INVASIVE SPECIES

Will Black Carp Be the Next Zebra Mussel?

Fisheries experts worry that, if it escapes, this imported fish could decimate mollusks in the Mississippi River Basin

For the freshwater mollusks of the Mississippi River Basin, life in recent decades has been no riverboat ride. Still one of the most diverse groups of fauna in North America, with more than 900 species, they have been battered by dredging and channeling of streams, suffocated by silt, and plagued by the invading zebra mussel. Now a war is raging up and down the Mississippi Basin over a threat that biologists say could drive dozens of species of threatened and endangered mussels and snails over the edge.

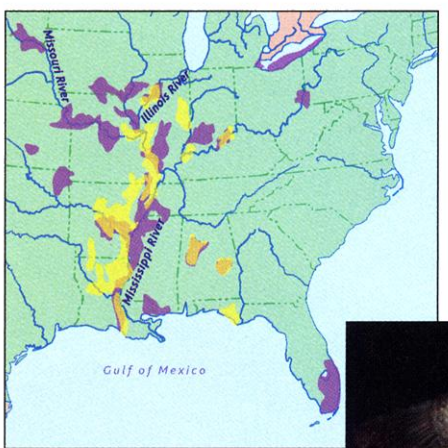
At issue is an imported mollusk-eating species of Asian carp, the black carp. Fish farmers say the voracious meter-long fish, which was imported from China in the 1970s by Arkansas aquaculturists, has become an indispensable tool to control fish parasites that threaten their livelihood. But fishery biologists and state conservation officials all over the basin don't want the carp around.

The carp uses its powerful teeth to eat any mollusk it can get its mouth around. So fisheries and mollusk experts worry that it could decimate populations of native mussels, clams, and snails if it escapes. "It can crush a mollusk up to the size of a golf ball," says malacologist Kevin Cummings of the Illinois Natural History Survey in Champaign, who is president of the Freshwater Mollusk Conservation Society.

For years, the black carp was confined to a handful of fish farms and research facilities, where it was used to control snails that carry a tiny trematode that makes hybrid striped bass wormy and unmarketable. To prevent escapees from reproducing in rivers, most fish farmers had used sterile black carp. When carp eggs are treated with heat or hydrostatic pressure soon after fertilization, they develop with three sets of chromosomes rather than two, which makes them unable to produce viable sperm and eggs. Individual fish can be checked for triploidy using a simple blood test.

Things changed in 1999, when an outbreak of a new trematode parasite on Mississippi catfish farms threatened the catfish industry, leading farmers there to clamor for a cure. Until then, Mississippi had allowed only triploid black carp. But aquaculture researchers and fish farmers insisted that there were not enough triploids to supply the state's catfish farmers, so Mississippi began allowing farmers to transport and stock fertile fish from Arkansas.

Mississippi's decision sparked a national campaign among biologists to fight the spread of black carp. In February 2000, the Mississippi Interstate Cooperative Resource Association (MICRA), a consortium of 28 state fisheries chiefs in the Mississippi Basin, petitioned the U.S. Fish and Wildlife Service (FWS) to list black carp under a federal law called the Lacey Act. This act bars the import and interstate transport of exotic species likely to cause harm. Fisheries biologists, state officials, and several scientific societies all lobbied to blacklist the fish.



Reason to worry. Populations of bighead (purple) and silver (yellow) carp have exploded in midwestern rivers.

There's good reason to worry about black carp, says ichthyologist Jim Williams of the U.S. Geological Survey (USGS) Caribbean Research Center in Gainesville, Florida. In a detailed 1996 risk assessment of the fish, Williams and USGS colleague Leo Nico concluded that black carp would survive and reproduce in U.S. rivers, consuming native mollusks and competing with native mollusk-eating fish such as the redear sunfish and freshwater drum. The pair also recommended that fertile fish be allowed only under strictly controlled conditions in hatcheries that produce triploids.

Although black carp have yet to escape the hatcheries and fish farms, their relatives have. Four other species of Asian carp—three of them imported by the aquaculture industry in the last 40 years—are now firmly established in the Mississippi Basin, biologists say. Populations of two of them, bighead carp and silver carp, have exploded in the Upper Mississippi Basin in the last 2 years, according to long-term monitoring data. Populations of bighead carp have more than doubled in the past 2 years on a stretch of the Mississippi near St. Louis, Missouri, for example, and bighead carp populations shot up more than 100-fold on an 80-kilometer stretch of the Illinois River near Peoria, says fish ecologist John Chick of the Illinois Natural History Survey's Great Rivers Field Station in Brighton. No one has yet documented an ecological effect of these escapees. But huge numbers of bighead and silver carp are likely to compete for food with native fish that also eat zooplankton, including paddlefish and several species of buffalo fish. If natives decline, that could make it tougher for struggling mussel species to disperse their larvae, which hitch a ride aboard particular species of native fish. All that could happen within the next 5 years, Chick says.

Despite the opposition, "black carp are our only [proven] option for treating the trematode problem," insists aquaculturist Anita Kelly of Mississippi State University in Starkville. Other options, including draining the ponds and treating them with a chemical to get rid of snails or using native mollusk-eating species such as the blue catfish and redear sunfish, have not been proven to work on farms. But the blue catfish looks promising, says Kelly. Fish farmers say they'd be happy to have a good alternative. "There's nothing sacred about black carp," says Mike Freeze of Keo Fish Farms in Keo, Arkansas.

Voracious eater. A black carp can crush a mollusk the size of a golf ball.

Even if black carp is listed, fish farmers in states that allow black carp—including the fertile diploids—can still use them, says Norm Stucky, Missouri's fisheries division administrator, increasing the likelihood of escape. He and MICRA are pushing a plan already in place in Missouri to have the government supply farmers with certified triploid black carp and then phase out all black carp over 5 years. FWS officials say they will decide whether to list the black carp as injurious in the next 2 months. In the absence of other federal laws to control harmful fish species, after that it's up to the states. —DAN FERBER

CREDITS: (LEFT TO RIGHT) USGS; LEO G. NICO