Cambarellus (Dirigicambarus) shufeldtii (Faxon) 1884

Cajun dwarf crayfish

Photo by C. Lukhaup

Distribution, Habitat, and Behavior

Cambarellus shufeldtii is widely distributed in the Gulf Coastal Plain, occurring primarily in large-river floodplains of the Mississippi River drainage from southern Illinois and Missouri south, as well as in several other drainages in Louisiana, Texas, Mississippi, and Alabama (Hobbs 1989, Peterson et al. 1996, Taylor and Tucker 2005). In Mississippi, the species occurs in all major drainages except the Tennessee River (Hobbs 1989). Peterson et al. (1996) found no *Cambarellus* species in the Jourdan River, a coastal drainage in Mississippi. Busack and Belk (1988) stated that populations in Mississippi outside of the Gulf Coast and Mississippi Alluvial Plain were probably the result of introductions, although they may now be well established in the region. However, without better historical distribution records, this cannot be confirmed, and it is also possible that extreme alterations in the hydrology of major river systems throughout the state facilitated dispersal and range expansion.

Cambarellus shufeldtii uses a variety of habitats with standing to slow-moving shallow water, including swamps, lakes, ponds, ditches, and slow streams (Bouchard 1972, Burr and Hobbs 1984, Hobbs 1989, Pflieger 1996, Taylor and Schuster 2004). Their habitat use appears to be largely restricted to shallow (<38 cm), clear, permanent water exposed to sunlight (Penn 1950). They are typically in areas with mud substrate where they reside in the fine woody debris and leaves near the shoreline, around large woody debris, roots or bald cypress knees, or in dense aquatic vegetation (Hobbs and Marchand 1943, Penn 1950, Burr and Hobbs 1984, Taylor and Schuster 2004). They tolerate a pH range of at least 5.4 – 7.4 (Penn 1950). Along the Mississippi Gulf coast, the species occurs more frequently in oxbow side-ponds than in habitats adjacent to river channels (Peterson et al. 1996). Compared to *C. diminutus*, *C. shufeldtii* used habitats that were less acidic, had less emergent aquatic vegetation, and had patchier submerged aquatic vegetation (Peterson et al. 1996).

Cambarellus shufeldtii does not burrow down to the water table but creates and occupies sealed chambers in mud as water recedes (Penn 1950).

Life Colors and Distinctive Characters

The small size of mature individuals and hooks on the 2nd and 3rd pairs of pereiopods (legs) in form I males are the most distinguishing characteristics of the genus *Cambarellus*. The rostrum is flat, the areola open, and the chelae narrow and smooth with fingers shorter than palm. Males have three straight terminal elements on the gonopods.

The species has dimorphic color patterns. Background color is tan to brown, and some individuals have longitudinal dark stripes on carapace and abdomen, whereas others have rows of spots. The color difference is due to a single gene (reviewed in Pflieger 1996).

Size

Females are larger than males (Page 1985) and reach about 33 mm total body length (Pflieger 1996). In Louisiana, females mature at a carapace length of about 8.5 mm (total length about 17 mm) (Penn 1942, Penn 1950, Lowe 1961), possibly larger (>11.5 mm) in Illinois (Page 1985). Form I male *C. shufeldtii* generally range between 15 and 30 mm total body length (Pflieger 1996), first maturing at a carapace length of 6.9 – 7.5 mm (Black 1966). However, Black (1966) noted that the smallest form I males frequently did not have mature sperm.

Most Like

The three other *Cambarellus* species in Mississippi, *C. diminutus*, *C. lesliei*, and *C. puer*, are similar in size and general body morphology, but in the those species, the male gonopod has curved terminal elements, a broadly triangular and bladelike caudal process, and a broader mesial process than does *C. shufeldtii*.

Life History

In Louisiana, *C. shufeldtii* breed year round, but reproductive peaks occur in late winter and early spring with a smaller peak in early to midsummer. Females live about one year during which they may have two broods (Lowe 1961). Males live 15-18 months, with reproduction beginning in the first spawning season after hatching (Penn 1942, Black 1966).

In western Tennessee, form I males are reported from April, June, and July and ovigerous females from July (Hobbs and Marchand 1943, Bouchard 1972). In Missouri, ovigerous females were collected from February to July, and form I males were abundant in February, July, October and November (Pflieger 1996). In Illinois, females with eggs were collected from February to May, those with young in April, June and July (Page 1985), and form I males in all months except January, August and September (Page 1985). In Kentucky, ovigerous females were collected in April and form I males in April, June, and September - November (Taylor and Schuster 2004). Eggs remain attached to the female for about three weeks (Lowe 1961), and after hatching, young remain with the female for about 7 - 10 days (Lowe 1956).

Number of eggs per female averaged 34 (range 18 – 70; N = 100) in Louisiana (Penn 1942), 64 (maximum = 109; N = 8) in Missouri (Pflieger 1996), 80 (47 - 99; N = 9) in Illinois (Page 1985), and 148 (81 – 116; N = 2) in Kentucky (Taylor and Schuster 2004). Average egg diameter was 1.1 mm in Illinois (Page 1985) and 1.0 mm in Louisiana and Kentucky (Penn 1942, Taylor and

Schuster 2004). Four females collected in Illinois in April carried 15 – 74 (average = 45) young, suggesting 44 % mortality in egg and early juvenile stages (Page 1985).

Crayfish Associates

Although *C. shufeldtii* and *C. diminutus* are sometimes sympatric in a drainage, the two did not occur syntopically at any of the 97 sites in Mississippi sampled by Peterson et al. (1996). Similarly, despite overlapping ranges, *C. shufeldtii* and *C. puer* are rarely syntopic, with the former appearing to displace the latter where the two co-occur in Louisiana (Penn 1950, Penn and Fitzpatrick 1963, Pflieger 1996). Possible mechanisms of displacement include behavioral dominance of *C. shufeldtii* over *C. puer*, as displayed in laboratory trials (Penn and Fitzpatrick 1963), and possible earlier maturity and year-round reproduction, at least in southern portions of the range, by *C. shufeldtii* (Black 1966).

Cambarellus shufeldtii has also been collected with the following Mississippi species: *Cambarus diogenes, Cambarus ludovicianus, Faxonella clypeata, Orconectes lancifer, O. p. palmeri, Procambarus acutus, P. clarkii, and P. viaeviridis* (Hobbs and Marchand 1943, Lowe 1961, Bouchard 1972, Burr and Hobbs 1984, Taylor and Schuster 2004). In Missouri, *C. shufeldtii* is most closely associated with *P. clarkii* (Pflieger 1996), and in the floodplain of the Coldwater River, Mississippi, the two species were collected in the same dip net (unpublished data.).

Conservation Status

IUCN Red List (2011): Least Concern
American Fisheries Society ranking: Currently Stable
Heritage global ranking: G5 (demonstrably widespread, abundant, and secure)
See Taylor et al. (2007) for explanation of these rankings.

Species Description

Originally described as *Cambarus shufeldtii.*

Faxon, W. 1884. Descriptions of new species of *Cambarus*; to which is added a synonymical list of the known species of *Cambarus* and *Astacus*. Proceedings of the American Academy of Arts and Sciences 20:107-158.

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