mately 3.5 grams. About 18,000 fish were produced by the two ponds. Length range data indicates that the bulk of the production was that of Pond 49, since only 1.26% of the 550 fish measured were in the length range of Pond 48.

## CONCLUSION

The obvious conclusion is that striped bass can be cultured in ponds; that prolarvae, postlarvae, larvae and small striped bass fish display positive phototropism; that plankton can be used as food prior to release into culture ponds; that artificially prepared food was utilized by the young fish; that among individuals of one hatch cannibalism is unlikely; that morsel size is very small compared to the body of the postlarva and small fish; that striped bass will utilize a forage form; that pond culture of this species is a feasible venture.

# PRELIMINARY REPORT

# THE USE OF TRANQUILIZERS AS A POSSIBLE SAMPLING TOOL

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## INTRODUCTION

In recent years game management has made tremendous use of tranquilizers in capture and treatment of wild animals. In comparison little work has been done with tranquilizers in regard to fishes. McFarland (1959, 1960) made an extensive study of anesthesia, with emphasis on long term exposure to facilitate transportation. Bayliff and Klima (1962) used four anesthetics, quinaldine, MS 222, Dormisan, and tertiary amylalcohol in tagging anchovetas.

Florida's success in tranquilizing turkeys and geese plus the availability of various drugs led to this experimentation with fishes. It is theorized that knowing the limitations of rotenone, and that in most rotenone samples almost half of the fish sink before being picked up, perhaps some tranquilizer could be found that would act as a surfacer. This would not only give greater reliance to a sample but would allow returning the desirable fish to the water.

Another desirable aspect of taking samples with tranquilizers is the possibility that bottom organisms would be only slightly or not at all affected by their use.

Lumb (1958), devoted four pages of his book, "Small Animal Anesthesia" to anesthetizing teleosts. He discusses using; ether, sodium amytal, tricane methanesulfonate (MS 222), carbon dioxide, cerethane, and cresol. Of all mentioned the merits of MS 222 are easily recognized as most desirable.

*Anesthetics Used*

| | |
|---|---|
| Alpha Chloralose | Fisher Scientific Co., Fair Lawn, N. J. |
| Sodium Pentobarbital | Vitamin Pharmaceuticals, Philadelphia, Pa. |
| Innovar — Fentanyl 0.4 mg. droperidal 20 mg. | McNeil Laboratories, Fort Washington, Pa. |
| RO 4-0403 | LaRoche Laboratories, Nutley, N. J. |
| Librium | LaRoche Laboratories, Nutley, N. J. |
| Ethinamaie | Eli Lilly & Co., Indianapolis, Ind. |
| Tribromoethanol | Winthrop Laboratories, New York, N. Y. |
| Anileridine Chloride | Merck & Co., Rahway, N. J. |

Of these eight drugs, Alpha chloralose was found not to be water

soluble and no further testing is planned. Tribromoethanol and Sodium Pentobarbital are the only drugs approved for sale. The others are considered "new" or "experimental," drugs.

## TESTING PROCEDURES

Small glass aquaria were filled with one gallon of aerated distilled water. The water had a pH of 7.2 using the Hach colorimeter and a temperature of 74 to 78 degrees.

Three 2-inch bluegill or warmouth were placed in each aquarium. Liquid drugs were added by using a 1 cc Tuberculin syringe, double scaled to 1/100th of a cc. Powdered drugs were weighed on a balance. All solutions were stirred slightly after being placed in the test aquaria.

Bluegill and warmouth were used as test fish because of their availability in large numbers and the fact that the bluegill are fragile while the warmouth is a sturdy fish, thus giving a fair comparison.

As fish became unconscious they were placed immediately in untreated water and allowed to recover.

## DRUGS

Very little information has been obtained on these drugs as to their properties or functions. One, Anileridine has an antidote which may be used to counteract the drug's effects and speed up recovery time. This was not used, as satisfactory recoveries were made by placing fish in untreated water.

## RESULTS

Innovar and Librium showed no signs of having any effect on the equilibrium or responsiveness of the fish. For these reasons their use has been discontinued.

Sodium Pentobarbital can be used as an injected anesthetic either complete or local. The dosage rates will need to be worked out to suit the particular size and species of fish to be anesthetized.

Four drugs emerged from these tests as very promising: Anileridine, Tribromoethanol, Ethinamaie, and RO 40403.

*Anileridine*

When used at 12 parts per 1000, fish were left on their sides in the solution for 71 hours. During this time the respiration rate dropped to 12 to 14 times per minute. This is compared to 60 plus for control fish. When removed from the treated water fish appeared normal in a little over two hours.

*RO 40403*

Very small amounts are needed to rapidly render a fish unconscious. At the rates used mortality was low and recovery times were satisfactory.

*Ethinamaie and Tribromoethanol*

Both of these drugs rendered fish unconscious but dosages need to be adjusted before determining future possibilities.

## CONCLUSIONS

No cost figures are available at this time. What limited information we have indicates a quarter acre sample, six feet deep can be taken for between $5.00 to $10.00.

The four most promising drugs will be further studied and actual field tests will be run in the spring of 1966.

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AQUEOUS SOLUTIONS — 25 FISH/TEST

| Drug | Concentration | Species | Average Time To Unconsciousness | Average Time To Recover | Mortality |
|---|---|---|---|---|---|
| Innovar | 12:1000 | Warmouth | No effect | — — — | 0% |
| Innovar | 16:1000 | Warmouth | No effect | — — — | 0% |
| Innovar | 40:1000 | Warmouth | No effect | — — — | 0% |
| RO 40403 | 24:1000 | Warmouth | 40 sec. | 14 min. | 12% |
| RO 40403 | 12:1000 | Bluegill | 2 min. | 17 min. | 0% |
| RO 40403 | 12:1000 | Warmouth | 3 min. | 15 min. | 0% |
| RO 40403 | 4:10000 | Warmouth | 6 min. | 12 min. | 4% |
| *Librium | 1:1000 | Bluegill | No effect | — — — | 0% |
| Sodium Pentobarbital | 12:1000 | Bluegill | No effect | — — — | 0% |
| Sodium Pentobarbital | 40:1000 | Bluegill | No effect | — — — | 0% |
| Anileridine | 40:1000 | Warmouth | 48 min. | — — — | 100% |
| Anileridine | 12:1000 | Warmouth | 2 hrs. 20 min. | 46 min. | 8% |
| Anileridine | 12:1000 | Warmouth | Left in for 71 hrs. | 2 hrs. 15 min. | 16% |
| Ethinamaie | 40:1000 | Bluegill | 2 min. | — — — | 100% |
| Ethinamaie | 12:1000 | Warmouth | 2 min. | 27 min. | 68% |
| **Ethinamaie | 4:10000 | Warmouth | 6 min. | 18 min. | 4% |
| Tribromoethanol | 40:1000 | Warmouth | 2 min. | — — — | 100% |
| Control | | 12 Warmouth<br>13 Bluegill | | | 4% |

*Limited supply
**Only 6 fish became unconscious

INJECTIONS — 4 FISH/TEST
Average Weight 3 ozs.

| Drug | Amount | Species | Average Time To Unconsciousness | Average Time To Recover | Mortality |
|---|---|---|---|---|---|
| Sodium Pentobarbital | 1.0 ml. | Warmouth | 2 minutes | — — — | 100% |
| Sodium Pentobarbital | .5 ml. | Warmouth | 3 minutes | 2 hours | 0% |
| RO 40403 | 1.0 ml. | Bluegill | No effects | — — — | 0% |
| Innovar | 1.0 ml. | Warmouth | No effects | — — — | 0% |

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