New Species of Freshwater Sculpins from the Middle Atlantic Eastern United States

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The thought of discovering a new species conjures up images of scientists trudging through remote regions of the world in search of rare specimens. While it is true that many new species are discovered in rarely explored habitats, new species are also being discovered right here in North America.

At Frostburg State University, in Frostburg, Maryland, Dr. Rich Raesly and a handful of graduate students have been studying the taxonomic status of Maryland's freshwater fishes for more than a decade. These studies have led to the discovery of what may be two new fish species in the middle Atlantic eastern United States.

Slimy Sculpin?

Sculpins are a group of bottom-dwelling marine and freshwater fishes with broad heads and large mouths. One type of sculpin that has been intensively studied by Dr. Raesly and his graduate students is the slimy sculpin (*Cottus cognatus*). The slimy sculpin has a large distribution with populations found from Asia westward into northwest Canada and parts of the United States. The southern limit of the slimy sculpin's distribution is the Potomac River drainage. This is where Dr. Raesly has made some interesting discoveries.

Early ichthyologists studying slimy sculpins noted morphological differences between Potomac populations and more northern populations. In addition, a small genetic data set showed oddities in the Potomac slimy sculpin. Based on these findings, Dr. Raesly and his graduate students conducted an intensive taxonomic study on Potomac slimy sculpins that included the collection of both morphological and genetic data. Data collected during the study led Dr. Raesly to the conclusion that the Potomac populations of slimy sculpins may not be slimy sculpins after all, but a new species.

Dr. Raesly believes that Potomac slimy sculpins may be remnant populations of an undescribed and formerly more widespread species. These sculpins, currently classified as slimy sculpins, are restricted to coldwater, high volume springs within the Potomac River drainage. Dr. Raesly speculates that during the Pleistocene, when temperatures were much cooler, these fish were more widespread within the drainage. As temperatures warmed, these coldwater fishes may have become confined to springs, where cool water is available year round.

Dr. Raesly is in the process of "describing" the new species. This process entails a number of scientifically defined steps, including the publication of the findings in a scientific journal. When the results are published, North America will have another species to add to an already diverse list. Unfortunately, the new species' affinity for coldwater habitats will make it vulnerable to the widespread, human-induced warming of North American streams.

The Blue Ridge Sculpin

In addition to the slimy sculpin, Dr. Raesly and some of his graduate students are studying the mottled sculpin (*Cottus bairdi*). In similar fashion to the story above, studies of the mottled sculpin focused on previous observations that certain populations appeared morphologically different than others.

The first clue of a new species came in the 1950s when a renowned ichthyologist, Dr. C. Richard Robins, noted that a number of mottled sculpin populations had a lower number of pectoral fin rays than most populations. The next clue came when two ichthyologists, Dr. Robert Jenkins **cont. on p. 33**

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and Noel Burkhead, noticed that mottled sculpins with lower pectoral fin ray numbers usually lacked a distinct notch in a band of pigment in front of the caudal fin that was possessed by other mottled sculpin populations. However, this was not solid evidence of a new species. This is because mottled sculpin populations frequently vary in morphological characteristics.

In order to help clarify the status of the mottled sculpin in Maryland and surrounding states, a thorough taxonomic study of mottled sculpins was undertaken by Frostburg State University graduate student Andrew Kinziger. Kinziger found genetic differences between the populations with the unusual morphology (low number of pelvic fin rays/lack of notch) and populations with more characteristic morphology. Assisted by Dr. Raesly and former graduate student David Neely, Kinziger recently described the new species from the Elk, Susquehanna, Bush, Patapsco, Patuxent, Potomac, Nanticoke, James and Roanoke River drainages as the Blue Ridge sculpin (*Cottus caeruleomentum*).

In an age when the word "biodiversity" is often followed by the word "crisis," learning which species inhabit North America's diverse landscape is crucial to the protection of our natural heritage. Consequently, intensive taxonomic studies of North America's freshwater fish fauna must continue.