TECHNICAL NOTES

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STATUS OF FISHERY CHEMICALS IN 1985

Attached is a reprint of an article from the January 1986 issue of The Progressive Fish-Culturist. The article lists all chemicals registered or approved for aquatic or fishery use.

Please note that the chemicals are listed according to the following categories:

Table A-1 Therapeutants
Table A-2 Anesthetics
Table A-3 Disinfecting Agents
Table A-4 Water Treatment Compounds
Table A-5 Herbicides and Algicides
Table A-6 Fish Control Agents

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Attachment

THE

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Status of Fishery Chemicals in 1985

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Abstract—A summary list of registered or approved products is provided for fishery uses, effective June 1985. The current status of efforts to register others and a discussion of the need for new products is presented.

During the 6 years since the 1979 report on the registration status of fishery chemicals, priorities and needs for fishery compounds have changed significantly (Anonymous 1979). Some new products have been registered or approved, and a number of registered compounds have been cancelled or dropped and are no longer available. A *registered* compound is an available commercial product bearing an Environmental Protection Agency (EPA) or Food and Drug Administration (FDA) label specifying its allowed uses. An *approved* product does not necessarily have an EPA or FDA label, because some other classification or designation may allow its use in aquatic situations. Examples are salt, acetic acid, and carbon dioxide. This report provides a summary list of the products that were registered or approved by EPA or FDA for fishery uses effective June 1985, describes the current status of registration efforts, and discusses the need for new products in fisheries.

Current Registration Status

Confusion exists as to which chemicals have been approved or registered for aquatic use, which commercial products are approved for aquatic applications, and what use patterns are permitted. The U.S. Congress charged EPA with control of the use of pesticides under the Federal Insecticide, Fungicide, and Rodenticide Act and its amendments (Office of the Federal Register 1984b). The FDA was assigned the responsibility for regulating the use of drugs under the Federal Food, Drug, and Cosmetic Act and its amendments (Office of the Federal Register 1984a). The promulgation of policy, rules, and guidelines to implement these laws was also given to these respective agencies. Regulatory control covers testing, development, distribution, and use, as well as the manufacturing process, bulk shipment, formulation, retail packaging, labeling, interstate shipment, applicators, application rates, use patterns, and the species of fish on which the compound can be used.

Recently, both EPA and FDA have increased their efforts to enforce regulations that govern the use of drugs and chemicals in fish culture. Inspectors have visited hatcheries and fish farms to question the use of particular compounds. If the use is not consistent with an approved label or is not covered by another form of approval, the user may be subject to disciplinary action. Unfortunately, fish culturists sometimes purchase generic products rather than registered compounds in an effort to save money—a practice that may prevent sponsors from recovering the costs of registering their

product and could cause them to remove the product from the market. Permits (Forms FDA 1800 Medicated Feed Application and FDA 2656 Registration of Drug Establishment) are required by FDA if fish culturists produce their own medicated feeds; quality assurance data must be provided to prove that the product is consistent with permitted drug levels. The discharge of water from fish cultural facilities is controlled by EPA under the National Pollutant Discharge Elimination System. Discharge permits require that each facility provide information on the types and amounts of chemicals discharged, and operate in accordance with specified effluent limitations, monitoring requirements, and other conditions.

Some unregistered uses of chemicals may be allowed by EPA if certain requirements are met. EPA does not regulate compounds such as sodium cyanide and isobornyl thiocyanoacetate (Thanite) as pesticides if they are used by state and federal biologists to collect fish for experimental purposes. However, state, local, or federal toxic substance regulations may restrict their use. Sodium cyanide must be used with extreme caution—never around domestic water supplies, and always in well ventilated areas and under close supervision. Insecticides that are registered for mosquito control in aquatic environments may also be used to control other aquatic nuisance organisms if (1) the pesticide is applied at concentrations or frequencies that are less than those stated on the label, (2) use on the target pest is not expressly prohibited, (3) the application is compatible with, and nontoxic to, the crop, animal, or site specified on the label, and (4) the method of application is not prohibited. Pesticides that meet these requirements include BTI (*Bacillus thuringiensis* Berliner variety *israelensis*), methoprene (Altosid), mineral oils, naled (Dibrom), parathion, petroleum oils, and solvents. Other insecticides are also registered to control mosquitos in aquatic situations, but these may be toxic to fish. They include chlorpyrifos (Dursban), dichlorvos (DDVP), fenthion (Baytex), lindane (BHC), malathion (Carbophos), methoxychlor (Methoxcide), pyrethroids, and temephos (Abate). Users are cautioned to read the label carefully to observe all prohibited uses and to follow all directions concerning methods of application.

The FDA uses two categories, *food fish* and *nonfood fish*, in determining which fishery use patterns are to be permitted. Food fish are species that, at some stage in their life cycle, may be consumed by humans, and include such species as black bass (*Micropterus* spp.), bluegills (*Lepomis macrochirus*), channel catfish (*Ictalurus punctatus*), salmon (*Oncorhynchus* spp. and *Salmo salar*), and trout (*Salmo* spp. and *Salvelinus* spp.). The regulations for food fish apply to all life stages, including eggs, fry, fingerlings, subadults, and brood fish. Nonfood fish are bait fishes such as golden shiners (*Notemigonus crysoleucas*), goldfish (*Carassius auratus*), and fathead minnows (*Pimephales promelas*), and the many species of ornamental fishes reared by aquarists. Although extensive testing for efficacy, animal safety, and environmental safety is required for both food and nonfood fishes, additional data on metabolites, residues, and residue persistence must be submitted for the establishment of a minimum tolerance and withdrawal time for chemicals to be applied to food fishes.

Registration Needs

Over 30 drugs and chemicals are registered or approved for use in fish culture and fishery management. However, new products are still needed, including a fungicide to replace malachite green; a broad spectrum antibiotic; controls for bacterial gill disease, viruses, copepods, and external protozoans, especially *Ichthyophthirius*, known as Ich; anesthetics with zero withdrawal times or no residues; new fish control agents and known selective toxicants, such as squoxin; selective toxicants for the rusty crayfish and Asiatic clam; and more effective aquatic herbicides.

Several agencies and chemical companies are investigating new drugs or additional uses of drugs or chemicals for fishery or aquatic situations. Screening programs are being conducted by the U.S. Fish and Wildlife Service to find a replacement for malachite green because it has been shown to be a potential teratogen in laboratory animals. So far, 15 possible replacement chemicals have been identified that show some promise for controlling fungal infections and nine have shown potential for controlling protozoan infections such as Ich. Romet-30 was registered in November 1984 for the control of furunculosis in salmonids, but it is also known to be effective against other bacteria. Erythromycin, sulfamerazine, and sulfamethazine are being investigated for possible use in controlling vertical transmission (within the eggs of salmon) of bacterial kidney disease. Oxolinic acid is being tested for use in controlling furunculosis, enteric redmouth disease, and vibriosis of salmonids. Tiamulin is a potential candidate to control both gram-negative and gram-positive bacteria. Candidate compounds being considered for possible control of bacterial gill disease in salmonids include chloramine-T and the hyamines

3500 and 1622. A project was recently begun at the La Crosse National Fishery Research Laboratory to identify the need for better anesthetics, and to delineate the activity of known fish anesthetics. The laboratory will then determine which anesthetics have the best potential for registration and initiate an effort to register them. A private company is apparently close to obtaining a registration for fluridone (Sonar), a herbicide with aquatic uses.

Efforts to register certain chemicals have been terminated because of their potential toxicity to the environment, human safety problems, lack of sufficient efficacy, or low priority. Four of the compounds dropped from consideration are known or suspected carcinogens: furazolidone (NF-180), nitrofurazone (Furacin), carofur, and chloramphenicol (Chloromycetin). The registration of silvex was cancelled because it has been shown to be a carcinogen. Use of acrolein (Aqualin) was discontinued by its United States sponsor because it was considered too hazardous for use. Diuron, Thanite, GD-174, toxaphene, ammonia, acriflavin, and sodium cyanide have also been dropped from consideration for registration.

Registered or Approved Compounds

Information is presented in the Appendix on products that have been registered or approved for use in fish culture or for the management of fishery resources. The Appendix tables are organized according to the following categories: therapeutants (Table A-1), anesthetics (Table A-2), disinfecting agents (Table A-3), water treatment compounds (Table A-4), herbicides and algicides (Table A-5), and fish control agents (Table A-6). Each table provides information on the product, such as trade and common names, sponsor, fishery use patterns, rates of application, and status of tolerance establishment. Comments are also provided on food use classifications, withdrawal times, and special conditions for use. Tables A-7 and A-8 provide conversion units and abbreviations. Readers and users are advised to always consult labels on formulations for specific details.

Several terms or phrases used in the tables should be noted because they have very specific meanings as defined in laws or in implementing regulations. *Tolerance* refers to residue levels of a drug or chemical that are permitted by regulatory agencies in food eaten by humans. *Withdrawal time* is the period of time that must pass after the last treatment or exposure to a certain drug, chemical, or pesticide before an animal can be consumed. Substances *generally recognized as safe* (GRAS) are widely used in items that FDA, after evaluating the existing data, has found to be safe for use in human food. (Examples are spices, oils, synthetic flavorings, and preservatives.) A *new animal drug application* (NADA) is a petition from a sponsor to the FDA requesting approval of the use of a drug for a specified purpose. When FDA grants approval, a sponsor is said to hold an approved NADA on that particular drug.

The *data call-in* program requires registrants of pesticides to provide EPA with needed data that can be used to assess each pesticide during the periodic reregistration process or to resolve special safety concerns. The purpose of the program is to ensure that adequate data are available or are collected before a pesticide is assessed for reregistration or other purposes. The *registration standards* program is EPA's approach to the assessment and reregistration of pesticide products as mandated by the U.S. Congress. The assessment involves a thorough review of the scientific data base underlying pesticide registrations and an identification of essential but missing scientific studies. Each registration standard document explains EPA's regulatory position on the use of a pesticide, analyzes available data, describes the rationale for EPA's position, and states the conditions that must be met to obtain reregistration. The *special review* program, formerly "rebuttable presumption against registration" (RPAR), is the process whereby EPA evaluates the history of use of a pesticide against established risk criteria. If the use poses hazards that clearly exceed the risk criteria, the registration may be cancelled. When the potential hazard has not been well defined or substantiated, EPA asks the sponsor to submit data to refute or rebut the stated concerns. If the review shows that no real hazard exists, the use is returned to the normal registration process. As the result of a special review program by EPA, a pesticide can be returned to the registration process, cancelled, restricted in use, or continued in administrative hearings.

References

Anonymous. 1979. Announcement of compounds registered for fishery uses. Progressive Fish-Culturist 41:36–37.

Office of the Federal Register. 1984a. Code of federal regulations. Title 21—Food and drugs, parts 500–599. U.S. Government Printing Office, Washington, D.C.

Office of the Federal Register. 1984b. Code of federal regulations. Title 40—Protection of environment, parts 150–189. U.S. Government Printing Office, Washington, D.C.

Appendix

In the Appendix Tables A-1 to A-6, products are listed by trade names; common names are in parentheses. Tables A-7 and A-8 give conversion formulas and nonstandard abbreviations, respectively.

TABLE A-1.—Therapeutants registered or approved for aquatic or fishery uses.

Product	Sponsor	Fishery use	Tolerance	Comments
Acetic acid, commercial grade (Vinegar)		Parasiticide—1,000–2,000 ppm for 1–10 min	Exempted from tolerance	Food fish use; declared as GRAS by FDA as general purpose food additive
Formalin-F (Formalin)	Natchez Animal Supply Co., Natchez, Mississippi	Parasiticide for use on trout, salmon, catfish, largemouth bass, and bluegill—25 ppm in ponds; up to 250 ppm for 1 h in tanks and raceways Fungicide for use on eggs of trout, salmon, and esocids—1,000–2,000 ppm for 15 min in egg treatment tanks	Not yet determined	Food fish use
Furanace capsules (Nifurpyrinol, Furpyridinol; P-7138)	Amdal Co., Division of Abbott Laboratories, North Chicago, Illinois	Antibacterial drug against columnaris disease in aquarium fish—3.8 mg capsule to 10 gal of water for 1 h	None established	Nonfood fish use only; do not use in saltwater aquariums or while egg or live-bearing fish are reproducing
Masoten (Trichlorfon)	Mobay Chemical Corp., Kansas City, Missouri	Parasiticide against anchorworms, lice, and gill flukes on goldfish or bait fish—0.25 ppm active ingredient for indefinite period	None established	Nonfood fish use only; not for use in streams; do not apply to ponds used as a source of drinking water for humans or animals; removed from pre-RPAR review and returned to reregistration process
Romet-30 (Ro-5: sulfadimethoxine + ormetoprim)	Hoffmann-La Roche, Inc., Nutley, New Jersey	Antibacterial drug against furunculosis on salmonids—50 mg/kg of fish per day for 5 d	0.1 ppm in salmonids	Food fish use; do not treat within 6 weeks of marketing or release as stocked fish
Salt (Sodium chloride)		Osmoregulatory enhancer—0.5–1% for indefinite period; 3% for 10–30 min	Exempted from tolerance	Food fish use; declared as GRAS by FDA
Sulfamerazine in fish grade (Sulfamerazine)	American Cyanamid Co., Princeton, New Jersey	Antibacterial drug against furunculosis on salmonids—10 g/100 lb of fish per day for 14 d in feed; discontinue use after 14 d	Zero tolerance in uncooked edible tissues of trout	Food fish use; do not treat within 3 weeks of marketing or stocking in stream open to fishing
Terramycin for fish (Oxytetracycline)	Pfizer, Inc., New York, New York	Antibacterial drug against *Aeromonas*, *Hemophilus*, and *Pseudomonas*—2.5–3.75 g/100 lb of fish per day for 10 d in feed	0.1 ppm in salmonids and catfish	Food fish use; 21-d preslaughter withdrawal

TABLE A-2.—Anesthetics registered or approved for aquatic or fishery uses.

Product	Sponsor	Fishery use	Tolerance	Comments
Carbonic acid (Carbon dioxide)		Anesthetic— 200–400 ppm for 4 min	Exempted from tolerance	Declared as GRAS by FDA as general purpose food additive
Finquel (MS-222; tricaine methanesulfonate)	Argent Chemical Laboratories, Redmond, Washington	Anesthetic— 50–330 ppm for 1–40 min Sedation— 15–66 ppm for 6–48 h	None established	Food fish use; 21-d withdrawal after use before harvesting fish for food
Sodium bicarbonate (Baking soda)		Anesthetic— 142–642 ppm for 5 min	Exempted from tolerance	Declared as GRAS by FDA as general purpose food additive

TABLE A-3.—Disinfecting agents registered or approved for aquatic or fishery uses.

Product	Sponsor	Fishery use	Tolerance	Comments
Net-Dip (Didecyl dimethyl ammonium chloride) [Distributed as Sanaqua by Aquavet, Hayward, California]	Aquasciences Research Group, Inc., North Kansas City, Missouri	Disinfection of aquarium and fish-holding equipment— 2 fl oz in 4 gal water for 10 min Disinfection in fish disease control institutions— 3.5 fl oz in 4 gal for 10 min	None established	Nonfood fish use; do not use directly on fish or other cultured aquatic life
Olin HTH Dry Chlorinator Granular (Calcium hypochlorite)	Olin Corp., Stamford, Connecticut	Disinfectant and sanitizer— 200 ppm available chlorine for 1 h to sanitize fish tanks, raceways, and utensils 5–10 ppm residual chlorine for 12–24 h to control algae and bacteria in fish ponds	Exempted from tolerance	Food fish use; to control algae or kill bacteria in fish ponds, remove all fish from pond before treatment

TABLE A-4.—Water treatment compounds registered or approved for aquatic or fishery uses.

Product	Sponsor	Fishery use	Tolerance	Comments
Fluorescein sodium		Dye to check water flows or dilution— 0.1 ppm	None established	Food fish use; exempted from registration by EPA
Lime (Calcium hydroxide; calcium oxide; calcium carbonate)		Pond sterilant— 1,338 lb/acre of quick lime; 1,784 lb/acre of slaked lime	Exempted from tolerance	Food fish use; declared as GRAS by FDA as general purpose food additive; EPA issued a data call-in letter in March 1983 and it was referred to a registration standard
Potassium permanganate		Oxidizer and detoxifier— 2 ppm	None established	Food fish use; exempted from registration by EPA
Rhodamine B and WT		Dye to check water flows or dilution rates— 20 ppb	Exempted from tolerance	Food fish use; exempted from registration by EPA

TABLE A-5.—Herbicides and algicides registered or approved for aquatic or fishery uses.

Product	Sponsor	Fishery use	Tolerance	Comments
Acme Norosac G-10 (Dichlobenil)	PBI/Gordon Corp., Kansas City, Missouri	Herbicide—70–150 lb/acre	None established	Nonfood fish use only; do not apply to water used for irrigation, livestock, or human consumption, do not use fish from treated water for 90 d after application; do not use in commercial fish or shellfish water
Agway Copper Sulfate (Copper sulfate)	Agway, Inc., Syracuse, New York	Algicide—2.75–5.5 lb/acre-ft	Exempted from tolerance in meat, milk, poultry, eggs, fish, shellfish, and irrigated crops	Food fish use, do not use water for any purpose for 7 d after treatments; do not use in trout ponds, if algae are visible, treat no more than ⅓ to ½ of the total pond at one time and wait 10–14 d between treatments to protect fish; trout and other species of fish may be killed at application rates, but fish toxicity generally decreases when the hardness of the water increases
Algae Control (Copper sulfate)	Athea Laboratories, Inc., Milwaukee, Wisconsin	Herbicide and algicide—0.25–2 lb/h for each ft^3/s	Exempted from tolerance in meat, milk, poultry, eggs, fish, shellfish, and irrigated crops	Food fish use; trout and certain other species of fish may be killed at application rates recommended, especially in soft or acid waters; however, fish toxicity generally decreases when the hardness of the water increases; consult state fish and game agencies before application, especially in public waters
Algaetrol-76 (Copper, elemental)	Thompson-Hayward Chemical Co., Kansas City, Kansas	Algicide—0.75–1.5 gal/acre-ft	Exempted from tolerance in meat, milk, poultry, eggs, fish, shellfish, and irrigated crops	Food fish use; treated areas may be used immediately after treatment for swimming or fishing; do not use in water containing trout if the carbonate hardness of water is less than 50 ppm; to minimize hazard to fish, treat ⅓ to ½ of the water area in a single operation and wait 10–14 d between treatments
Algimycin PLL (Copper, elemental)	Great Lakes Biochemical Co., Inc., Milwaukee, Wisconsin	Algicide—4 oz/1,000 gal	Exempted from tolerance in meat, milk, poultry, eggs, fish, shellfish, and irrigated crops	Food fish use; remove large masses of floating algae manually before treatment if fish are present in the pond because decaying algae may reduce the oxygen content to a dangerous level for fish
Algimycin PLL-C (Copper, elemental)	Great Lakes Biochemical Co., Inc., Milwaukee, Wisconsin	Algicide—1–3 gal/acre-ft	Exempted from tolerance in meat, milk, poultry, eggs, fish, shellfish, and irrigated crops	Food fish use; remove large masses of floating algae manually before treatment if fish are present in the pond because decaying algae may reduce the oxygen content to a dangerous level for fish; to minimize hazard to fish, never treat more than ⅓ of the surface at one time and wait 72 h before applying to another section
Algimycin PLL-C Slow Release (Copper sulfate)	Great Lakes Biochemical Co., Inc., Milwaukee, Wisconsin	Algicide—10–20 lb/acre-ft 20–40 lb/acre	Exempted from tolerance in meat, milk, poultry, eggs, fish, shellfish, and irrigated crops	Food fish use; if algae are visible, treat no more than ⅓ to ½ of the total pond at one time and wait 10–14 d between treatments to protect fish
Algon Algaecide (Copper, elemental)	Sungro Chemicals, Inc., Los Angeles, California	Algicide—1.3–2.5 gal/15,000 ft^3	Exempted from tolerance in meat, milk, poultry, eggs, fish, shellfish, and irrigated crops	Food fish use; may be toxic to trout and other species of fish; do not use in water containing trout if the carbonate hardness of water does not exceed 50 ppm; to minimize hazard to fish, treat ⅓ to ½ water area in a single operation and wait at least 10–14 d between treatments

TABLE A-5.—Continued.

Product	Sponsor	Fishery use	Tolerance	Comments
Amitrol-T Liquid Herbicide (Amitrole)	Union Carbide Agricultural Products Co., Inc., Research Triangle Park, North Carolina	Herbicide—0.5–10 gal 5–400 gal water	None established	Nonfood fish use only, for use in marshes and drainage ditches, do not apply where water will be used for irrigating, drinking, fishing, or other domestic purposes, a registration standard was issued on 30 March 1984 on its use as a herbicide. EPA is initiating a special review of amitrole because it causes cancer in laboratory animals
Aquacide (2,4-D)	Aquacide Co., St. Paul, Minnesota	Herbicide—2.5–4 lb 1,000 ft^2	0.1 ppm in potable water, 1 ppm in fish and shellfish	Food fish use to avoid fish suffocation when treating an entire body of water, treat ⅓ to ½ of the area at a time and allow 3–5 weeks before continuing to untreated areas, water drawn directly from treated areas may damage desirable plants; consult state fish and game agencies before applying to public waters
Aqua-Clear (Diquat dibromide)	I. Schneid, Inc., Atlanta, Georgia	Herbicide and algicide—0.25–2.5 ppm	0.01 ppm in potable water; 0.1 ppm in fish and shellfish	Food fish use, if dense weed areas are present, treat ⅓ to ½ of the water area in a single operation and wait at least 10–14 d between treatments to minimize hazard to fish; consult state fish and game agencies before applying to public waters, do not apply to muddy waters
Aqua-Kleen (2,4-D)	Union Carbide Agricultural Products Co., Inc., Research Triangle Park, North Carolina	Herbicide—100–200 lb/acre	0.1 ppm in potable water; 1 ppm in fish and shellfish	Food fish use, do not use treated water for irrigation, sprays, livestock, or domestic water supplies
Aqua-Pure Algaecide Organic Copper Complex (Copper, elemental)	Malter International Corp., New Orleans, Louisiana	Algicide—0.2–0.4 ppm	Exempted from tolerance in meat, milk, poultry, eggs, fish, shellfish, and irrigated crops	Food fish use, toxic to fish when the recommended maximum concentration at 0.4 ppm is exceeded, treat ½ of the lake or pond at one time when the rate of application is 0.4 ppm, the other ½ should be treated 7 d later to avoid oxygen depletion
Aquaquat (Diquat dibromide)	Aquacide Co., St. Paul, Minnesota	Herbicide—8–16 oz/1,000 ft^2	0.01 ppm in potable water; 0.1 ppm in fish and shellfish	Food fish use; for application only to ponds where there is little or no outflow of water and which are totally under the control of the user; do not use the treated water for animal consumption, spraying, irrigation, or domestic purposes for 14 d after treatment; do not apply to aquatic sites in Florida; to avoid fish suffocation, treat only ⅓ to ½ of the area at a time and wait 10–14 d between treatments, consult state fish and game agencies before applying to public waters
Aquashade (Acid blue and acid yellow)	Aquashade, Inc., Eldred, New York	Herbicide and algicide—1 gal/acre, 4 ft deep	None established	Nonfood fish use; safe to use treated water for swimming and irrigation purposes
Aquathol Granular (Endothall)	Pennwalt Corp., Philadelphia, Pennsylvania	Herbicide—13–108 lb acre-ft	0.2 ppm in potable water	Food fish use, do not use treated water for irrigation, spraying, or domestic purposes within 7 d of treatment, do not use fish from treated water within 3 d

TABLE A-5.—Continued.

Product	Sponsor	Fishery use	Tolerance	Comments
Aquathol K (Endothall)	Pennwalt Corp., Philadelphia, Pennsylvania	Herbicide—0.3–2.6 gal/acre-ft	0.2 ppm in potable water	Food fish use, do not use treated water for irrigation, spraying or domestic purposes within 7 d of treatment, do not use fish from treated water within 3 d
Aquatic Weed Control (Diquat dibromide)	Share Corp., Milwaukee, Wisconsin	Herbicide and algicide—0.25–2.5 ppm	0.01 ppm in potable water, 0.1 ppm in fish and shellfish	Food fish use, do not apply to muddy water, do not use treated water for human or animal consumption swimming, spraying or irrigation within 14 d after treatment, to minimize hazard to fish, treat ¼ to ½ of the water area in a single operation and wait at least 14 d between treatments; consult state fish and game agencies before applying to public waters
Aquatic Weed Killer (Diquat dibromide)	Venus Laboratories, Inc., Wood Dale, Illinois	Herbicide and algicide—10–20 gal/acre	0.01 ppm in potable water, 0.1 ppm in fish and shellfish	Food fish use, delay period to use treated water for drinking—14 d, and for livestock, swimming spraying, and irrigation—10 d; treat only ¼ to ½ of the dense weed areas at a time and wait 10–14 d between treatments to minimize hazard to fish, consult state fish and game agencies before applying to public waters
Aquatrine (Copper, elemental)	Applied Biochemists, Inc., Mequon, Wisconsin	Algicide—0.6–1.2 gal/acre-ft	Exempted from tolerance in meat, milk, poultry, eggs, fish, shellfish, and irrigated crops	Food fish use, fish or shrimp may be harvested immediately after treatment, do not use in waters containing trout if carbonate hardness of the water is less than 50 ppm, to minimize hazard to fish or shrimp, treat ¼ to ½ of water area at a time allowing 1–2 weeks between consecutive treatments, aerate, or resume water flow 12–24 h following treatment
Aquazine (Simazine)	Ciba-Geigy Corp., Greensboro, North Carolina	Algicide and herbicide—1.7–8.5 lb/acre-ft	0.01 ppm in potable water; 12 ppm in fish	Food fish use; treated water may not be used for irrigation, spraying, livestock, or human consumption for 12 months following treatment; treated ponds may be used for swimming 4 hours after application
AV-70 Algaecide (Copper, elemental)	A & V, Inc., Pewaukee, Wisconsin	Algicide—0.75–1.5 gal/acre-ft	Exempted from tolerance in meat, milk, poultry, eggs, fish, shellfish, and irrigated crops	Food fish use, do not use in water containing fish if the carbonate hardness of water is less than 50 ppm; to minimize hazard to fish, treat ¼ to ½ of the water area in a single operation and treat remainder in 1–2 week intervals
AV-70 Plus Algaecide (Copper, elemental)	A & V, Inc., Pewaukee, Wisconsin	Algicide—0.62–1.25 gal/acre-ft	Exempted from tolerance in meat, milk, poultry, eggs, fish, shellfish, and irrigated crops	Food fish use, water can be used immediately after treatment, do not use in water containing fish if the carbonate hardness of water is less than 50 ppm; to minimize hazard to fish, treat ¼ to ½ of water area in a single operation and wait 10–14 d between treatments
Border-Patrol (Diquat dibromide)	Rose Chemical Products, Inc., Columbus, Ohio	Herbicide—10–40 gal/acre	0.01 ppm in potable water, 0.1 ppm in fish and shellfish	Food fish use, delay period to use treated water for drinking—14 d, and for livestock, swimming spraying, and irrigation—10 d, if dense weed areas are present, treat only ¼ to ½ of the dense weed areas at a time and wait

TABLE A-5.—Continued.

Product	Sponsor	Fishery use	Tolerance	Comments
				14 d between treatments to minimize hazard to fish; do not apply to muddy water; consult state fish and game agencies before applying to public waters
Clean-Flo Lake Cleanser (Aluminum sulfate, calcium sulfate, boric acid)	Clean-Flo Laboratories, Inc., Hopkins, Minnesota	Herbicide and algicide— 50 lb·acre-ft	Aluminum sulfate exempted from tolerance	Food fish use, no restrictions on fishing, swimming, or irrigation; will work only in ponds and lakes that are properly aerated, is neutralized by high carbon dioxide levels in the water, for use only by applicators licensed by the company
Clean-up (Diquat dibromide)	I. Schneid, Inc., Atlanta, Georgia	Herbicide and algicide— 0.25–2.5 ppm	0.01 ppm in potable water; 0.1 ppm in fish and shellfish	Food fish use; if dense weed areas are present, treat ⅓ to ½ of the water area in a single operation and wait at least 10–14 d between treatments to minimize hazard to fish; consult state fish and game agencies before applying to public waters, do not apply to muddy water
Conkill (Diquat dibromide)	Athea Laboratories, Inc., Milwaukee, Wisconsin	Herbicide and algicide— 0.25–2.5 ppm	0.01 ppm in potable water; 0.1 ppm in fish and shellfish	Food fish use; do not apply to muddy water; for application to ponds, lakes, and drainage ditches where there is little or no outflow of water and which are totally under the control of the user; do not use the treated water for animal consumption, swimming, spraying, irrigation, or domestic purposes for 14 d after treatment; do not apply to aquatic sites in Florida; to minimize hazard to fish, treat ⅓ to ½ of the water area in a single operation and wait at least 14 d between treatments, consult state fish and game agencies before applying to public waters
Copper Sulfate (Copper sulfate)	Universal Cooperatives, Inc., Minneapolis, Minnesota	Algicide— 2.75–5.5 lb/acre-ft	Exempted from tolerance in meat, milk, poultry, eggs, fish, shellfish, and irrigated crops	Food fish use; sectional treatments help prevent loss of fish
Copper Sulfate Granular Crystals (Copper sulfate)	Tennessee Chemical Co., Atlanta, Georgia	Algicide— 0.25–2 ppm	Exempted from tolerance in meat, milk, poultry, eggs, fish, shellfish, and irrigated crops	Food fish use; trout and certain other fish species may be killed at application rates recommended on this label especially in soft or acid waters; however, fish toxicity generally decreases when the hardness of the water increases; when controlling algae in impounded waters, lakes or reservoirs (not including rice fields) and the entire body of water is to be treated, treat only ⅓ to ½ of the water area in a single operation and wait 10–14 d between treatments; consult state fish and game agencies before applying, especially to public waters; if treated water is to be used as potable water, the residual metallic copper content must not exceed 1 ppm (4 ppm copper sulfate pentahydrate)

TABLE A-5.—Continued.

Product	Sponsor	Fishery use	Tolerance	Comments
Cutrine Algaecide (Copper, elemental)	Applied Biochemists, Inc., Mequon, Wisconsin	Algicide—0.75–1.5 gal/acre-ft	Exempted from tolerance in meat, milk, poultry, eggs, fish, shellfish, and irrigated crops	Food fish use: water may be used immediately after treatment; do not use in water containing trout if the carbonate hardness of water is less than 50 ppm
Cutrine Granular Algaecide (Copper, elemental)	Applied Biochemists, Inc., Mequon, Wisconsin	Algicide—1 lb/430 ft^2	Exempted from tolerance in meat, milk, poultry, eggs, fish, shellfish, and irrigated crops	Food fish use; water may be used immediately after treatment; never treat more than ⅓ to ½ of lake or pond at a time to avoid suffocation of fish due to lack of oxygen; do not use in water containing trout if the carbonate hardness of water is less than 50 ppm
Cutrine-Plus Algaecide (Copper, elemental)	Applied Biochemists, Inc., Mequon, Wisconsin	Algicide—0.6–1.2 gal/acre-ft	Exempted from tolerance in meat, milk, poultry, eggs, fish, shellfish, and irrigated crops	Food fish use; treated areas may be used for swimming or fishing immediately after treatment; do not use in water containing trout if the carbonate hardness of water is less than 50 ppm
Dichlone 50 WP (Dichlone)	FMC Corp., Agricultural Chemical Group, Philadelphia, Pennsylvania	Algicide—2.2 oz/acre-ft	None established	Nonfood fish use only; do not apply in shallow ponds that contain desirable fish; do not use in potable water; treat ⅓ of pond at a time to minimize effect on fish; re-treat in 2–3 d after decomposition of algae has occurred; consult state fish and game agencies before application
Diquatic Weed Killer (Diquat dibromide)	Lubar Co., Kansas City, Missouri	Herbicide—0.25–2.5 ppm	0.01 ppm in potable water; 0.1 ppm in fish and shellfish	Food fish use; for application to ponds, lakes, and drainage ditches where there is little or no outflow of water and which are totally under the control of the user; do not use the treated water for animal consumption, swimming, spraying, irrigation, or domestic purposes for 14 d after treatment; when treating water areas containing fish, treat only ⅓ to ½ of the water area in a single operation; consult state fish and game agencies before applying to public waters
Formula 268 Aqua-Quat (Diquat dibromide)	The State Chemical Manufacturing Co., Cleveland, Ohio	Herbicide—10–40 gal acre	0.01 ppm in potable water; 0.1 ppm in fish and shellfish	Food fish use; do not apply to muddy water; for application only to ponds, lakes, and drainage ditches where there is little or no outflow of water and which are totally under the control of the user, do not use treated water for animal consumption, spraying, irrigation, or domestic purposes for 14 d after treatment; do not apply at aquatic sites in Florida; to minimize hazard to fish, treat ⅓ to ½ of the water area in a single operation and wait 10–14 d between treatments; consult state fish and game agencies before applying to public waters
Herbizole (Amitrole)	Fairmont Chemical Co., Inc., Newark, New Jersey	Herbicide—0.5–10 gal acre	None established	Nonfood fish use only; do not apply where water will be used for irrigating, drinking, or any domestic uses, a registration standard was issued on 30 March 1984 on its use as a herbicide; EPA is initiating a special review of amitrole because it causes cancer in laboratory animals

TABLE A-5.—Continued.

Product	Sponsor	Fishery use	Tolerance	Comments
Hydrothol 191 (Endothall)	Pennwalt Corp., Philadelphia, Pennsylvania	Algicide—0.6–2.2 pt/acre-ft Herbicide—0.7–3.4 gal/acre-ft	0.2 ppm in potable water	Food fish use: do not use treated water for livestock or domestic purposes within the following periods: up to 0.3 ppm—7 d after treatment, up to 3 ppm—14 d after application, up to 5 ppm—25 d after application; do not use fish from treated waters for food or feed within 3 d after treatment
Hydrothol 191 Granular (Endothall)	Pennwalt Corp., Philadelphia, Pennsylvania	Algicide and herbicide—3–136 lb/acre-ft	0.2 ppm in potable water	Food fish use: do not use treated water for livestock or domestic purposes within the following periods: up to 0.3 ppm—7 d after treatment, up to 3 ppm—14 d after application, up to 5 ppm—25 d after application; do not use fish from treated waters for food or feed within 3 d after treatment
Kocide Copper Sulfate Pentahydrate Crystals (Copper sulfate)	Kocide Chemical Corp., Houston, Texas	Herbicide and algicide—0.25–2 ppm To control tadpole shrimp—5–10 lb/acre	Exempted from tolerance in meat, milk, poultry, eggs, fish, shellfish, and irrigated crops	Food fish use: to minimize hazard to fish, treat ⅓ to ½ of the water area in a single operation and wait 10–14 d between treatments; if treated water is to be used as a source of potable water, the metallic copper residual must not exceed 1 ppm (4 ppm copper sulfate pentahydrate)
Komen Aquatic Herbicide (Copper, elemental)	Kocide Chemical Corp., Houston, Texas	Herbicide—6–16 gal/acre	Exempted from tolerance in meat, milk, poultry, eggs, fish, shellfish, and irrigated crops	Food fish use: trout and other species of fish may be killed at application rates recommended; however, fish toxicity generally decreases when the hardness of the water increases; consult state fish and game agencies before applying to public waters; to minimize hazard to fish, treat ⅓ to ½ of the water area in a single operation and wait 10–14 d between treatments
K-Tea Algaecide (Copper, elemental)	Kocide Chemical Corp., Houston, Texas	Algicide—0.2–1 ppm/acre	Exempted from tolerance in meat, milk, poultry, eggs, fish, shellfish, and irrigated crops	Food fish use: to minimize hazard to fish, treat ⅓ to ½ of the water area in a single operation and wait 10–14 d between treatments; trout and other species of fish may be killed at application rates recommended; however, fish toxicity generally decreases when the hardness of the water increases; consult state fish and game agencies before applying to public waters
Mogul AG-431 (Copper, elemental)	The Mogul Corp., Chagrin Falls, Ohio	Algicide—0.75–4.5 gal/acre	Exempted from tolerance in meat, milk, poultry, eggs, fish, shellfish, and irrigated crops	Food fish use; under conditions of heavy chara or filamentous algae growth or when treating the entire water body, treat ⅓ to ½ of the water area in a single operation; decaying vegetation depletes the oxygen content of water and will result in fish kills if an extensive area is treated at one time, treat remainder at 2 week intervals
National Chemsearch Watrol (Diquat dibromide)	National Chemsearch, Irving, Texas	Herbicide—12–48 gal/acre	0.01 ppm in potable water; 0.1 ppm in fish and shellfish	Food fish use: for application only to ponds, lakes, and drainage ditches where there is little or no overflow of water and which are totally under the control of the user, do not use the treated water for animal consumption, swimming, spraying, irrigation, or domestic purposes for 14 d after treatment; do not apply to aquatic

TABLE A-5.—Continued.

Product	Sponsor	Fishery use	Tolerance	Comments
				sites in Florida. if dense weed areas are present, treat only ⅓ to ½ of the dense weed areas at a time and wait 14 d between treatments to minimize hazard to fish, do not apply to muddy water, consult state fish and game agencies before applying to public waters
Norkem 500 (Diquat dibromide)	Kem Manufacturing Corp., Tucker, Georgia	Herbicide and algicide— 0.5–1.5 ppm	0.01 ppm in potable water; 0.1 ppm in fish and shellfish	Food fish use; for still or slow flowing ponds, lakes, ditches, laterals, canals, is not toxic to fish or wildlife
Ortho Diquat Herbicide HA (Diquat dibromide)	Chevron Chemical Co., San Francisco, California	Algicide— 0.5–1.5 ppm Herbicide— 0.5–2 gal/acre	0.01 ppm in potable water; 0.1 ppm in fish and shellfish	Food fish use, delay period before treated water can be used is 14 d for drinking and 10 d for livestock, swimming, spraying, and irrigation, do not apply to muddy water, to minimize hazard to fish, treat only ⅓ to ½ of dense weed areas and wait 10–14 d between treatment
P.D.Q. (Diquat dibromide)	I. Schneid, Inc., Atlanta, Georgia	Herbicide and algicide— 0.25–2.5 ppm	0.01 ppm in potable water; 0.1 ppm in fish and shellfish	Food fish use; if dense weed areas are present, treat ⅓ to ½ of the water area in a single operation and wait at least 10–14 d between treatments to minimize hazard to fish; consult state fish and game agencies before applying to public waters; do not apply to muddy water
Riverdale 2,4-D Granules (2,4-D)	Riverdale Chemical Co., Chicago, Illinois	Herbicide— 100 lb/acre	0.1 ppm in potable water; 1 ppm in fish and shellfish	Food fish use; decaying vegetation in treated areas may deplete the supply of oxygen, consequent suffocation of fish may be avoided by treating ⅓ to ½ of the water area in a single operation; untreated areas may be treated after the vegetation in the originally treated areas has thoroughly decayed, approximately 2–3 months
Rodeo (Glyphosate)	Monsanto Agricultural Products Co., St. Louis, Missouri	Herbicide, annuals— 1.5 pt to 3–30 gal water Herbicide, perennials— 4.5–7.5 pt to 3–20 gal water	0.25 ppm in fish 0.1 ppm in potable water	Food fish use; do not apply within 0.5 mile upstream of potable water intakes
Selig's Mister Trim Number 10 (Diquat dibromide)	Selig Chemical Industries, Atlanta, Georgia	Herbicide— 0.25–2.5 ppm	0.01 ppm in potable water; 0.1 ppm in fish and shellfish	Food fish use; for application only to ponds, lakes and drainage ditches where there is little or no outflow of water and which are totally under the control of the user, do not use the treated water for animal consumption, swimming, spraying, irrigation, or domestic purposes for 14 d after treatment; do not apply to aquatic sites in Florida; when treating water areas containing fish, aquatic weed control should proceed stepwise—in bands; large areas of decaying vegetation lowers the oxygen content of the water and results in serious loss of fish; do not apply to muddy water
Sentry Yardman (Diquat dibromide)	Sentry Chemical Co., Stone Mountain, Georgia	Herbicide— 0.25–2.5 ppm	0.01 ppm in potable water; 0.1 ppm in fish and shellfish	Food fish use; for application only to ponds, lakes and drainage ditches where there is little or no outflow of water and which are totally under the

TABLE A-5.—Continued.

Product	Sponsor	Fishery use	Tolerance	Comments
				control of the user, do not use the treated water for animal consumption, swimming, spraying, irrigation, or domestic purposes for 14 d after treatment; do not apply to muddy water; to minimize hazard to fish, treat ⅓ to ½ of the water area in a single operation and wait at least 10–14 d between treatments; consult state fish and game agencies before applying to public waters
Solricin 135 (Potassium ricinoleate)	CasChem, Inc., Bayonne, New Jersey	Algicide— 2 ppm, apply 3 times, 45 d apart Control Oscillatoria-type blue-green algae— 1.9–9.5 gal/acre-ft	Exempted from tolerance in catfish	Food fish use: apply 4 weeks before harvest to treat ponds containing off-favored fish, apply the recommended amount of product uniformly over the pond using a chemical boat, apply from shoreline outward toward the center of the pond; avoid dumping product as this can create hot spots and kill fish
Tennessee Chemical Copper Sulfate Medium Crystals (Copper sulfate)	Tennessee Chemical Co., Atlanta, Georgia	Algicide— 0.9–5.4 lb/acre-ft	Exempted from tolerance in meat, milk, poultry, eggs, fish, shellfish, and irrigated crops	Food fish use: if algae are visible, treat no more than ⅓ to ½ of the total pond at one time and wait 10–14 d between treatments to protect fish, trout and other fish may be killed at application rates, but fish toxicity decreases when water hardness increases
Triangle Brand Copper Sulfate (Copper sulfate)	Phelps Dodge Refining Corp., New York, New York	Algicide— 0.7–2.7 lb/acre-ft	Exempted from tolerance in meat, milk, poultry, eggs, fish, shellfish, and irrigated crops	Food fish use; restrict livestock and swimming for 12 h after treatment
Ultimate (Diquat dibromide)	Stern Chemtech Corp., Monroe, Louisiana	Herbicide— 5–20 gal acre	0.01 ppm in potable water; 0.1 ppm in fish and shellfish	Food fish use; delay period to use treated water for drinking—14 d, and for livestock, swimming, spraying, and irrigation—10 d; do not apply to muddy water
Vertac Weed-Rhap A-4D (2,4-D)	Vertac Chemical Corp., Jacksonville, Arkansas	Herbicide— 2.5–4.5 pt/acre	0.1 ppm in potable water; 1 ppm in fish and shellfish	Food fish use: do not contaminate domestic water supplies or irrigation water; to minimize hazard to fish, treat no more than ⅓ to ½ of the water area in any 1 month
Vertac Weed-Rhap LV-4D (2,4-D)	Vertac Chemical Corp., Jacksonville, Arkansas	Herbicide— 2.5–4.5 pt/acre	0.1 ppm in potable water; 1 ppm in fish and shellfish	Food fish use; do not contaminate domestic water supplies or irrigation water
Vertac Weed-Rhap LV-6D (2,4-D)	Vertac Chemical Corp., Jacksonville, Arkansas	Herbicide— 1.66–3 pt/acre	0.1 ppm in potable water; 1 ppm in fish and shellfish	Food fish use; do not contaminate domestic water supplies or irrigation water; to minimize hazard to fish, treat no more than ⅓ to ½ of the water area in any 1 month
Weedar 64 (2,4-D)	Union Carbide Agricultural Products Co., Inc., Research Triangle Park, North Carolina	Herbicide— 2.5–10 gal/acre	0.1 ppm in potable water; 1 ppm in fish and shellfish	Food fish use; do not use treated water for irrigation, sprays, livestock, or domestic water supplies
Weed-A-Way (Copper, elemental)	Sungro Chemicals, Inc., Los Angeles, California	Herbicide and algicide— 1 gal/2,500 ft^2 water 6 ft deep or	Exempted from tolerance in meat, milk, poultry, eggs, fish,	Food fish use: do not use treated water for irrigation or for agricultural sprays on food crops or for domestic purposes within 7 d of treatment; do not use

TABLE A-5.—Continued.

Product	Sponsor	Fishery use	Tolerance	Comments
		1 gal ft of water to maximum of 3 gal 7,500 ft^2 water less than 3 ft deep	shellfish, and irrigated crops	fish from treated water for food or feed within 3 d of treatment; to avoid a fish kill, never treat an entire lake at one time, allow at least 10–14 d between treatments to allow the chemical to dissipate and to avoid oxygen depletion, in very soft water, reduce amount by ¼, and reduce size of treatment areas to avoid a fish kill
Weed Boomer (Diquat dibromide)	Target Chemical Co., Cerritos, California	Herbicide and algicide— 0.5–1.5 ppm	0.01 ppm in potable water; 0.1 ppm in fish and shellfish	Food fish use; do not apply to muddy water, do not use treated water for drinking purposes until 14 d after treatment, to minimize hazard to fish, treat ⅓ to ½ of the water area in a single operation and wait at least 10–14 d between treatments consult state fish and game agencies before applying to public waters
Weed-O-Cide (Diquat dibromide)	Quality Chemical Co., North Miami, Florida	Herbicide and algicide— 0.25–2.5 ppm	0.01 ppm in potable water; 0.1 ppm in fish and shellfish	Food fish use; do not apply to muddy water; do not use treated water for human or animal consumption, swimming, spraying, or irrigation within 10 d after treatment; if dense weed areas are present, treat only ⅓ to ½ of the dense weed areas at a time and wait 14 d between treatments to minimize hazard to fish; consult state fish and game agencies before applying to public waters
Weedtrine II (2,4-D)	Applied Biochemists, Inc., Mequon, Wisconsin	Herbicide— 100 lb acre	0.1 ppm in potable water; 1 ppm in fish and shellfish	Food fish use; do not contaminate irrigation ditches or water used for domestic purposes
Weedtrine-D (Diquat dibromide)	Applied Biochemists, Inc., Mequon, Wisconsin	Algicide— 0.5–1.5 ppm Herbicide— 2.5–10 gal acre	0.01 ppm in potable water; 0.1 ppm in fish and shellfish	Food fish use; delay period to use treated water for drinking 14 d, and for livestock, swimming, spraying, and irrigation 10 d; do not apply to muddy water; to minimize hazard to fish, treat only ⅓ to ½ of the dense weed areas at a time and wait 10–14 d between treatments
WKC-5 (Diquat dibromide)	ABCO Inc., Irwin, Pennsylvania	Herbicide— 9.5–37 gal acre	0.01 ppm in potable water; 0.1 ppm in fish and shellfish	Food fish use; do not apply to muddy water; for application only to ponds, lakes and drainage ditches where there is little or no outflow of water and which are totally under the control of the user; do not use the treated water for animal consumption, spraying, irrigation, or domestic purposes for 14 d after treatment; if dense weed areas are present, treat only part of dense weed areas at a time to prevent hazard to fish
Xylene (Xylene)	Union Oil Co. of California; Union Chemicals Division, Schaumburg, Illinois	Herbicide— 100 gal acre	Exempted from tolerance when used as an aquatic herbicide applied to irrigation conveyance systems	Food fish use; for use only in programs of the U.S. Bureau of Reclamation and cooperating water user organizations, not for use in potable water; residues not to exceed 10 ppm

TABLE A-6.—Fish control agents registered or approved for aquatic or fishery uses.

Product	Sponsor	Fishery use	Tolerance	Comments
Bayluscide 5% Granular Sea Lamprey Larvicide (Bayer 73)	Mobay Chemical Corp., Kansas City, Missouri	Survey tool for sea lamprey populations—100 lb/acre	None established	Nonfood fish use only; restricted for use by certified applicators of the U.S. Fish and Wildlife Service, Fisheries and Oceans Canada, and provincial and state fish and game personnel
Bayluscide-TFM Wettable Powder Sea Lamprey Larvicide (Bayer 73, TFM)	Mobay Chemical Corp., Kansas City, Missouri	Lampricide—Mixed with TFM in proportions that result in final concentration of Bayluscide of not more than 2% of TFM by weight	None established	Nonfood fish use only; restricted for use by certified applicators of the U.S Fish and Wildlife Service, Fisheries and Oceans Canada, and provincial and state fish and game personnel
Bayluscide 70% Wettable Powder (Bayer 73)	Mobay Chemical Corp., Kansas City, Missouri	Lampricide—Used with TFM in proportions that result in final concentration of Bayluscide of not more than 2% of TFM by weight	None established	Nonfood fish use only; restricted for use by certified applicators of the U.S. Fish and Wildlife Service, Fisheries and Oceans Canada, and provincial and state fish and game personnel
Chem-Fish Regular (Rotenone)	Tifa Limited, Millington, New Jersey	Piscicide—0.5–10 ppm of 5% rotenone	Exempted from tolerance when applied to growing crops; not exempted when applied to a crop at the time of or after harvest	Nonfood fish use only; consult state game and fish agencies before applying
Chem-Fish Special OF (Rotenone)	Tifa Limited, Millington, New Jersey	Piscicide—0.5–10 ppm of 5% rotenone	Exempted from tolerance when applied to growing crops; not exempted when applied to a crop at the time of or after harvest	Nonfood fish use only; consult state game and fish agencies before applying
Chem-Fish Synergized (Rotenone)	Tifa Limited, Millington, New Jersey	Piscicide—1 gal of 2.5% rotenone/6 acre-ft	Exempted from tolerance when applied to growing crops; not exempted when applied to a crop at the time of or after harvest	Nonfood fish use only; consult state game and fish agencies before applying
Fintrol-Concentrate (Antimycin)	Aquabiotics Corp., Northbrook, Illinois	General piscicide—1–10 ppb	None established	Nonfood fish use only; fish killed with Fintrol should not be consumed by man or animals; treated water should not be consumed by man, livestock, or for crop irrigation until fingerling fish survive 48 h exposure in live cars in the treated waters. Fintrol can be used to remove scaled fish from catfish ponds
Noxfish Fish Toxicant (Rotenone)	Penick Corp., Lyndhurst, New Jersey	Piscicide—0.1–5 ppm of 5% rotenone	Exempted from tolerance when applied to growing crops; not exempted when applied to a crop at the time of or after harvest	Nonfood fish use only; keep out of lakes, streams, or ponds except under use conditions; registered for use by, or under permit from, and after consultation with, state and federal fish and wildlife agencies

TABLE A-6.—Continued.

Product	Sponsor	Fishery use	Tolerance	Comments
Nusyn-Noxfish Fish Toxicant (Rotenone)	Penick Corp., Lyndhurst, New Jersey	Piscicide—0.2–10 ppm of 2.5% rotenone	Exempted from tolerance when applied to growing crops, not exempted when applied to a crop at the time of or after harvest	Nonfood fish use only; restock 2–4 weeks after treatment, keep out of lakes, streams, or ponds except under use conditions; registered for use by, or under permit from, and after consultation with, state and federal fish and wildlife agencies
Powdered Cube Root (Rotenone)	Penick Corp., Lyndhurst, New Jersey	Piscicide—1.36 lb of 5% rotenone acre-ft	Exempted from tolerance when applied to growing crops; not exempted when applied to a crop at the time of or after harvest	Nonfood fish use only
Prentox Prenfish Toxicant (Rotenone)	Prentiss Drug and Chemical Co., Inc., New York, New York	Piscicide—0.1–5 ppm of 5% rotenone	Exempted from tolerance when applied to growing crops; not exempted when applied to a crop at the time of or after harvest	Nonfood fish use only; restock 2–4 weeks after treatment, keep out of lakes, streams, or ponds except under use conditions; registered for use by, or under permit from, and after consultation with, state and federal fish and wildlife agencies
Prentox Rotenone Fish Toxicant Powder (Rotenone)	Prentiss Drug and Chemical Co., Inc., New York, New York	Piscicide—0.1–5 ppm of 5% rotenone	Exempted from tolerance when applied to growing crops; not exempted when applied to a crop at the time of or after harvest	Nonfood fish use only; restock 2–4 weeks after treatment; keep out of lakes, streams, or ponds except under use conditions; registered for use by, or under permit from, and after consultation with, state and federal fish and wildlife agencies
Prentox Synprenfish Toxicant (Rotenone)	Prentiss Drug and Chemical Co., Inc., New York, New York	Piscicide—0.2–10 ppm of 2.5% rotenone	Exempted from tolerance when applied to growing crops; not exempted when applied to a crop at the time of or after harvest	Nonfood fish use only; restock 2–4 weeks after treatment; keep out of lakes, streams, or ponds except under use conditions; registered for use by, or under permit from, and after consultation with, state and federal fish and wildlife agencies
5% Rotenone-Fish Toxicant Powder (Rotenone)	Tifa Limited, Millington, New Jersey	Piscicide—8 lb of 5% rotenone 6 acre-ft	Exempted from tolerance when applied to growing crops; not exempted when applied to a crop at the time of or after harvest	Nonfood fish use only; consult state and federal fish and wildlife agencies before applying; dust may be irritating to eyes, skin, and mucous membranes, wear protective clothing
Rotenone Solution FK-11 (Rotenone)	Fairfield American Corp., Newark, New Jersey	Piscicide—0.5–1 ppm of 2.5% rotenone	Exempted from tolerance when applied to growing crops; not exempted when applied to a crop at the time of or after harvest	Nonfood fish use only; for use only by, or under permit from, appropriate state and federal fish and wildlife agencies, do not apply to lakes, streams, or ponds except as directed on label and in accordance with appropriate state and federal fish and wildlife programs
Sea Lamprey Larvicide Lamprecid (TFM)	Hoechst Aktiengesellschaft, Frankfurt-am-Main, Germany	Lampricide—1–10 ppm, depending on the water quality	In progress	Nonfood fish use only; restricted for use by certified applicators of the U.S. Fish and Wildlife Service, Fisheries and Oceans Canada, and provincial and state fish and game personnel

TABLE A-6.—Continued.

Product	Sponsor	Fishery use	Tolerance	Comments
Security Fish-Tox-5 (Rotenone)	Woolfolk Chemical Works, Inc., Fort Valley, Georgia	Piscicide—0.5–1 ppm of 5% rotenone	Exempted from tolerance when applied to growing crops; not exempted when applied to a crop at the time of or after harvest	Nonfood fish use only; restock 2–4 weeks after treatment, not for use in running waters, public lakes, or without the consent of the owner of a private pond, state game and fish agencies must be contacted before use
Security Powdered Cube (Rotenone)	Woolfolk Chemical Works, Inc., Fort Valley, Georgia	Piscicide—1.3–3 lb of 5% rotenone acre-ft	Exempted from tolerance when applied to growing crops, not exempted when applied to a crop at the time of or after harvest	Nonfood fish use only, restock 2–4 weeks after treatment, not for use in running streams, public lakes, or without the consent of the owner of a private pond
TFM Bar (TFM)	Bell Laboratories, Inc., Madison, Wisconsin	Lampricide—One bar 0.25 ft^3/s 1 ppm for 8 h at 18°C or 0.8 ppm for 10 h at 12°C	In progress	Nonfood fish use only, restricted for use by certified applicators of the U.S Fish and Wildlife Service, Fisheries and Oceans Canada, and provincial and state fish and game personnel
Unico Rotenone Spray Powder (Rotenone)	Universal Cooperatives, Inc., Minneapolis, Minnesota	Piscicide—0.10–5.0 ppm of 5% rotenone	Exempted from tolerance when applied to growing crops; not exempted when applied to a crop at the time of or after harvest	Nonfood fish use only; restock 2–4 weeks after treatment; do not allow animals to drink the spray solution or runoff; avoid contamination of water; do not use for killing fish without first obtaining a permit from the state game and fish authorities; do not apply when weather conditions favor drift from area treated; do not apply where runoff is likely to occur; do not contaminate water by cleaning of equipment or disposal of wastes

TABLE A-7.—Conversion units.[a]

Unit	Conversion
Acre-foot	1 acre of surface area covered by 1 foot of water 43,560 cubic feet 2,718,144 pounds of water 326,000 gallons of water
Cubic foot	7.5 gallons 62.4 pounds of water 28,354.6 grams of water
Gallon	8.34 pounds of water 3,800 milliliters 3,800 grams of water
Quart	950 milliliters 950 grams of water
Pound	453.6 (454) grams 16 ounces
Ounce	28.35 grams

[a] A concentration of 1 ppm (mg/L) requires 2.7 pounds per acre-foot, 0.0038 grams per gallon, 0.0283 grams per cubic foot, or 0.0000623 pounds per cubic foot.

TABLE A-8.—Nonstandard abbreviations.

Co.	= Company
Corp.	= Corporation
EPA	= Environmental Protection Agency
fl oz	= fluid ounce
GRAS	= generally recognized as safe
Inc.	= Incorporated
NADA	= new animal drug application
pt	= pint (16 fluid ounces)
ppb	= parts per billion
RPAR	= rebuttable presumption against registration