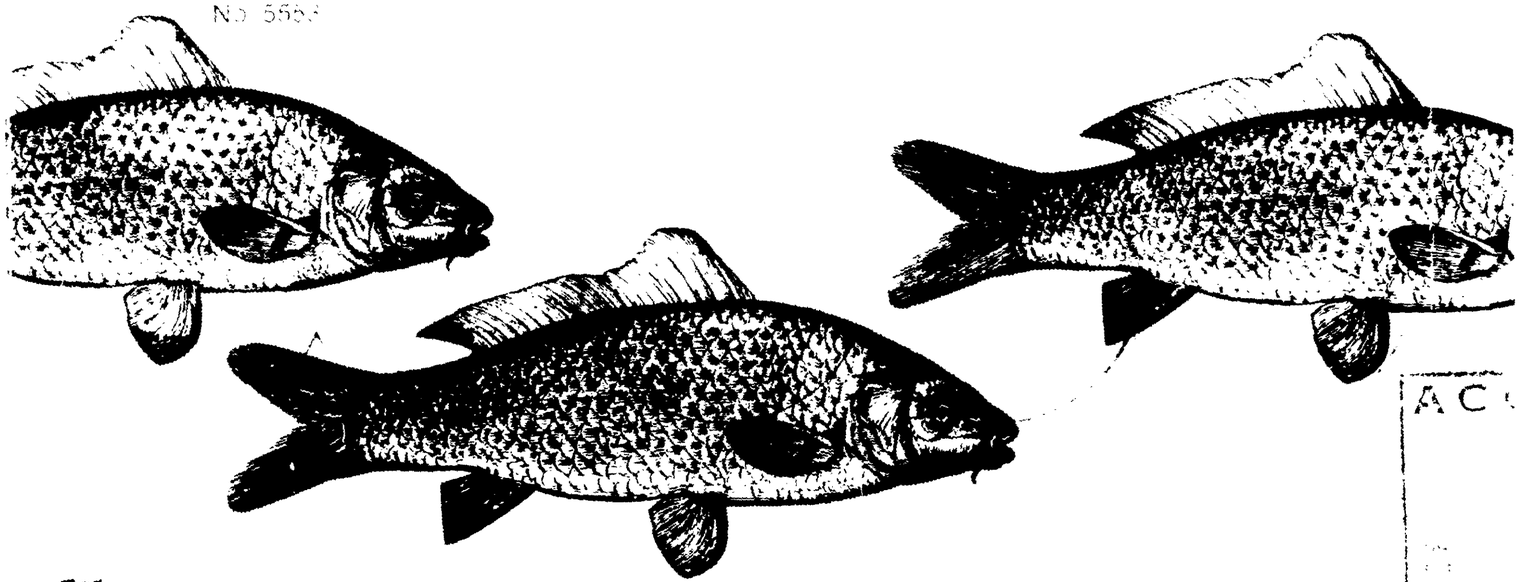


For
running waters,
very shallow waters,
bog lakes, streams,
catfish ponds,
shoal and shoreline areas.

AC

6-19-70

8991-7

®

FINTROL-CONCENTRATE releases toxicant to a depth of 2 to 3 feet.

This can contains 1 bottle of **Fi** **OL-Concentrate** (solution 20%) [green label] and 1 bottle of Diluent [blue label] for preparing 16 oz. of a solution containing:

ACTIVE INGREDIENT: ANTIMYCIN A	10%
INERT INGREDIENTS (in acetone)	90%
TOTAL	100%

Ayerst®

WARNING: Keep out of reach of children. Contains acetone. If swallowed, give 2 to 4 glasses of water, induce vomiting, and consult physician. See side panel for other WARNINGS.

Veterinary Medical Division • AYERST LABORATORIES INCORPORATED • New York, N.Y. 10017

U.S.D.A. Reg. No. 8991-7

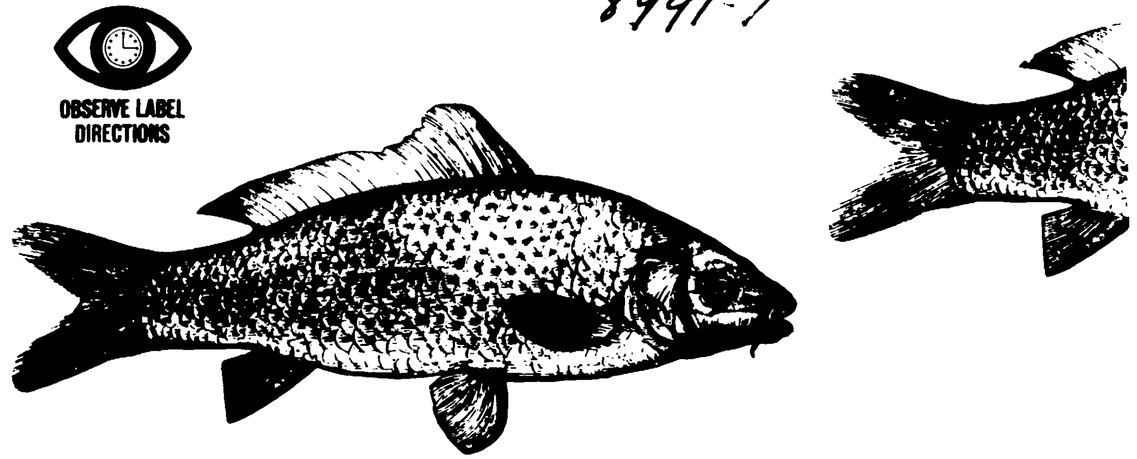
93

6-19-70

8991-7

TAKE TIME

OBSERVE LABEL DIRECTIONS



FINTROL-CONCENTRATE is designed for use in **running** waters (streams) and in **very shallow** waters. The active ingredient disperses to a depth of 2 to 3 feet. This liquid form of **FINTROL** can be applied to lakes and ponds by the boat bailer method or spray equipment. Spray methods are useful at depths to 1 foot. Boat bailer and drip tubes when applied at the propeller wash are useful at depths to 3 feet. For shoals, very small ponds, potholes, etc. a back-pack sprayer may be used. PROTECTIVE GOGGLES AND PROTECTIVE GLOVES MUST BE WORN AT ALL TIMES WHEN MIXING AND APPLYING **FINTROL.** In streams, **FINTROL-CONCENTRATE** is most often applied through drip stations established to meter the toxicant at a precalculated rate. Contents of this can will treat 38 acre-feet of water at 1 p.p.b.

FINTROL-CONCENTRATE can be used to eliminate all fish from a body of water (complete kill). Or, it can be used to remove only certain fish species or size groups from mixed populations (selective kill). It will effectively remove scale fish from catfish ponds.

DIRECTIONS FOR MIXING: Add **DILUENT** [blue label] to the **FINTROL-CONCENTRATE** (solution 20%) [green label] in the oversize mixing container. CAP TIGHTLY AND INVERT 2-3 TIMES TO MIX THOROUGHLY. FURTHER DILUTE WITH *AT LEAST* FIVE (5) GALLONS OF WATER. APPLY WITHIN EIGHT (8) HOURS. [Note: The solution obtained by mixing **DILUENT** and **FINTROL-CONCENTRATE** retains potency for up to seven (7) days. But once water has been added to this solution, it must be used within eight (8) hours to ensure potency.]

SPECIAL INSTRUCTIONS: Prior to the use of a fish toxicant in either public or private waters, the Director of the State Fish and Game Department or Conservation Department must be contacted to determine whether a permit is required. Such products must be used by or under the technical supervision of personnel of state and federal fish and game agencies, trained in fisheries management, who will provide any special instructions applicable to the particular geographical area.

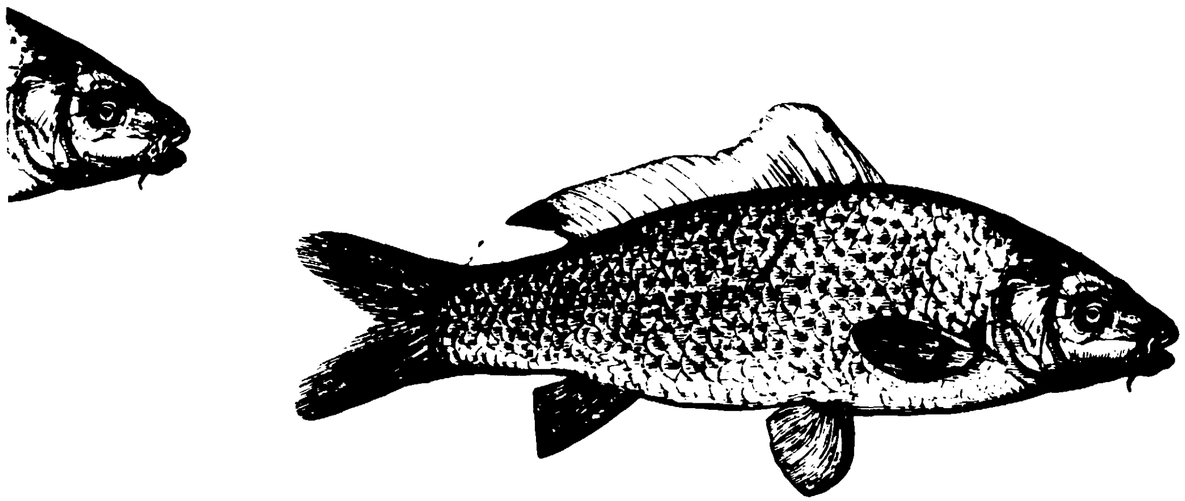
READ ACCOMPANYING LITERATURE CAREFULLY FOR DETAILED DIRECTIONS FOR USE OF THIS PRODUCT.

Use of **FINTROL-CONCENTRATE** does not impart detectable taste or odor to treated waters. Restocking can usually be done within a week after application.

Made and Printed in U.S.A.

6-19-70

8991-7



WARNING: May be fatal or harmful if swallowed. Keep out of reach of children, pets, livestock, and wildlife. Avoid inhalation of vapors or contact with skin and eyes. Use PROTECTIVE GOGGLES AND PROTECTIVE GLOVES at all times when mixing, handling, or applying **FINTROL**.

Any contact of **FINTROL** with the eyes can cause **intense pain and irritation** immediately or within several hours following contact. If any contact occurs with eyes or skin, flush repeatedly with water immediately. Consult physician if discomfort occurs.

Contains acetone. If swallowed, give 2 to 4 glasses of water, induce vomiting, and consult physician. Should inhalation cause nausea, fresh air will dispel it.

FLAMMABLE: KEEP AWAY FROM HEAT AND FLAME.

Thoroughly rinse all containers prior to disposal. Pending the conclusion of studies now in progress, fish killed with antimycin A should not be consumed by man or animals. Treated water must not be used for drinking by man or animals, or for crop irrigation, until fingerling rainbow trout or fingerling bluegills survive 48 hours' exposure in livecars in the treated water.

LICENSED BY WISCONSIN ALUMNI RESEARCH FOUNDATION

FINTROL
BRAND OF ANTIMYCIN A
(U.S. PAT. NOS. 2,657,170 AND 3,152,953)

TAKE TIME

OBSERVE LABEL DIRECTIONS

Directions for mixing: Add DILUENT [blue label] to the **FINTROL-CONCENTRATE** (solution 20%) [green label] in the oversize mixing container. Mix thoroughly. Further dilute with AT LEAST forty (40) volumes of water. Apply within eight (8) hours.

NOTE: The solution obtained by mixing the Diluent with **FINTROL-CONCENTRATE** (solution 20%) retains potency for up to seven (7) days. But once water has been added to this solution, it must be used within eight (8) hours to ensure potency.

U.S.D.A. Reg. No. 8991-7

Net contents 5 Gallons

WARNING:
Keep out of reach of children
See side panel for other warnings.

Ayerst®
Veterinary Medical Division
AYERST LABORATORIES INC.
New York, N.Y. 10017

WARNING: FLAMMABLE: KEEP AWAY FROM HEAT AND FLAME. KEEP OUT OF REACH OF CHILDREN. Contains acetone. If swallowed, give 2 to 4 glasses of water, induce vomiting, and consult physician. KEEP TIGHTLY CAPPED.

READ ACCOMPANYING LITERATURE CAREFULLY FOR DETAILED DIRECTIONS FOR USE OF THIS PRODUCT.

LICENSED BY WISCONSIN ALUMNI RESEARCH FOUNDATION

FINTROL
BRAND OF ANTIMYCIN A
(U.S. PAT. NOS. 2,657,170 AND 3,152,953)

Directions for mixing: Add DILUENT [blue label] to the **FINTROL-CONCENTRATE** (solution 20%) [green label] in the oversize mixing container. Mix thoroughly. Further dilute with AT LEAST forty (40) volumes of water. Apply within eight (8) hours.

NOTE: The solution obtained by mixing the Diluent with **FINTROL-CONCENTRATE** (solution 20%) retains potency for up to seven (7) days. But once water has been added to this solution, it must be used within eight (8) hours to ensure potency.

U.S.D.A. Reg. No. 8991-7

Contents of this container, when mixed as directed with accompanying Diluent, will produce a solution of **FINTROL** containing:

ACTIVE INGREDIENT:	
ANTIMYCIN A	10%
INERT INGREDIENTS	
(in acetone)	90%
Total	100%

Net contents 5 Gallons

WARNING:
Keep out of reach of children

See side panel for other warnings.

Ayerst
Veterinary Medical Division
AYERST LABORATORIES INC.
New York, N.Y. 10017

WARNING: FINTROL-CONCENTRATE MAY BE INJURIOUS TO EYES. If any contact occurs with eyes or skin, flush repeatedly with water immediately. Consult physician. KEEP OUT OF REACH OF CHILDREN. Contains acetone. If swallowed, give 2 to 4 glasses of water, induce vomiting, and consult physician. FLAMMABLE: KEEP AWAY FROM HEAT AND FLAME. KEEP TIGHTLY CAPPED.

READ ACCOMPANYING LITERATURE CAREFULLY FOR DETAILED DIRECTIONS FOR USE OF THIS PRODUCT.

LICENSED BY WISCONSIN ALUMNI RESEARCH FOUNDATION

FINTROL
BRAND OF ANTIMYCIN A
(U.S. PAT. NOS. 2,657,170 AND 3,152,953)

TABLE IIb: FOR RAPID ESTIMATION OF FINTROL-15 REQUIREMENTS

Desired Concentration (p.p.b. active ingredient)	Amount of FINTROL-15 per acre-foot*
1 p.p.b.	0.96 oz.
2 p.p.b.	1.92 oz.
3 p.p.b.	2.88 oz.
4 p.p.b.	3.84 oz.
5 p.p.b.	4.80 oz.
6 p.p.b.	5.76 oz.
7 p.p.b.	6.72 oz.
8 p.p.b.	7.68 oz.
9 p.p.b.	8.64 oz.
10 p.p.b.	9.60 oz.

* Obtained by multiplying 0.96 oz. by the p.p.b.

Note: 1 standard measuring cup will deliver approximately 19 oz. by weight of FINTROL-15.

FINTROL-15, which releases its active ingredient within the first 15 feet of depth, is often used in combination with FINTROL-5 and FINTROL CONCENTRATE. In a lake of varying depth, FINTROL CONCENTRATE is recommended for the shallows, FINTROL-5 for areas where the approximate depth is 5 feet, and FINTROL-15 for the deepest (15 to 20 foot) portions.

Sample calculation:

To treat 50 acre-feet at 7 p.p.b., use:
6.72 oz. × 50 = 336 oz. ÷ 16 = 21 lb. of FINTROL-15.

TABLE IIc: FOR RAPID ESTIMATION OF FINTROL-CONCENTRATE REQUIREMENTS

Desired Concentration (p.p.b. active ingredient)	Amount of FINTROL-CONCENTRATE per acre-foot	
	cc.	oz. (approx.)*
1 p.p.b.	12.3	½
2 p.p.b.	24.6	¾
3 p.p.b.	36.9	1¼
4 p.p.b.	49.2	1½
5 p.p.b.	61.5	2
6 p.p.b.	73.8	2½
7 p.p.b.	86.1	2¾
8 p.p.b.	98.4	3¼
9 p.p.b.	110.7	3¾
10 p.p.b.	123.0	4

* Obtained by multiplying 12.3 cc. by the p.p.b.

Note: 1 measuring teaspoon = 5 cc.; 1 measuring tablespoon = 15 cc.; ¼ standard measuring cup = 60 cc.; ½ standard measuring cup = 120 cc.; 1 standard measuring cup = 240 cc.

† FINTROL-CONCENTRATE is a two solution mixture. After mixing it is readily diluted with running water. It is designed for use in running water, but may be used in still waters up to 3 feet deep when used as directed.

Sample calculation:

To treat 75 acre-feet at 3 p.p.b., use:
46.9 cc. × 75 = 2,767 cc. of FINTROL-CONCENTRATE
or
3¼ fl. oz. × 75 = 93¾ fl. oz. of FINTROL-CONCENTRATE

METHODS OF APPLICATION

IMPORTANT: DURING APPLICATION OF FINTROL, ALL PERSONS IN THE IMMEDIATE VICINITY SHOULD WEAR PROTECTIVE GOGGLES AND PROTECTIVE GLOVES.

Sand formulations: To insure good distribution in farm ponds, it is recommended that FINTROL-5 be distributed with the aid of a small boat powered by a small outboard motor. The toxicant may be applied simply by punching a hole in the bottom of a can and allowing the desired amount of FINTROL-5 to dribble out through the hole into the propwash. This will insure that all the active ingredient dissolves off the sand. The outboard motor will also mix the water in the pond giving a thorough distribution of the toxicant. If possible, deep spots are given a heavier dose of toxicant than shallow spots.

In larger bodies of water, a hand-operated or powered seed spreader can be employed to obtain a relatively uniform distribution of FINTROL-5 or FINTROL-15. The powered spreaders can be mounted on a boat and calibrated to the speed of the boat. Because of the fineness and abrasive characteristics of the sand, some modifications of these seeders may be necessary.

Liquid formulation: Directions for mixing: Add the Diluent [blue label] to the FINTROL-CONCENTRATE (solution 20%) [green label] in the oversize mixing container. Cap tightly and invert 2 to 3 times to mix thoroughly. Further dilute with AT LEAST five (5) gallons of water to insure that the acetone contained in FINTROL-CONCENTRATE will not affect rubber parts on any equipment that might be used to apply it. After water has been added, apply within eight (8) hours. [Note: The solution obtained by mixing the Diluent with FINTROL-CONCENTRATE (solution 20%) retains potency for up to seven (7) days. But once water has been added to this solution, it must be used within eight (8) hours to ensure potency.]

After appropriate dilution with water, the liquid formulation of FINTROL can be applied to lakes and ponds by the boat bailer method or spray equipment. Spray methods are useful at depths to one foot. Boat bailer and drip tubes when applied at the propeller wash are useful at depths to 3 feet. Pinpoint applications to shoal areas and small, isolated ponds can readily be made with backpack sprayers. (See CAUTION on use of PROTECTIVE GOGGLES AND PROTECTIVE GLOVES.) Application from an airplane is *not* recommended; before attempting aerial distribution, please contact: Aquatic Biology Department, Veterinary Medical Division, Ayerst Laboratories, 685 Third Avenue, New York, N.Y. 10017.

For treating, FINTROL CONCENTRATE is most often applied through drip stations established to meter the toxicant at a predetermined rate. Information on the use of such equipment may be obtained from state and/or federal agencies experienced in stream treatment.

It is recommended that applications of FINTROL be made at daybreak or as soon as there is enough light to work by.

PRECAUTIONS

Use PROTECTIVE GOGGLES AND PROTECTIVE GLOVES in all cases when mixing, handling, or applying FINTROL. Any contact of FINTROL with the eyes can cause *intense pain and irritation* immediately or within several hours following contact. Avoid contact of FINTROL with skin. If eye contact occurs, flush repeatedly with water immediately. Consult physician if discomfort persists. FINTROL CONCENTRATE contains acetone. If swallowed, give 2 to 4 glasses of water to dilute acetone, induce vomiting and consult physician. Should inhalation of fumes of FINTROL CONCENTRATE cause nausea, fresh air will dispel it.

FINTROL may be highly irritating if swallowed.

Keep FINTROL out of reach of children, pets, livestock, and wildlife. Thoroughly rinse all containers prior to disposal. Pending the conclusion of studies now in progress, fish killed with antimycin A should not be consumed by man or animals. Treated waters must not be used for drinking by man or animals, or for crop irrigation, until fingerling rainbow trout or fingerling bluegills survive 48 hours exposure in livecars in the treated waters.

With regard to the sand formulations, if the remaining contents of an opened can are not to be used immediately, the silica bag must be placed on top of the contents prior to resealing to protect the contents from moisture. Left-over portions of diluted liquid formulation retain potency for up to seven (7) days. But once water has been added to FINTROL-CONCENTRATE, it must be used within eight (8) hours to ensure potency.

Due to its acetone component, FINTROL-CONCENTRATE is flammable: keep away from heat and flame.

HOW TO DETERMINE WHEN TREATED WATER MAY BE RESTOCKED

Since antimycin A degrades rapidly following application, waters can usually be restocked about one week following treatment with FINTROL. Place livecars containing a sensitive species of fish in the treated water. It is recommended that these fish be fingerling rainbow trout or fingerling bluegills if the water temperature is between 38° and 68° F. When the water temperature exceeds 68° F., only fingerling bluegills should be used. If the fish survive for 48 hours, the water may be restocked.

HOW TO DETOXIFY FINTROL WITH POTASSIUM PERMANGANATE $KMnO_4$

It should be necessary to detoxify FINTROL in the outflow of a pond to prevent killing fish downstream, apply potassium permanganate ($KMnO_4$) at 1 part per million (1 p.p.m.) to the outflow. Drip systems of hose-and-drip or carburetor types can be employed to continuously dispense a solution of potassium permanganate into the water at the discharge outlet.

To evaluate the effectiveness of the detoxification process, place livecars containing fingerling rainbow trout or fingerling bluegills approximately 100 yards downstream from the site of $KMnO_4$ introduction. The water is considered detoxified if the fish survive for at least 48 hours in the livecar.

To detoxify FINTROL-treated streams, apply $KMnO_4$ at 1 p.p.m. at detoxification stations. Continue the application of $KMnO_4$ until all FINTROL-treated water has passed the station. The water may be considered detoxified when fingerling rainbow trout or fingerling bluegills survive for at least 48 hours in livecars placed 100 yards downstream from the site of potassium permanganate ($KMnO_4$) introduction.

Special instructions: Prior to the use of a fish toxicant in or near public [illegible] waters, the Director of the Fish and Game Department or Conservation Department should be contacted to determine whether [illegible] such. Such products must be used by or under the direct supervision of personnel of state and federal fish and game agencies, trained in fisheries techniques who will provide any special instructions applicable to the specific geographical area.

A SPECIAL BIOASSAY KIT is available without charge to personnel of state and federal agencies. Write on official letterhead to: Aquatic Biology Department, Veterinary Medical Division, Averst Laboratories, 685 Third Avenue, New York, N.Y. 10017.

No. 5201 FINTROL-5, containing 1% antimycin A. In 5 gallon cans, each containing Net Wt. [illegible] oz.

No. 5203 FINTROL-15 containing 5% antimycin A. In 5 gallon cans, each containing Net Wt. 75 lbs.

No. 5555 FINTROL-CONCENTRATE. 16 oz. unit containing 8 oz. (240 cc.) Diluent and 8 oz. (240 cc.) FINTROL-CONCENTRATE (20% solution) in an oversize mixing container. Also supplied, *on special order only*, 10 gallon unit containing 5 gallon Diluent and 5 gallon FINTROL-CONCENTRATE (20% solution) in oversize mixing container. In each case, when mixed, 10% antimycin A is provided.

FINTROL

Fish toxicant

For partial or complete eradication of undesirable freshwater fish

IMPORTANT: USE PROTECTIVE GOGGLES AND PROTECTIVE GLOVES AT ALL TIMES WHEN MIXING, HANDLING, OR APPLYING FINTROL. Any contact of FINTROL with the eyes can cause *intense pain and irritation* immediately or within several hours following contact. Avoid contact of FINTROL with skin. If any contact occurs with eyes or skin, flush repeatedly with water immediately. Consult physician if discomfort occurs.

FINTROL-CONCENTRATE contains acetone. If swallowed, give 2 to 4 glasses of water to dilute acetone, induce vomiting, and consult physician. FINTROL-CONCENTRATE is flammable: keep away from heat and flame.

[illegible] 5555

123

ASSIGNED TO WISCONSIN ALUMNI RESEARCH FOUNDATION

FINTROL
BRAND OF ANTIMYCIN A
U.S. PAT. NOS. 2,657,170 AND 3,152,953)

U.S.D.A. Reg. No. 8991-5 (for FINTROL-5)
U.S.D.A. Reg. No. 8991-6 (for FINTROL-15)
U.S.D.A. Reg. No. 8991-7 (for FINTROL-CONCENTRATE)

Veterinary Medical Division
AYERST LABORATORIES
INCORPORATED
New York, N.Y. 10017

8991-7

Revised March 1970

FINTROL® IS AVAILABLE IN THREE FORMULATIONS

FINTROL-5 is designed for use in small, shallow ponds and lakes, and in the shallow portions of large lakes. Its active ingredient (antimycin A) is coated on sand. When the coated sand descends in the water, the active ingredient is released within the first 5 feet of depth. Each can of FINTROL-5, weighing 8 lb., 4 oz. and containing 1% active ingredient by weight, will treat approximately 50 acre-feet of water at 1 p.p.b.

FINTROL-15 is intended specifically for use in treatment of the epilimnion, or upper layer, of large deep lakes and, also, for use in lakes and channels that do not exceed 15 to 20 feet in depth. FINTROL-15 is formulated to release antimycin A from its sand carrier within the first 15 feet of depth. Each can of FINTROL-15, weighing 7 lb. and containing 5% active ingredient by weight, will treat approximately 127 acre-feet of water at 1 p.p.b.

FINTROL-Concentrate is designed for use in running waters, streams, and shallow waters. This liquid form of FINTROL may be applied to lakes and ponds by boat bailer method or spray equipment. Spray methods are useful at depths to 1 foot. Boat bailer and drip tubes, when applied at the propeller wash, are useful at depths to 3 feet. Application from an airplane is *not* recommended; before attempting aerial distribution, please contact: Aquatic Biology Department, Veterinary Medical Division, Ayerst Laboratories, 685 Third Avenue, New York, N.Y. 10017. Each can of FINTROL-CONCENTRATE [containing 240 cc FINTROL-CONCENTRATE (solution 20%) and 240 cc. Diluent] will, after mixing, treat approximately 38 acre-feet of water at 1 p.p.b.

The three formulations of FINTROL are frequently used in combination. For instance, in lakes of varying depth, FINTROL-CONCENTRATE can be used in the shallows, FINTROL-5 at depths of approximately 5 feet, and FINTROL-15 in the deepest (15 to 20 foot) areas.

DESCRIPTION

The active ingredient of FINTROL is antimycin A. When absorbed through the gills of fish, antimycin A kills by interfering with the respiration of body cells. Antimycin A does not repel fish. This is an important advantage, particularly when running waters, bog lakes, and the epilimnion, or upper layer, of large lakes are treated. Fish make no attempt to escape contact with the toxicant by seeking to move into waters that are clear of it. FINTROL's action is rapid and irreversible.

Sensitivity to FINTROL varies widely among fish species. Hence, it may be employed to selectively destroy certain species, without affecting other species concurrently inhabiting the same body of water.

Sensitive
gizzard shad, trouts, pikes, carp, minnows, suckers, brook stickleback, white bass, sunfishes, perches, freshwater drum, sculpins

Least Sensitive
shortnose gar, bowfin, goldfish, catfish

FINTROL also may be used to selectively destroy certain age groups of species; younger fish are more sensitive to FINTROL.

Providing the concentration is correctly estimated, FINTROL can be used effectively at any time of year in either cold, warm, soft, hard, acid, alkaline, clear or turbid (muddy) waters. (See TABLE I and instructions for bioassay.)

FINTROL does not impart detectable taste or odor to treated waters. In the usual, recommended concentrations it causes no apparent harm to aquatic plants, insects, or bottom fauna. Since FINTROL's active ingredient degrades rapidly, the reclaimed waters may be restocked soon after treatment. **(See HOW TO DETERMINE WHEN TREATED WATER MAY BE RESTOCKED.)** There is very little interruption in availability of the waters for recreational, agricultural, industrial, or other purpose.

USES

FINTROL is used to cull undesirable species of fish from freshwater lakes, ponds, and streams. It can be used to eliminate all fish from a body of water (complete kill). Or, it can be used to remove only certain fish species or size groups from mixed populations (selective kill).

A **complete kill** may be achieved with a concentration of anywhere from 5 to 25 p.p.b. of active ingredient. **(See HOW TO DETERMINE THE MOST EFFECTIVE CONCENTRATION.)** FINTROL is particularly advantageous for complete kills because it detoxifies so rapidly the pond can usually be restocked in about a week, or as soon as caged fish survive 48 hours' exposure to the treated waters.

Under optimal circumstances, in ponds managed for sports fishing, **selective kills** may be achieved at concentrations as low as 0.5 to 1.0 p.p.b. However, because these concentrations are extremely low, there is no rule of thumb that can be relied upon to determine them accurately. A BIOASSAY IS ALWAYS REQUIRED TO PINPOINT THE OPTIMAL CONCENTRATION FOR SELECTIVE KILLS. (Literature describing this procedure is available upon request.)

A ***selective kill*** has these advantages: It can be made without interrupting sport fishing for more than a week or so, and fishing may be gradually improved without restocking. In the past, when bluegill, minnows, or green sunfish dominated a pond managed for bass, the usual solution to the problem was the total removal of all the fish with a fish toxicant. This meant restocking and little or no fishing for one or two years. Now with FINTROL this is no longer necessary. Low concentrations of FINTROL will affect small bluegill, green sunfish, and minnows primarily. Only a few of the very small bass will succumb. The bulk of the adult bluegill and green sunfish will not be affected. Thus FINTROL helps to bring about a balanced relationship between the bass and bluegill populations. This improves fishing without interrupting it for any appreciable length of time.

In **catfish farming** FINTROL can be used to *selectively eliminate* the trash fish (scale fish) that commonly reduce the yields and increase the costs of the commercial catfish farmer. It is possible to do this with FINTROL because concentrations that will eliminate scale fish generally will not harm adult catfish. The scale fish most often encountered by the catfish farmer will succumb to anywhere from 5 to 10 p.p.b. of active ingredient (see TABLE I) whereas, under ordinary circumstances, it takes in excess of 20 p.p.b. to kill catfish. [Caution should be exercised during "stress conditions" of unusually high water temperature and reduced oxygen content when the sensitivity of fishes to chemicals may increase.]

HOW TO SELECT THE APPROPRIATE FORMULATION

The nature of the water to be treated (its depth and rate of flow) and the character of the surrounding land are factors to be taken into consideration when determining the formulation of FINTROL to employ in a given situation.

HOW TO DETERMINE THE MOST EFFECTIVE CONCENTRATION

**For complete kills and, also,
for removal of scale fish from catfish ponds**

The concentration of antimycin A required to kill one or more species of fish in any given body of water depends upon: 1) the sensitivity of the species to be eradicated, and 2) the chemical and physical properties of the water at the time of application of the toxicant; the pH and the temperature of the water being the most important of these chemical and physical factors under ordinary circumstances. Therefore, to determine what concentration of antimycin A will be required to kill the undesirable fish in your pond or lake:

1) identify the species to be eradicated.
2) determine the pH and average water temperature by measuring at various sites and depths.
3) refer to TABLE I for approximate concentrations.
4) conduct a bioassay to pinpoint the optimal concentration.

TABLE I provides a rough estimate of the concentrations required for a **complete kill** under various environmental conditions. However, since water chemistry is subject to sudden alteration by many variable, and often unpredictable factors (pollution, heavy bloom, weather, [illegible]) it should be realized that such changes m[illegible] the performance of the toxicant. For this reason [illegible] measurements of pH and water temperature should always be taken as close to the time of treatment as is feasible. Also, **whenever a considerable expenditure is entailed, a bioassay is necessary to corroborate the concentrations**

selected by means of TABLE I. Bioassay will help establish the lowest concentration of FINTROL needed to achieve the desired result (and so will help reduce the cost of treatment).

TABLE I — FOR ROUGH ESTIMATION OF CONCENTRATIONS* OF FINTROL (ANTIMYCIN A) NEEDED FOR COMPLETE ERADICATION OF DIFFERENT FISH SPECIES, UNDER VARIOUS COMBINATIONS OF WATER TEMPERATURE AND WATER pH

TARGET SPECIES**	SENSITIVITY OF TARGET SPECIES TO FINTROL (in p.p.b. of active ingredient)	EFFECTIVE CONCENTRATION OF FINTROL* (in p.p.b. of active ingredient)			
		When pH is 8.5 or less		When pH is 8.5 or more	
		water temperature above 60° F.	water temperature below 60° F.	water temperature above 60° F.	water temperature below 60° F.
col. 1	col. 2	col. 3	col. 4	col. 5	col. 6
gizzard shad trouts pikes carp minnows suckers brook stickleback white bass sunfishes perches freshwater drum sculpins	5-10	5	7.5	7.5	10
shortnose gar bowfin goldfish catfish	15-25	15	20	20	25

*** The concentration level suggested by this table should be confirmed by an on-site bioassay.**
This table is applicable only when a *complete* kill is desired. Do not use it for a selective kill. (See the following section.)

** Fish nomenclature according to American Fisheries Society.

Note (columns 1 and 2) that the sensitivity of the target species determines the concentration range. To eradicate sensitive species, it is recommended that the appropriate formulation of FINTROL be applied so that the body of water will have a concentration of from 5 to 10 p.p.b. of antimycin A, depending upon variations in pH and water temperature. For more tolerant species, higher concentrations are recommended. Laboratory studies indicate that less sensitive fish will succumb at concentrations of from 15 to 25 p.p.b. of antimycin A, depending upon variations in pH and water temperature.
Columns 3 to 6 show how to adjust for pH and water temperature. Note that, in general, the lower the pH, the less FINTROL required. The higher the water temperature, the less FINTROL required. The ideal situation for a complete kill would combine: highly sensitive species, low pH and high water temperature.

For selective kills in ponds managed for sports fishing

The only way to determine the concentration of FINTROL needed for a **selective kill** is to perform a bioassay. This involves subjecting both the target and nontarget fish to several concentrations of FINTROL to determine the minimum lethal dose. (A description of the bioassay procedure is available upon request.)

Before applying FINTROL to either public or private waters, write to the Director of the State Fish and Game Department or Conservation Department for State and Federal regulations governing the use of fish toxicants in your area. (See **Special instructions.**)

HOW TO CALCULATE THE AMOUNT OF FINTROL TO BE ADDED TO A BODY OF WATER TO OBTAIN A GIVEN CONCENTRATION

To calculate the amount of FINTROL to be added to a body of water for eradication of undesired species, the following steps should be taken:

1. Select the formulation of FINTROL to be used. FINTROL-5 is recommended for use in small ponds, FINTROL-15 for deep lakes or channels, and FINTROL-CONCENTRATE for very shallow ponds, shallow flowing waters, or shoreline areas.
2. Determine the volume of water to be treated in acre-feet. This can be arrived at by multiplying the surface area in acres by the average depth in feet.
3. Determine the concentration to be used.
4. Multiply the number of acre-feet to be treated by the value given opposite the desired concentration in the table for the formulation to be used. (See Tables IIa, IIb, IIc.)

TABLE IIa: FOR RAPID ESTIMATION OF FINTROL-5 REQUIREMENTS

Desired Concentration (p.p.b. active ingredient)	Amount of FINTROL-5 per acre-foot
1 p.p.b.	4½ oz.
2 p.p.b.	9 oz.
3 p.p.b.	13 oz.
4 p.p.b.	1 lb 2 oz.
5 p.p.b.	1 lb 6 oz.
6 p.p.b.	1 lb 10 oz.
7 p.p.b.	1 lb 15 oz.
8 p.p.b.	2 lb 3 oz.
9 p.p.b.	2 lb 8 oz.
10 p.p.b.	2 lb 12 oz.

* Obtained by multiplying 4.48 oz. by the p.p.b.

Note: 1 standard measuring cup will deliver approximately 12 oz. by weight of FINTROL-5.

* As previously explained, FINTROL-5 is designed for use in water with an average depth of about 5 feet. Its active ingredient is coated on sand. When the sand is applied to water, the active ingredient begins to dissolve. As the sand sinks [illegible] the water the active ingredient continues to dissolve [illegible] all the active ingredient has [illegible] water.

Sample calculation:

[illegible]