# Vegetation Control in Fish Ponds with Terbutryn (Igran 80W)

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*Abstract: Najas, Chara,* and several filamentous algae species were controlled or eliminated by a single 0.1 mg/1 (active ingredient) application of the herbicide Igran 80W, an 80% wettable powder formulation of terbutryn (2-tert-butylamino-4-ethyl-amino-6-methyl-thio-s-triazine), a commercial product registered for control of terrestrial vegetation but not now approved by the United States Environmental Protection Agency for use in ponds or other waters. The chemical, applied in summer, eliminated target plants within 2 weeks of application. The chemical is relatively nontoxic to fish at concentrations recommended for vegetation control.

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Control or elimination of aquatic vegetation is desirable in most warm-water fish production systems. Plants reduce fish production by removing and storing nutrients, interfering with feeding of fish, harboring predatory animals, occupying space, and hindering harvest. Effective and inexpensive herbicides are essential to the fish farming industry.

Calrosan, a 1% granulated form of terbutryn (2-tert-butylamino-4-ethyl-amino-6-methyl-thio-s-trianzine) is registered in Great Britain for use in aquatic weed control. It reportedly controls many emergent and floating plants and, especially, submerged plants and algae (British Agrochemicals Association, 1976). Clarosan is applied directly to the water at a rate of 0.05 to 0.1 mg/liter active ingredient, in April and May, before heavy weed growth occurs. Only 1 application per season is required. Treated water may be used for irrigation after 5 weeks (British Agrochemicals Association 1976). Terbutryn appears to have no long-lasting detrimental effects on the aquatic ecosystem, but like most other herbicides, it has indirect effects—primarily that of causing dissolved oxygen deficiencies—as a result of the death and decay of plants (Murphy 1982; Johannes and Luedemann 1972).

In the present study, Igran 80W[1], an 80% wettable powder formulation of terbutryn, a product of Ciba-Geigy Corp., Greensboro, North Carolina, was identified as a promising candidate chemical for testing for weed control in fish production ponds. In the United States, the herbicide is used for weed control in winter wheat, winter barley, and grain sorghum, and on noncrop land areas, but is not approved for use in water. The toxicity of Igran 80W to fish and birds is low (Ciba-Geigy Corporation 1976).

## Methods

These studies were conducted at the Fish Farming Experimental Station, Stuttgart, Arkansas, in 1982 and 1983. Observations were made on 79 ponds, 0.04 to 11 ha in area, in which *Najas, Chara,* and several species of filamentous algae grew in abundance. Small amounts of cattail (*Typha*) and smartweek (*Polygonum*) were present around the edges of some of the ponds. Submerged aquatic plants occupied 25% to 75% of the water volume in each pond in summer, and this percentage decreased little in winter. The quantity of vegetation made it impossible to manage the ponds, and interfered particularly with fish feeding. Harvest of fish by draining the pond was difficult and laborious, and seining was impossible. These conditions had persisted since the summer of 1980.

Most of the ponds contained channel catfish (*Ictalurus punctatus*) and some contained largemouth bass (*Micropterus salmoides*), bluegills (*Lepomis macrochirus*), and green sunfish (*Lepomis cyanellus*).

A single treatment concentration of Igran 80W was applied to all ponds. The chemical was mixed with water and applied as a surface spray, at the rate of 0.1 mg/liter active ingredient, to all ponds. To insure uniform distribution, at least 3.8 liter/ha were sprayed onto the smaller ponds and about 20 liter/ha on the larger ponds. Fathead minnows (*Pimephales promelas*), golden shiners (*Notemigonus crysoleucas*), and goldfish (*Carassius auratus*) were stocked to determine the effect of Igran 80W on spawning, on the survival of eggs, and on the survival and growth of fry.

Dissolved oxygen was measured on an irregular basis after treatment with Igran 80W.

## Results and Discussion

Igran 80W applied in July and August completely eliminated *Najas, Chara,* and filamentous algae in 2 weeks. The onset of death and decay of the plants was apparent at the end of the first week when the *Najas* and *Chara* began breaking up and the algae turned brown. Two weeks after treatment,

[1] Reference to trade names does not imply government endorsement of commercial products.

the ponds were essentially free of vegetation except for the smartweed and cattails. Thereafter the ponds remained free of weeds and were easily seined. Smartweed and cattails, where present, were unaffected.

The most noticeable factor affecting fish was a decline of dissolved oxygen, which occurred within 3 days after treatment; however, concentrations returned to normal within 2 weeks. Although the dissolved oxygen levels dropped to less than 1 mg/liter in the morning and as low as 2 to 3 mg/liter in late afternoon—no fish mortality was observed.

Igran 80W applied in late fall and early spring was also effective in killing the submerged vegetation and algae, but without the drastic reduction in dissolved oxygen (it did not fall below 5 mg/liter).

Fathead minnows, golden shiners, and goldfish spawned after the herbicide treatment, and the number and hatchability of eggs, and growth and survival of fry appeared to be unaffected.

A plankton bloom appeared 2 to 4 weeks after treatment. Clay turbidity increased in some ponds, probably as a result of the absence of rooted aquatics. Fingerling channel catfish that were stocked grew at the expected rate, and no unusual disease or behavioral signs became apparent.

The low application rate (0.1 mg/liter), low cost ($10-$12/kg), low fish toxicity, and its effectiveness against a number of species of aquatic plants makes Igran 80W a potentially valuable herbicide for fish ponds. It would have to be used with caution during warm weather in ponds containing large amounts of vegetation because of the potential loss of dissolved oxygen. However, it cannot now be used under any circumstances (other than experimental) because it has not been approved by the U.S. Environmental Protection Agency for use in fish ponds. The label clearly states "Do not contaminate domestic or irrigation water supplies, or lakes, streams, or ponds."

In conclusion, Igran 80W is inexpensive, easily applied, and appears to be highly effective for control of aquatic vegetation.

## Literature Cited

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