ACKNOWLEDGEMENTS

I wish to thank Dr. S. Ming Chien for making drawings of Figs. 1-8, and Mr. Joe Sullivan for preparing tissue sections.

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FISH MORTALITIES ASSOCIATED WITH Goezia Sp. (Nematoda: Ascaroidea) in Central Florida [1]

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ABSTRACT

This is the first report of *Goezia sp.* from freshwater fish in North America. Extensive mortalities among striped bass *(Morone saxatilis)* resulted from the damage caused by these nematodes. A possible mode of infection is given and a discussion of the pathology associated with the worms is presented.

INTRODUCTION

The striped bass, *Morone saxatilis* (Walbaum), has in recent years enjoyed a come back in the Southeastern United States due to large scale stocking programs conducted by various states. In most cases the stocking is the basis for an extensive put-grow-and-take fishery. The state of Florida successfully stocked this fish in the summer of 1968 (Ware, 1970). Ware discussed the establishment of the striped bass and the growth of the fish during its first two years. He also discussed some of the difficulties caused by the nematode, *Geozia* sp., which caused large mortalities in the stocks of striped bass put into four Florida lakes. This nematode and its effects on the stocking program that will be discussed in this paper.

CASE HISTORY

The nematode, *Goezia* sp., appears to have been introduced into the striped bass populations in 1968 when, at Richloam State Hatchery, fry were fed ground up frozen marine herring. That this is the site of entry of the worm is evidenced by the facts that (1) the striped bass arrived at Richloam State Hatchery in the sac-fry stage and thus were not feeding; (2) the worm is known to infect marine herring (Yamaguti, 1961); (3) changes in the feeding procedures (namely, eliminating the raw fish meal), in subsequent years have prevented more recent stocks of striped bass from becoming infected at the hatchery, and (4) *Goezia* sp. can be found in adult striped bass on the Richloam Hatchery. These hatchery fish are part of the original stock of striped bass that were fed the raw herring in 1968.

There is precedence in the literature for this type of transmission for *Goezia* sp. Dollfus (1935) reported a very similar situation in which a three-year-old rainbow trout became infected with *Goezia ascaroides* by being fed raw fish meal made from marine fishes. This fish had been hatched and raised in an artificial environment.

[1] Supported by the Southeastern Cooperative Fish Disease Project. (In part by Sport Fish Restoration Funds and Rockefeller Project RF 65061.)

In addition to the mortalities by Ware (op. cit.), the *Goezia* sp. again caused mortalities in 1970, but only in those lakes from which it was reported in 1969. This would indicate that the worm has established itself in these lakes, and is cycling through the fish.

Furthermore, *Goezia* sp. has been recovered from *Tilapia aurea* in at least one lake which had received a stock of striped bass in 1968. This indicates that the number of host species is increasing and now exists in two species of fish with extremely different food habits.

PATHOLOGY

Goezia sp. is a nematode which has been previously reported in several species of marine fishes. Characteristically, the genus inhabits the stomach wall of its host. This was also the case with the striped bass. Larval worms were first observed in hemorrhagic ulcer-like depressions of the stomach wall of the fish. This was the initial observation made in July, 1969, at the Southeastern Fish Disease Laboratory, Auburn, Alabama. Bacterial cultures taken at this time showed *Aeromonas* sp. to be present in the cysts of one stomach.

Later samples showed the worms to be embedded in the musculature of the stomach wall. There was a considerable increase in the amount of connective tissue in response to the presence of the worm possibly due to mechanical damage caused by the spiny cuticle of the worms. The ulcerated areas were healed over, but small (up to 5mm) scarified areas contained the worms.

Samples from January, 1970, revealed the worms to be encysted on the external wall of the stomach and to a lesser degree, in the mesentery.

Fish mortalities appeared to be mostly closely associated with the abundance of food for the striped bass. In this regard, the drop of the coefficient of condition, K(Hile), below 1.70 was reported as a good indicator of impending mortalities (Ware, 1970).

DISCUSSION AND SUMMARY

The mortalities of the striped bass due to *Goezia* were large in at least two of the lakes initially stocked. Mortalities in the other two lakes could have occurred, but may not have been detected. Fortunately, the worm has not appeared in those lakes stocked subsequently to 1968, nor does it appear to have spread into other lakes from those already infected.

The observations that *Goezia* sp. has established itself in *Tilapia aurea*, and has reoccurred in previously infected lakes suggests that the worm has been able to complete its life cycle in these lakes. At present, knowledge of this group of worms is very limited, and control measures cannot be instituted until we have a greater understanding of the biology of the worm.

ACKNOWLEDGEMENT

The authors are indebted to Mr. Forrest J. Ware, Fisheries Biologist, Florida Game and Fish Fresh Water Fish Commission, for specimens and details of this case, and Mr. John Plumb who performed the bacterialogical tests.

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