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Crayfish: An Overlooked Fauna



Many crayfish display surprisingly brilliant hues of blue, green, orange, red, and yellow, sometimes in dazzling combinations. Others have spots or mottled patterns, bold stripes or bands, or are albino. Above is *Cambarus dubius*, one of many species with no common name.

All photos by Guenter Schuster

Whether you know them as mudbugs, ditch bugs, river lobsters, crawlybottoms, crawdads, or crawfish, anyone who has spent time in streams is familiar with crayfish. Chances are you've eaten them in southern restaurants or social gatherings, used them for fish bait, or played with them in streams. The probability is also high—even among aquatic biologists—that you know little about them, including the possibility that they may represent one of the continent's most imperiled aquatic groups. But you are not alone.

Crayfish are so poorly known that over half of them don't have common names. The ones that do include fanciful names such as Cajun dwarf crayfish (*Cambarellus shufeldtii*), phantom cave crayfish (*Procambarus pecki*), bottlebrush crayfish (*Barbicambarus cornutus*), devil crawfish (*Cambarus diogenes*), ditch fencing crayfish (*Faxonella chypeata*), Piedmont blue burrower (*Cambarus barti*), and even the rusty grave digger (*Cambarus millus*).

Crayfish represent one of the largest aquatic faunal groups in North America north of Mexico, with approximately 353 known species, or nearly two-thirds of the world's crayfish fauna. Almost all crayfish in the United States occur east of the Continental Divide and comprise the family Cambaridae (335 taxa), primarily in the genera *Cambarus*, *Procambarus*, and *Orconectes*. Astonishingly, about 95 percent of the U.S. species occur in the Southeast, making this region the global center of crayfish diversity. Recognized biodiversity is rapidly expanding; 45 species were formally described between 1988 and 1996 alone (Taylor et al. 1996). Ultimate crayfish diversity may exceed 400 species.

Crayfish thrive in creeks and rivers, lakes and ponds, swamps and ditches, even pine flatwoods and wet meadows. Stream forms are most diverse. Physiographic integrity—restriction to a particular province or subsection—is displayed by many crayfish. *Cambarus* species primarily occur in the Appalachian Highlands, *Orconectes* species are generally found on the Interior Low Plateau, and *Procambarus* species are mostly Coastal Plain endemics. Many, primarily Coastal Plain crayfish, excavate burrows whose entrances are conspicuously marked by mud-ball "chimneys." About 40 troglotic (cave-dwelling) species live in subterranean streams, and have lost their eyes and pigments.

Crayfish mate in fall through winter. A male courts a female by touching her with his antennae and chelae (claws). During copulation, he deposits sperm into her sperm receptacle and places a plug in it, perhaps to retain his sperm or prevent other males from mating with her. After fertilization, she glues the eggs to her swimmerets (swimming legs), then sequesters herself in a safe place while "in berry" (her egg mass resembles berries). Hatching takes place after a few



These three specimens illustrate the morphological diversity of the group. From left to right: bottlebrush crayfish (*Barbicambarus cornutus*), *Orconectes lancifer* (no common name), and “*Cambarus new species*,” an as yet unnamed member of the genus *Cambarus*.

weeks. Juveniles have three stages and stay with mom for weeks before striking out.

Sexually mature males have two annually cycling forms: the reproductively active Form I and sexually inactive Form II. Generally, males are in Form II during the summer months. In late summer or fall males molt into Form I, and actively pursue mating. Molting, or the shedding of the carapace (exoskeleton) to allow for growth, is a critical time for crayfish due to increased vulnerability to predation and pollutants. North American crayfish 5 to 7 inches (12 to 17 centimeters) long are considered large. They live 1.5 to 3.5 years, but troglobitic crayfish species may live several decades.

Crayfish play many important roles in their ecosystems. They are omnivorous, processing organic matter and transforming energy between different levels in the food chain, and are eaten by more than 240 predators.

Long a favorite in Cajun cuisine, a commercial crayfish industry is centered in Louisiana. Having an average annual value of \$91 million, 87 million pounds are annually produced from pond culture and wild harvested stock. Crawfish festivals celebrating this delectable decapod are well known in the Deep South. A Crayfish Derby has been held in Columbia, Missouri, for 15 years.

Crayfish are susceptible to habitat damage caused by impoundments, stream channelization, pollution, and sedimentation. Probably the biggest threat is nonnative crayfish introduced as fishing bait. Introduced crayfish may compete with natives for shelter, hybridize with them, and destroy vegetation beds used by native crayfish and other organisms for foraging, nesting, and shelter. One introduced species in particular, the rusty crayfish (*Orconectes rusticus*), has displaced native species in many areas.

The degree of crayfish imperilment may exceed that of fishes, and is second only to the most imperiled group in North America, freshwater mussels. Conservation biologists estimate that 48 percent of our crayfish fauna deserve conservation status. At present, however, only four are listed under the Endangered Species Act: two cave crayfish (*Cambarus aculabrum* and *C. zophonastes*) in northern Arkansas with no common names, the Nashville crayfish (*Orconectes shoupi*) in central Tennessee, and the Shasta crayfish (*Pacifastacus fortis*) in northern California.

Taylor et al. (1996) played a major role in highlighting the plight of this largely overlooked aquatic group. Conservation biologists are helping by

hosting workshops focused on crayfish identification, distribution, ecology, and status. Some Fish and Wildlife Service ecosystem teams are generating reports and considering management strategies for potentially imperiled crayfish. These efforts are making crayfish more of a consideration in the management, restoration, and conservation of our Nation's aquatic resources.

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Reference

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