

EASTERN ASSOCIATION OF MOSQUITO CONTROL WORKERS

A discussion meeting was held in Pennsylvania, New York on May 5th, 1942 at which the following papers were presented before the members and guests:

Random observations and hypotheses concerning the relations of fish and mosquitoes

By Mr. John T. Nichols, Curator
of Recent Fishes, American
Museum of Natural History,
New York City

My summer residence for the past 32 years has been on the south shore of Long Island, a mostly flat area facing the broad waters of Moriches Bay to the east, and narrower waters between mainland and beach to the south, bordered all around by salt water. Several short creeks which used to be quite shallow water flow to the bay.

This has been a mosquitoey locality. Mosquitoes are always common, in most years sufficiently abundant to annoy persons not acclimated to them, not infrequently have occurred in such dense swarms as to be a pest. My knowledge of mosquitoes is just sufficient to differentiate the handsomely colored salt marsh mosquito, from another more uniformly brownish species, together make up the bulk of the population. I have never been reason to suspect that any malaria mosquitoes were present.

Mosquito swarms usually occur in muggy periods of rains. Aside from any increase directly traceable to the weather their number has varied up and down from unknown natural causes and there have been relatively mosquitoless unexplained years. Hence any relations which one attempts to draw with this or that factor can only be tentative. I have occasionally

seen mosquitoes on the marshes early in the season carrying a red mite, and have noticed that in such cases there were relatively few mosquitoes later in the season. This again may be coincidence.

Mosquito wrigglers are sought as live food by many or most small fishes. The efficiency of a fish as a mosquito destroyer usually depends on its being small enough and abundant enough, and the young of some species are pretty efficient though the adults are too large. A number of years ago I was on a Florida "river" which seemed as though it should have been mosquitoey, but quite without mosquitoes. A reason was not far to see: its borders were literally alive with viviparous tooth carps, especially Gambusia well known as a destroyer of wrigglers. I furthermore believe that the abundance of these little fish was correlated with an abundance of large-mouth bass out in the channel. The bass no doubt preyed on them, but held down any smaller fish which might have followed them into shallow water and reduced their numbers, as the bass did not.

This situation came to mind later in thinking of similarly small fish, namely Lucania, which occurred in small numbers in the freshwater creeks at my Long Island locality, where there were also somewhat larger predatory fishes, notably the brook pickerel which was common and very likely held down the numbers of smaller species. As an experiment I introduced large-mouth bass in the waters. It followed that the pickerel decreased, Lucania and perhaps other small fishes increased considerably, and there were several years relatively free from mosquitoes. How much this proves and how much it was due to coincidence I don't know, but believe both were facts. Likely in part from lack of proper spawning grounds the bass faded out. For the past 10 years with Moriches Bay let open to the ocean, bay and creeks have become progressively more saline, and the old fresh-water balance

wiped out anyway.

It is generally recognized that fish are an efficient mosquito control, but not how important the balance of fish life may be in such matters. In Florida on Long Island as indicated, large-mouth bass were an anti-mosquito factor. But I have recently been told that successful introduction of large-mouth bass to Cuban lakes has seriously increased mosquitoes, the fish in this case presumably destroying the mosquito-destroyers instead of their enemies.

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There is one factor in our periodic great abundance of mosquitoes which it seems could not be controlled locally. Mosquitoes doubtless drifted into the woods on the prevailing Southwest wind from the stretch of marshes which border the south bays on Long Island west of us, and accumulated in the overgrowth. When mosquitoes had been very troublesome, strong winds from the north or the east relieved us of them. In the last year or two they have been considerably less than average, and there is no doubt in my mind that extensive ditching all along the south shore is a considerable factor in their decrease.

As I see it the immediate effect of this ditching is to give small fishes (mostly Fundulus), access to otherwise isolated pools in the marsh, immediately bringing down the number of wrigglers. A second effect which is gradual with the passage of years is to dry up and change the character of the marsh. After 2 or 3 years of ditching our own marsh is becoming relatively dry and firm, even though it is completely flooded by occasional storm tides. This second effect may or may not be desirable from the point of view of mosquito-control, it is very undesirable from that of other wild life.

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One other observation may have a bearing on the general problem. For 5 years or so we have had a small shallow, artificial fresh-water pond, which was made at the edge of the marsh by damming a swamp. This is frequented by wild ducks. Sometimes for 2 or 3 weeks in late summer most of it is mud with water only in the deeper parts, and in somewhat isolated pools. Least terns and other birds at such times take out a large part of the grown fish population, concentrated within the reach. Offhand it might now seem to be a danger spot. However, at this time I have found fish fry, a very great abundance of more or less predaceous water bugs, and wrigglers in any of its water. May we deduce as a general rule that it is not temporarily isolated pools (which will contain a concentration of corrective agents) that make a condition favorable for mosquitoes? If this is the case should not the objective be to ditch a marsh so that as its water rises all parts of it will be available to the residual fish-life of its deeper parts, rather than so as to drain off its waters?

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These observations are too cursory and too little critical to prove one or another hypothesis. They merely serve to emphasize the conviction that successful control of mosquitoes, or any other animal, should rest on a better understanding of the existing balance of life, and where possible, work with not against it.

Observations on Some Relations of Mosquito Control
Ditching - To Marsh Birds

By Mr. Aretas A. Saunders,
Fairfield, Connecticut

The various different problems that come under long term conservation are not as successful as they might