

LETTER TO THE EDITOR

MOSQUITOFISH IN CONTROL PROGRAMS

As the director of a county health department, with a small but active and effective vector control division, I presumably am one of the "mosquito control practitioners" toward which Henry Rupp directed the contents of his article (J. Am. Mosq. Control Assoc. 12:155-166, 1996). Moreover, I am also the northern regional representative, on the executive board, of the statewide Indiana Vector Control Association (IVCA). As such, I read this forum with great interest and, frankly, some dismay regarding the ferocity of the attacks on the use of mosquitofish as a means of mosquito control.

Mosquitofish (*Gambusia affinis*) play a small, but important part in our health department's mosquito control program. Our program includes comprehensive adult and larvae monitoring, larvaciding through an integrated program of chemical and biological means, and, where possible, legal enforcement against vector breeding sites (i.e., tire dumps). We also advise county municipalities that undertake autocidizing programs.

Our use of *Gambusia affinis* is limited to select artificial environments, including livestock troughs, golf course water traps, and backyard ornamental fishponds. Ornamental fishponds are, in fact, the sites most closely resembling natural environments into which we stock these fish. Within our department offices, we have maintained a successful breeding program via indoor aquaria. Every year, we are required to obtain a new fish stocking permit from the Indiana Department of Natural Resources describing the environments into which we intend to introduce mosquitofish. By law, we *cannot* introduce them into native fisheries in the state. Moreover, we require that property owners receiving these fish sign a strict contract regarding their use. (A copy of this form is printed here in Fig. 1). We also keep records on the number of fish stocked at each site (usually three or four pairs). Recipients are never merely given mosquitofish to take home. Our vector control staff thoroughly check out the environment and the circumstances prompting each request for mosquitofish. If required conditions are not met, mosquitofish are not introduced there. Only our staff may physically introduce the fish into the site. At the close of the warm season, the staff members return to the sites to collect the fish, and note if any fish have died or were born during the season. Virtually all of the containers/ponds into

which we introduce mosquitofish are less than three feet deep. For a mosquitofish to survive a northern Indiana winter, it must "burrow" into the mud/leaves of a water vessel (if unheated) that is at least four and a half to five feet below ground surface. Thus, should we fail to recover an individual fish, it is almost certainly doomed!

How effective are mosquitofish at mosquito control? Ernest Bay's statement about the impossibility of raising mosquito larvae in a *Gambusia*-populated trough was so very true! I have seen this happen a number of times. In one particular instance, a local horse trough was literally teeming with *Culex restuans* larvae and pupae, until three pairs of *Gambusia affinis* were introduced. Three days after stocking them, the tank had been thoroughly "cleaned" of all traces of both larvae and pupae. These mosquitofish kept this trough free of mosquito breeding for the remainder of the season.

Aside from their direct intrinsic value for mosquito control in small semipermanent, artificial containers, mosquitofish also provide an excellent educational tool regarding the importance of mosquito control, especially for young people. Children who visit our department are instantly attracted to our tanks and never grow tired of watching the fish.

As an environmentalist, I also strongly share concerns about the wholesale introduction of any exotic species, including *Gambusia*, into native ecosystems. Certainly, should native biota provide effective mosquito control, the use of such species should be advocated first. Preservation of native biodiversity is of ever increasing importance to medicine and public health, as well as quality of life in general.

But don't throw the mosquitofish "baby" out with the "bath water" of exotic invaders! Talk of a wholesale ban on the use of these fish is ludicrous and phobic. What is needed is not a ban, but careful *restrictions* in their use. Mosquitofish are a very valuable tool, if reasonable prudence, good judgment, and control are exercised in their use. In our area of the United States, they are ideally suited for a host of artificial, semipermanent water vessels, which might otherwise potentially contribute to the local incidence of mosquito-borne diseases.

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MOSQUITO FISH AGREEMENT

I, the undersigned, have been given Mosquito-Fish (*Gambusia affinis*) by the LaPorte County Health Department (LPCHD) for the expressed purpose of controlling undesirable mosquito populations in a surface water feature under my control/possession.

I understand that in accepting these Mosquito-Fish, I agree not to allow them to be introduced into those surface waters of the state of Indiana which are fisheries for native game - and pan - fish; and I understand that such introduction would be a violation of Indiana Code 14-2-5-8, and could potentially harm those fisheries.

I further understand that it is important to follow the directions below:

- * Do not keep Mosquito-Fish in an ornamental pond or other shallow (less than 4 1/2' deep), outside pond for over-wintering.
- * Any outside pond used for over-wintering should be at least 4 1/2' deep, or otherwise deep enough that the pond does NOT freeze solid.
- * The outside pond used for over-wintering should have a soft, muddy substrate with fresh vegetation and leaves on the bottom.
- * If the Mosquito Fish are over-wintered in an outside container instead of a pond, this container should be equipped with a heating apparatus and the temperature of the water must NOT exceed 80 degrees F.
- * The temperature of the water must NOT drop below 40 degrees F. If conditions suggest the temperature of the water might drop below 40 degrees F and a heating apparatus is not available, the Mosquito-Fish should be returned to the LPCHD.
- * It is advised that the pH level of the water be tested periodically and be within the range of 6.6-7.8, and as close to neutral (7.0) as possible.
- * If these directions cannot be followed or if conditions change and put either the Mosquito Fish or native fisheries in danger, we agree to have Mosquito Fish returned to the LPCHD.
- * We ask that the Mosquito Fish be returned to the LPCHD if the mosquito problem is under control and the fish are not wanted for over-wintering.
- * The Mosquito Fish will eat fish flake food when being over-wintered and it is recommended they be fed every other day.

Name (printed)

Address

Signature

Date

Fig. 1. LaPorte County Health Department mosquito fish agreement.