

The Occurrence of the Banded Pygmy Sunfish in the Green River Drainage of Kentucky

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ABSTRACT

The discovery of an apparent relict population of the banded pygmy sunfish *Elassoma zonatum* is reported from the Cypress Creek drainage, Muhlenberg County, Kentucky (Green River System). This constitutes a range extension of approximately 160 km east in Kentucky. A description of the area demonstrates the close association of the banded pygmy sunfish with cypress swamps.

INTRODUCTION

In conjunction with the preparation of an environmental statement pertaining to a channel modification project in the Cypress Creek watershed (Green River drainage) of Muhlenberg County, Kentucky, several collections of fishes revealed an apparent relict population of the banded pygmy sunfish *Elassoma zonatum*. The synoptic geographic range of this species extends from the Atlantic Coastal Plain of North Carolina south to Florida, across the Gulf Coastal Plain to eastern Texas and northward to southern Illinois (Clay 1975, Pflieger 1975, Eddy and Underhill 1978, Smith 1979). The species has long been known from southern Illinois (Jordan and Evermann 1896) with extirpated populations in the Lower Wabash River valley representing the northern limits of distribution (Smith 1979). At present, the species is unknown from adjacent drainages in southwestern Indiana, although Gerking (1945) regarded its occurrence in that area as probable. In Kentucky, this diminutive sunfish has been reported from the extreme western portions of the state in the Gulf Coastal Plain Province (Sisk 1969, Smith and Sisk 1969, Clay 1975, Webb and Sisk 1975).

A detailed study of the life history and habitat preference of the species in a Louisiana bayou was presented by Barney and Anson (1920). They reported that the species was generally associated with dense beds of submerged aquatic vegetation and a thick surface mat of *Lemna* sp., *Wolffia* sp., or *Spirodela* sp. in bayou areas with little or no flow. Gunning and

Lewis (1955) reported similar observations on a population of banded pygmy sunfish in a southern Illinois spring-fed swamp.

Due to the proposed rechanneling of extended segments of the Cypress Creek watershed and the extensive areawide surface mining activities with concomitant impacts to surrounding wetlands, the documentation of this apparent relict population of *Elassoma zonatum* is deemed appropriate along with a brief description of the study area, species associates, and notes on habitat.

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MATERIALS AND METHODS

The fieldwork for this study was performed on 6-8 November 1978. The collections were made with a 1.8 × 3.0-m 0.032-m-square mesh nylon seine. One collection was made utilizing sodium cyanide as outlined by Tatum (1968). Representatives of all species were fixed in 10 percent formalin and later preserved in 35-40 percent isopropanol. The no-

menclature used conforms to that of Bailey et al. (1970). Voucher specimens were deposited at the Kentucky Nature Preserves Commission in Frankfort, Kentucky, and Eastern Kentucky University, Richmond, Kentucky.

THE STUDY AREA

Cypress Creek originates approximately 6.7 km northwest of Greenville, Muhlenberg County, Kentucky, and flows in a northerly direction for 52 km before joining the Pond River 1.7 km south of the confluence of the Pond and Green rivers. The only major tributary in the watershed is Little Cypress Creek which originates 6.7 km north of Greenville, Kentucky, and flows 15 km in a northerly direction before joining Big Cypress Creek 5 km northwest of Central City, Kentucky. Approximately 35 percent of Cypress Creek and 44 percent of Little Cypress Creek had been channelized previously. According to local residents, the original channelization project was conducted about 1920. During the present study, the stream banks were densely vegetated and in several areas the adjacent floodplain retained characteristics of the original wetland community. Additional impacts on the watershed included a waste water disposal plant on Little Cypress Creek and extensive surface mining activity in the headwaters of Cypress Creek. The area studied included stream segments from west of Central City to immediately south of the McLean-Muhlenberg County line.

Station 1

Station 1 was in a cattail marsh 4.2 km northwest of Central City, off Clarks Road. The main channel of Little Cypress Creek lies immediately south of the marsh. The area is characterized by dense stands of cattails *Typha* sp., spike rush *Eleocharis* spp., and cutgrass *Leersia oryzoides* (L.) Sw. interspersed among open water areas that support floating mats of duckweed *Lemna* sp. and *Chara* sp. beds. The substrate was generally

composed of silt and muck covered with thick layers of decaying plant matter, logs, and stumps. The depth varied from 0.15 m in the larger open areas to 1.3 m in smaller pockets and narrow channels scattered within the marsh. Flow was negligible in all areas.

Collecting efforts at Station 1 yielded 2 specimens of *Elassoma zonatum*. They were taken from the edge of a deep (1.3-m) pool near dense stands of *Typha* sp. and floating mats of duckweed. Other species associated with the deeper pools and channels were the grass pickerel *Esox americanus vermiculatus*, bowfin *Amia calva*, lake chubsucker *Erimyzon sucetta*, warmouth *Lepomis gulosus*, bluegill *L. macrochirus*, and mosquitofish *Gambusia affinis*. The mosquitofish was particularly abundant, especially in open, shallow water areas.

Station 2

Station 2 was 6.7 km west-northwest of Central City, immediately south of the state Highway 81 bridge. The collection was taken from the old channelized mainstem of Cypress Creek. Numerous breaks in the spoil banks allow considerable exchange of water between Cypress Creek and the adjacent swamp areas. Beaver dams, log jams, and accumulations of leaf litter and other plant matter in the channel have created a series of pools that range from 0.45 to 2 m in depth. The channel width is a relatively uniform 8 m. Little aquatic vegetation was established in the main channel although overhanging riparian vegetation and roots of trees provided cover at the edge of the stream.

This site was sampled utilizing sodium cyanide; thus close association of one species with another was difficult to ascertain. One specimen of *Elassoma zonatum* was taken along with individuals of ribbon shiner *Notropis fumeus*, slough darter *Etheostoma gracile*, warmouth, longear sunfish *Lepomis megalotis*, bluegill, and black crappie *Pomoxis nigromaculatus*. Juvenile sunfishes were the most abundant group at that station.

Station 3

Station 3 was 0.5 km south of the state Highway 81 bridge in a small unnamed tributary that drains a cypress swamp and enters Cypress Creek from the east. Several small, low beaver dams created a series of pools, and associated vegetation included bald cypress *Taxodium distichum* (L.) Richard, *Chara* sp., *Potamogeton* sp., burreed *Sparganium* sp., cat-tail, spike rush, and dense mats of duckweed. The substrate in the pools consisted of muck (to 0.45 m) covered with thick layers of decaying plant material. Numerous sticks and logs were also present. The pools were approximately 0.6 m deep and 3 m wide with minimal flow and represented the only significant open water within the cypress swamp. Although the surrounding areas were extremely wet, there were few pools of a size or depth capable of supporting fish.

Seining yielded 2 specimens of *Elassoma zonatum* from the pools and other associates were the grass pickerel, mosquitofish, warmouth, green sunfish *L. cyanellus*, lake chubsucker, and pirate perch *Aphredoderus sayanus*. The mosquitofish and the grass pickerel were noticeably abundant. The low water condition facilitated seining conditions by concentrating fishes in the small pools.

The occurrence of *Elassoma zonatum* in the Cypress Creek drainage constitutes a new record for the Green River system and extends the reported range of the species in Kentucky approximately 160 km east. Its presence in this remnant swampy area is not surprising in light of its reported habitat preference. It is of interest to note that Braun (1943) reported the bald cypress in river swamps and sloughs as far east in Kentucky as the Cypress Creek area. The distribution of *Elassoma zonatum* closely parallels that of bald cypress, especially at the periphery of the range of the latter. This suggests that appropriate habitats for *Elassoma zonatum* were once present over the western third of Kentucky. The ap-

parent absence of the species in the Tradewater and Cumberland river drainages to the immediate west may in part reflect a dearth of systematic surveys in those drainages. An alternate explanation for its absence may be the drainage of wetlands in recent times. It is felt that further collections in similar habitats in the western third of the state may reveal new populations of *Elassoma zonatum* as well as other species currently associated with the Gulf Coastal Plain Province.

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