Results Of Testing Clean-Flo Lake Cleanser(TM) In Florida Lakes

LOWELL TRENT and BILL McARTHUR

Botanist, Florida Game & Fresh Water Fish Commission
Lake City, Florida 32055;
and Technical Representative
Clean-Flo Laboratories, Inc.
Hopkins, Minnesota 55343

ABSTRACT

This paper presents results of a pilot study of efficacy and observable toxicity in Florida lakes of a new product formulation[1] comprising an admixture of soluble calcium, aluminum and sodium cations, and a buffering agent. The intended purpose of the compound is to remove phosphate from natural waters by precipitation, thereby causing a natural decline of aquatic flora. Eight impoundments were treated with quantities ranging from 5 ppm to 20 ppm, and visual results noted. Declines were noted in ponds containing hydrilla (*Hydrilla verticillata* Royle), duckweed (*Lemna minor* L), Southern naiad (*Najas quadalupensis* (Spreng.) Magnus) filamentous algae (unspeciated), and blue-green algae (unspeciated). No deterious effects were observed on fish or other aquatic animals.

INTRODUCTION

Clean-Flo has been found in laboratory tests and in field tests in Minnesota to precipitate phosphate and iron from natural waters.[2] The purpose of the study was to perform a preliminary pilot study to see if this compound produces similar results in the warm, high phosphate, relatively low pH waters of Florida, and to determine whether the aquatic plants would decline as a result. For this purpose, visual observation and the use of field test equipment was utilized to give a general indication of whether or not more intensive study was warranted. Hach kits were used to obtain approximate indications of change in water chemistry.

Fish toxicity had been studied earlier in aquaria[3] in which they survived in concentrations up to 1000 ppm with no noticeable deleterious effects. In the present tests, no dead fish were detected.

RESULTS OF PILOT STUDY

Between October 16, 1972 and April 5, 1973, six ponds were treated so that plant reactions of 3 and 6 months duration were monitored. Table 1 shows the types of plants observed, amount of chemical added, and degree of control.

TABLE 1. PLANT SPECIES CONTROLLED AND LENGTH OF CONTROL WITH CLEAN-FLO LAKE CLEANSER.[a]

Species	Number of ponds	Concentration (ppm)	Months[b] 1.5	3	6
Hydrilla	1	15	25	80	100
Southern naiad	1	15	50	95	—
Southern Naiad	1	20	100	100	—
Filamentous Algae	2	15	100	100	100
Filamentous Algae	2	20	100	78	—
Duckweed	1	30	10	100	80
Planktonic Algae	1	15	0	0	0
Blue-green Algae	1	5	100	100	90

[a]Blank spaces indicate that no observation was made at that time.
[b]Numbers represent average percent control of ponds containing the particular species.

Pond 1. At Crystal Lago Golf Course, a 3-acre pond was infested with hydrilla which was completely covering the surface of the pond. On top of the hydrilla was a covering of filamentous algae. Sufficient chemical was mixed with water to result in 15 ppm, and applied as a liquid. After 1.5 months the pond had 25% open water. The filamentous algae was completely gone. After 3 months 80% of the surface was open and filamentous algae were still absent. As the hydrilla receded, it turned brown and then dissolved into the water, leaving no bottom residue. Minnows were healthy in appearance.

After 6 months the pond was completely clear of hydrilla except for a new growth just beginning at the center of the pond. The cattail (*Typha latifolia* L.), was not affected. Filamentous algae were beginning to grow in the shallow areas.

Pond 2. At Seminole Health Club a pond 0.25 acre in surface area was 60% covered with filamentous algae. The algae were completely gone 2 weeks after adding 20 ppm chemical. Re-growth was noted within 3 months.

Pond 3. At Seminole Health Club another 0.25 acre pond was 65% covered with Southern naiad and filamentous algae prior to treatment. Two weeks after adding 20 ppm chemical, the plants were dying, and after 1.5 months the surface was completely clear. After 3 months a regrowth of filamentous algae was beginning on the bottom of the pond. The treatment had no deleterious effect on the cattails present.

[1]Clean-Flo Lake Cleanser(TM), patent pending. Clean Flo Laboratories, Inc. Hopkins, Minnesota.
[2]Laing, R. L. 1973. Phosphate Reduction in Long Lake (T35, R24), Isanti County, Minnesota using Clean Flo Lake Cleanser. Booklet, Clean-Flo Laboratories, Inc., Hopkins, Minnesota. 6 pages.
[3]Bomquist, Arnold. 1972. National Biocentric Laboratory, Inc., St. Paul, Minnesota, Personal Correspondence.

Pond 4. A 2-acre pond, had 6 inches clarity by Secchi disk measurement. A channel around an island was densely filled with Southern naiad and totally covered with filamentous algae. The turbidity was caused by a combination of suspended calcium carbonate and planktonic green algae (unspeciated). One and one-half months after adding 15 ppm of chemical 50% of the Southern naiad and filamentous algae were gone, but the turbidity had not changed. After 3 months 95% of the weeds, and all of the filamentous algae had disappeared. Abundant or common planktonic algae at this time included *Sphaerellocystis, Lyngbya, Anabaena, Euglena,* and *Anacystis.* Total phosphate (PO^4) was 0.08 ppm.

While this one test on planktonic algae showed no apparent control, it is interesting that green algae have been controlled in Minnesota waters.[4]

Pond 5. A flood-control canal was sectioned off with 6 mil polyethylene sheet as a test plot for 0.25 mile, in two sections. Duckweed completely covered the surface with a thickness of 2 to 3 in. The section to the right of the center partition was treated with 30 ppm chemical. A mixture of an organic copper complex (Cutrine)[5] and 6,7-dihydrodipyrido (1,2-*a*:2',1'-*c*)pyrazinediium ion (diquat) was added to the section left of the partition at a rate of 2 ppm of each herbicide. Thus a control of natural water was on each side of the two test plots, while a comparison was made of efficacy of the two materials.

Two weeks after treatment the duckweed on the Clean-Flo treated side was dying. It progressively turned yellow, then brown, then swelled and turned white, and then dissolved.

After 2 months the water surface on each side of the center partition was 98% free of duckweed. But the invert-treated section had dead terrestial foliage along the bank, while the foliage on the Clean-Flo treated side had live foliage, with no loss of vigor. Dead shrubbery was common along the banks of the invert-treated section.

Observation after 2 months revealed a few floating dead plants, and a clean, sandy bottom. After 3 months both treated sections were completely clear and the control plants were unaffected. A few hydrilla plants were found growing in the canal 5 months after treatment, with some small patches of duckweed coming back. Table 2 gives the water analysis of this impoundment before and after treatment.

Pond 6. Another 2-acre pond had a heavy bloom of blue-green algae (unspeciated), which had been present for 6 months. One week after 5 ppm of chemical was added the algae began to congeal into small clumps and die. The pond then became completely clear even though a neighboring pond remained in bloom with similar algae.

SUMMARY

Results of this pilot study show promise for controlling certain herbaceous aquatic weeds in Florida. More intensive studies, more accurate chemical analysis, and more complete algae tests are warranted. Likewise more detailed aquatic animal studies are needed relative to Florida waters.

TABLE 2. WATER QUALITY TESTS OF FLOOD CONTROL CANAL BEFORE AND AFTER TREATMENT MITH CLEAN-FLO[a]

Measurement	Initial	After 11 days
Meta phosphate (ppm)	0.27	0.0
Ortho phosphate (ppm)	0.25	0.0
Meta-poly phosphate (ppm)	0.02	0.0
Nitrate nitrogen (ppm)	5.00	8.8
Nitrite nitrogen (ppm)	0.00	0.01
pH	7	7.2
Hardness, calcium (ppm)	190	—
Hardness, magnesium (ppm)	20	—
Hardness, total (ppm)	210	—

[a]These tests were done with a hach kit, weather clear, wind (0-5mph), temperature (air) 80 F, (water) 80 F.

ACKNOWLEDGEMENTS

Grateful appreciation is given to Les Bitting of Old Plantation Water Control District for his help and use of his waterways and to Richard Dumas of the Florida Game and Fresh Water Fish Commission for his work and technical assistance.

[4]Shapiro, Joseph. 1971. Report to Clean-Flo Corp. on the Use of Clean-Flo Chemical in Lakes, Limnological Research Center, University of Minnesota, Minneapolis, Minnesota. 9 pages.

[5]Copper is the form of copper sulphate triethanolamine.