPA, where they are currently being reviewed. After the current review is completed, additional data will likely be required. The re-registration process is expected to take several years to complete.

Impacts on Fish and Other Aquatic Organisms

Laboratory tests with fish such as bluegills, trout, carp, and channel catfish indicate there is a margin of safety between toxic dosages and label application rates of Aquazine. However, there have been indirect adverse effects from Aquazine treatments to fish due to the depletion of dissolved oxygen associated with the decay of aquatic algae and plants. Species of fish with high oxygen demands (e.g. trout and bass) are the most sensitive.

In studies with aquatic organisms such as *Daphnia* (waterfleas) and amphipods, toxic effects were seen only at concentrations above the label application rates. However, certain types of snails and midges have been adversely affected by Aquazine treatments. In addition, plant-dwelling populations of aquatic organisms may be adversely affected by application of simazine due to habitat loss.

Plant and animal species on the federal and state endangered resources lists or their habitats may be affected by aquatic treatments using pesticides. A permit to use Aquazine may be denied or conditioned to protect these resources if they are present in the proposed treatment area.

Herbicide Degradation, Persistence and Trace Contaminants

According to available studies, the concentration of simazine in water is reduced primarily through microbial breakdown, metabolism by aquatic plants and algae, and by adsorption to the sediments (especially muck or clay). Persistence in ponds is dependent upon many factors including the density of plants and algae present at the time of treatment. The half-life of simazine (the time it takes for half the active ingredient to break down) ranges from 30 to 70 days.

The EPA has not yet assessed the environmental fate of simazine. Additional data required by the EPA include aquatic and terrestrial metabolism and degradation studies. Ciba-Geigy submitted information on these topics to EPA in April, 1988; the data are currently under review.

Human Health

Concerns about human health effects of Aquazine use primarily revolve around applicator exposure. Aquazine causes eye irritation, and is harmful if inhaled or absorbed through the skin. Individuals applying or mixing Aquazine need to protect their skin and eyes and avoid breathing dust or spray mist.

According to the EPA's re-registration guideline, available toxicity data are insufficient to fully assess the long-term chronic effects of simazine. Though existing toxicology studies for long-term chronic effects do not suggest significant hazards, the EPA is currently reviewing additional data before a complete environmental exposure assessment can be made.

For Additional Information

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Washington, D.C. 20460

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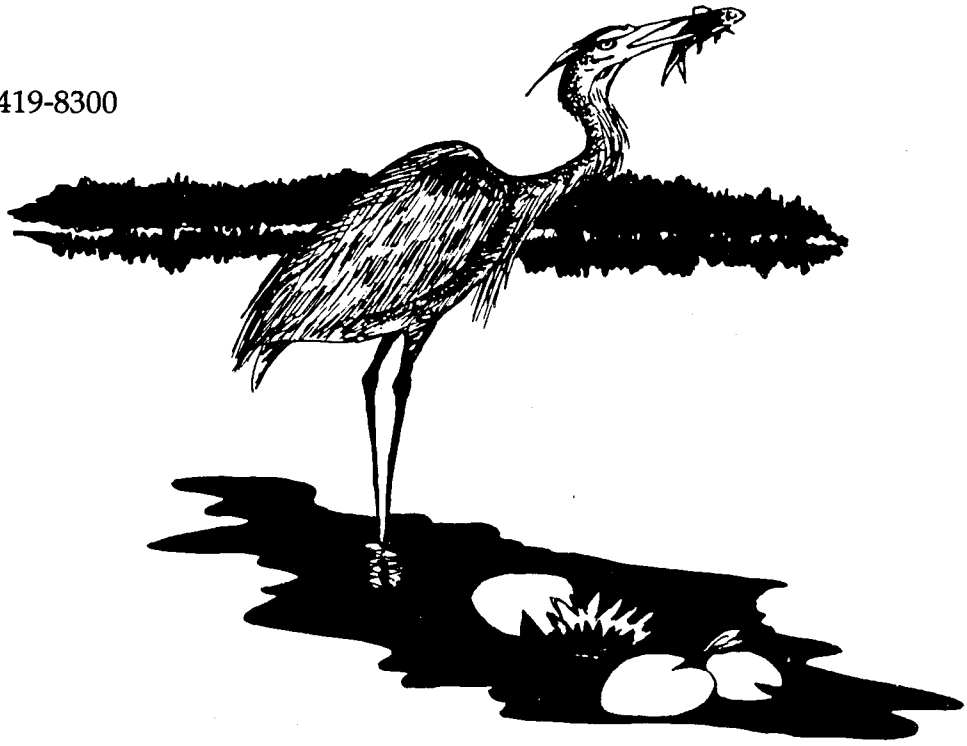

NOTE: This fact sheet is published in accordance with chapter NR 107, Wis. Adm. Code. No endorsement of any chemical pesticide or plant control method is stated or implied. The DNR accepts no liability for damage or injury that may result from use of chemical pesticides under NR 107.

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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