

## **Black Carp and Zebra Mussels Debate Continues**

In his letter in the April 1994 issue of *Fisheries*, I. Rubenshtein advocated stocking waterbodies with Asian black carp (*Mylopharyngodon piceus*) as a biological control of zebra mussels. Rubinshtein argued that non-reproducing strains of black carp were "not hazardous for introduction to America." However, it seems likely that the number and size of fish required to successfully suppress zebra mussel populations would also threaten native unionid bivalves, which normally suffer insignificant amounts of predation in North American habitats. The likelihood of encounter between black carp and unionids would be great since (1) zebra mussels preferentially colonize the shells of living unionids, and (2) zebra mussels flourish in habitats that support large unionid populations (e.g., large rivers). More than 70% of all described unionids in North America are considered endangered, threatened, or of special concern [Williams et al 1993, *Fisheries* (Bethesda) 18(9): 6-22]. The introduction of a fish that is capable of crushing mollusks "the size of a golf ball" (Water Farming Journal, May 1993, p. 3) might therefore produce a significant impact on already stressed unionid populations. This potential impact must be considered when debating the merits of using exotic molluscivores as biocontrols for zebra mussels.

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## **Non-veterinarian Fish Health Specialists Can Be as Good as Vets**

I read with great interest the two essays in Vol. 19, No. 5 *Fisheries* concerning the fish health vocation. Both authors hit on a subject close to my heart during my working career.

There was a time when veterinarians did not want to be involved with diseases of aquatic animals. Veterinary schools left no room in the full four-year veterinary curriculum for basic courses in fish health and management or environmental requirements for fishes. I have been retired for 10 years and away from a university with a veterinary school but doubt veterinary curricula have changed.

These two authors might like to know (that) I taught a basic fish health course, a fish nutrition course, and a water quality for fishes course (for) 20 years. Not a single veterinary student took any of these courses. I had an occasional DVM but no veterinary students.

I believe as Kevin Amos; the well-trained non-veterinarian fish health specialist can be every bit as good at his or her job as a veterinarian with specialized training. Non-veterinarians must train themselves completely by taking advanced degrees and many advanced courses relating to animal diseases. Veterinarians also should take advanced courses, especially in the aquatic environmental area. Christopher Wilson states, "Veterinarians bring some unique qualifications to the field of fish health." Maybe so, but non-veterinarians bring unique qualifications into the field too. He certainly is correct in saying, "What is required is a little more respect for everyone's background and a little less ego."

I spent a decade developing a Fish Disease Technology Option in the Microbiology Curriculum at Colorado State

University. The curriculum for the Option was similar to, yet quite different from, a pre-veterinary curriculum. We had several undergraduate students working their ways through the four-year curriculum leading to a B.S. degree, each year, through the years.

Some students graduating from the Fish Disease Technology curriculum found jobs in the fish culture industry; some continued into graduate school and obtained advanced degrees in the fish health vocation. Some used the curriculum as a stepping stone into veterinary school; most of those, unfortunately, did not stay in the fish health field.

All in all, I judged the curriculum a success. I cannot understand why other universities with a strong fisheries program, and a veterinary school with its animal health-related course offerings, have not set up similar curriculums to train fish health technicians. Also, the special courses available in order to support a Fish Disease Technology curriculum could be used by DVMs to find their way into fish health management careers.

The Fish Health Section of AFS has followed an excellent course of action in the fish pathologist certification program to make sure those who obtained the title were worthy of it. But the Section has failed by not working closely with the Fishery Education Section and qualified universities to build curricula for training fish health specialists.

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## **More Underwater Photography Tips**

Roger Peterson's underwater photography tips (Career/Leadership Development, *Fisheries*, June 1994) can use a bit of help. First, one needn't be in above average physical condition. Opportunities abound for shallow water, snorkeling photography by weak swimmers.

Second, choosing film by ISO is foolish. Distance, speed (maximum opening) of the lens, choice of lens (wide angle, as he pointed out), ambient conditions, strobe, number of strobes, and other factors help freeze the subject, which is the point of high-speed film. More important is using archival film (film that won't decay over the years), film that is sensitive to reds and yellows rather than blues and greens, and film preferred by publishers. The only choice is Kodachrome. The most commonly used speed is 64; slower and faster are available but not used much by pros.

Fourth, never start the season without an entire new set of O-rings and never go on a trip without new lithium batteries, which last about twice as long as conventional.

Fifth, and most important for non-full-time professionals, is this: Never—but never—buy an underwater outfit if you can rent one. I wish I had been given this advice. I spent \$600 on a used Nikonos and ancient SB-1 strobe, another \$50 and two agonizing weeks searching for O-rings, and another \$200 to repair my toy after I flooded it on the third roll of film because I failed to seat the back O-ring properly when I reloaded.

Beach resorts have underwater camera shops where you can rent a (usually) Nikonos V and modern SB strobe for about \$25 a day. Divide that into the cost of a new outfit! They also offer short courses in using the equipment, and flooding insurance if you take the course. Cities with dive shops also offer opportunities to rent equipment.

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