**Procambarus (Pennides) lylei** Fitzpatrick and Hobbs 1971
Shutispear crayfish

![Female. Photo by S.B. Adams.](image)

**Distribution, Habitat, and Behavior**

*Procambarus lylei* is endemic to Mississippi and has been reported from 19 sites in five counties. It was originally described from Calhoun County and has since been documented in Montgomery, Webster, and Yalobusha counties, MS (Fitzpatrick and Hobbs 1971, Busack 1988, Fitzpatrick and Suttkus 1992). In addition, the MS crayfish database (this website) indicates two collections of female *P. lylei* from Grenada County, MS. All records of the species are from the following drainages within the Yalobusha River watershed (Yazoo River basin): Topashaw, Shutispear, Sabougla, Turkey, Skuna, and Batupan Bogue, and the Yalobusha drainage upstream of the confluence with Topashaw Creek.

Like other species in the subgenus *Pennides*, *P. lylei* is a stream-dwelling crayfish. When the species was collected at the type locality, the stream was 1.5 m wide, 0.3 m deep, and had a “sluggish” current (Fitzpatrick and Hobbs 1971). The substrate was “sticky mud” with small woody debris and detritus, and the riparian zone was wooded, primarily with *Salix nigra* Marsh (Fitzpatrick and Hobbs 1971). Fitzpatrick and Suttkus (1992) speculated that the species does not tolerate low oxygen levels or eutrophication. Busack (1988) found *P. lylei* most often in “small, slow to moderately flowing, cool streams with soft mud bottoms, with abundant leaf litter and forest cover”. The largest stream where he found the species was spring fed, 3-4 m wide and no more than 1 m deep, and appeared to support a large population. In the upper Topashaw Creek drainage, the species occurred in sand-bottom streams (Busack 1988).

**Life Colors and Distinctive Characters**
The description of characters is adapted from Fitzpatrick and Hobbs (1971) and Fitzpatrick (1996). The rostrum is long with convergent margins terminating in spines, a long, slender acumen, and in about half the specimens, a median carina. The areola is open, and the carapace has two cervical spines. The antennal scale is subtriangular and
widest proximal to the midpoint. Chelae are long and slender with 7 – 8 tubercles along the median margin of the palm and moderately well-defined, longitudinal ridges on both fingers. The abdomen is narrower and longer than the carapace. Form I males have simple hooks on the third and fourth pereiopods (legs), with those on the fourth being somewhat truncated. Gonopods are asymmetrical, with a shoulder on the cephalic surface, a complete set of five terminal elements, all directed cephalodistally. Females have shorter, stouter chelae. The annulus ventralis is moveable, with a shallow submedian trough in the cephalic two-thirds. The short, narrow sinus originates in the caudal end of the trough and curves caudally to intersect the caudal margin of the annulus ventralis. One pair of lobes extends caudally from the thoracic sternum and obscures the cephalic margin of the annulus ventralis.

Size
The three type specimens ranged in carapace length from 24.4 to 33.3 mm (Fitzpatrick and Hobbs 1971). Form I males ranged in size from 30.0 to 35.3 mm carapace length (Fitzpatrick and Suttkus 1992). The two largest specimens reported to date are females with carapace lengths of 52.3 and 39.4 mm (Fitzpatrick and Hobbs 1971, Fitzpatrick and Suttkus 1992).

Most Like
Members of the Pennides subgenus are distinguishable from other Procambarus subgenera in Mississippi by the combination of two cervical spines (rather than one or none) on the carapace, hooks on the third and fourth pereiopods (legs) of males (rather than on just the third pair), and a lack of long setae on the mesial margins of the palms of the chela (as is present in P. mancus). Moreover, Mississippi members of Pennides have a characteristic color pattern including a wide dark band extending along the dorsolateral surface of the carapace and onto the dorsal surface near the caudal margin of the carapace. Below the dark band is a light band and below that another dark band. Typically, a continuous or broken dark band extends down the dorsolateral surfaces of the abdomen.

Fitzpatrick and Hobbs (1971) hypothesized that of the Mississippi crayfishes, P. lylei was most closely related to P. ablusus and P. elegans, both of which also have a complete set of terminal elements on the male gonopod and a relatively smooth caudal margin of the thoracic sternum (just anterior to the annulus ventralis) in the female. However, preliminary allozyme analysis of eight Pennides species (including P. ablusus but not P. elegans) indicated that P. lylei was more closely related to P. penni and P. clemmeri than to P. ablusus (Busack 1988).

Procambarus lylei is distinguishable from other species in the subgenus by possessing a distinct shoulder on the cephalic margin of the gonopod and by having a complete set of terminal elements (5) on the form I gonopod, all of which curve cephalodistally. The median carina, when present, is also distinctive among the Pennides species in the state (Fitzpatrick 1996). Males can be distinguished from others in the subgenus by the attenuated apex of the gonopod and the lack of a small spine on the mesial surface of the basis of the cheliped (Fitzpatrick and Suttkus 1992).
The only species in the Pennides subgenus with ranges known to overlap that of *P. lylei* are *P. vioscai paynei* and *P. ouachitae*. Neither *P. v. paynei* nor *P. ouachitae* have five distinct terminal elements on the gonopod. In *P. vioscai*, the mesial process is curved caudally, and in *P. ouachitae*, the mesial process is the longest of the terminal elements. In female *P. v. paynei*, the sinus of the annulus ventralis originates in the cephalic half and does not extend to the caudal margin, and the thoracic sternum has no lobes projecting caudally over the annulus ventralis. In *P. ouachitae*, the sinus originates near the cephalic margin of the annulus ventralis, which is obscured by more than one pair of lobes extending caudally from the caudal margin of the thoracic sternum. In *P. lylei*, the sinus is very short, originating in the caudal third of the annulus ventralis and extending to the caudal margin, and the thoracic sternum has one pair of lobes extending caudally over the cephalic margin of the annulus ventralis. Also, the annulus is “at least semi-moveable” in *P. lylei*, but in *P. v. paynei* and *P. ouachitae*, the sternum inhibits movement of the annulus (Fitzpatrick and Suttkus 1992).

**Life History**

Form I males have been collected on 2 April (Fitzpatrick and Hobbs 1971) and from mid-June to mid-July (Fitzpatrick and Suttkus 1992). Small juveniles have been collected in April, September, and October (Fitzpatrick and Hobbs 1971; MS crayfish database, this website, Fitzpatrick and Suttkus 1992), indicating that the species may have two breeding seasons. Nothing else is known of the species’ life history.

**Crayfish Associates**

*Procambarus lylei* has been collected with *Cambarus diogenes*, *C. striatus*, *P. acutus acutus*, *P. hayi*, *P. ouachitae*, and an undescribed (as of 1988) species of *Orconectes* (Fitzpatrick and Hobbs 1971, Busack 1988, Fitzpatrick and Suttkus 1992).

**Conservation Status**

Busack (1988) suggested that the species’ range was contracting due to habitat degradation, including hydrologic and stream channel alterations and loss of cover, resulting primarily from stream channelization and agriculture. Fitzpatrick and Suttkus (1992) discounted this idea, noting that “populations are vigorous in reproduction and under no immediate threat”, but that the species is rare due to its “restricted range and comparative scarcity where found”. Busack (1988) proposed that another *Pennides* species, *P. ouachitae* (originally identified as *P. vioscai* but corrected by Fitzpatrick and Suttkus (1992)), appeared to be replacing or displacing *P. lylei* in degraded habitats. In 2008, we revisited three of Busack’s sites that had coexisting *P. lylei* and *P. ouachitae* 20 years ago, and all still contained both species, suggesting that the latter is probably not actively displacing the former (MS crayfish database). In the most agriculturally impacted site, *P. lylei* density was extremely low, and we caught only juveniles so identification was not definitive. An additional conservation concern is that the already-limited range is fragmented by Grenada reservoir and probably by channelized portions of the Yalobusha River and its major tributaries, presumably isolating populations in the tributary systems from one another.
IUCN Red List: Endangered B1ab(iii)
American Fisheries Society ranking: Vulnerable
Heritage global ranking: G2 (imperiled)
State of Mississippi: Tier 1 (in need of immediate conservation action and/or research)(MDWFP 2005).
See (Taylor et al. 2007) for further explanation of American Fisheries Society and Heritage rankings.

Species Description

Literature Cited


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