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The Bluebarred Pygmy Sunfish (*Elassoma okatie*) in Georgia

The Bluebarred Pygmy Sunfish (*Elassoma okatie*) in Georgia

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INTRODUCTION

The bluebarred pygmy sunfish, *Elassoma okatie*, is a recently described species known from the Edisto, New, and eastern Savannah River drainages in South Carolina (Rohde and Arndt, 1987). We report another population from the western Savannah River drainage in Georgia.

METHODS

The bluebarred pygmy sunfish was collected during four consecutive seasonal surveys (8 December 1995 - 17 October 1996) of fish communities in streams on the U.S. Army Fort Gordon military installation in Richmond County, Georgia. In each of four streams, Brier, Boggy Gut, Sandy Run, and Spirit Creeks, we sampled at four or five locations distributed over linear distances of 2-5 km. A total of 66 collections was made.

Fishes were collected with 2.4 x 3.0 m seines with 5 mm mesh and then fixed in 10% formalin. Fishes were later washed, their total length recorded, and then transferred to 50% isopropanol. Series have been deposited in the Museum of Zoology at Northeast Louisiana University: NLU 72696 (8 December 1995), 72921 and 72933 (3 April 1996), 73318 (16 July 1996), 73491 (17 October 1996).

Standard sample effort was ten hauls stratified among all apparent macrohabitats in a defined reach of stream that usually consisted of a pool-riffle sequence. Habitat measurements were made immediately prior to seining: turbidity with a Hach 2100P turbidimeter; temperature, conductivity, pH and dissolved oxygen with Hydrolab multiparameter water quality probe; and depth and water velocity with a Marsh-McBirney wading rod and FloMate velocity meter at ten equidistant points along a cross-sectional transect.

RESULTS

The bluebarred pygmy sunfish was found at only one location in one stream: Boggy Gut Creek, at Gibson Road bridge, 3 km E of Avondale, Georgia. This station is in the southwest corner of Fort Gordon, section 42, and is 600 m N of an artillery impact area. On pre-1977 USGS maps, this site appears as the outflow of Burch Mill Pond, but the pond no

longer exists. A concrete structure 50 m upstream from the bridge does persist, however, and it partly impounds and diverts the stream channel around itself and creates a backwater. A sandbar extends obliquely downstream from the structure to the western shore at the bridge. We sampled from the bridge upstream to this structure.

Shore slope is not pronounced; it rises 0.14 m every 1 m from water's edge for a distance of 4 m. The channel width is 9-11 m. The substrate is mud, deep silt, and decaying vegetation in the backwater, sand and "pea" gravel in the channel; leaf litter occurs in slack water and eddies throughout. Emergent grasses and forbs and submerged aquatic vegetation, including water milfoil, *Myriophyllum* sp., are abundant in the backwater. Sedge, *Carex* sp., occurs in stream margins, mid-channel, and in patches on the sandbar. A pool 2 m deep occurs under the bridge and extends approximately 10 m upstream into the channel.

The water is clear (< 10 NTUs), acidic ($\text{pH} < 6$), and has a low conductivity ($< 30 \mu\text{S}$); it is typical tannin-stained blackwater (Table 1). Shallow water (< 1 m) of moderate velocity (< 30 cm/s) predominates. Flow is highest in the deepest part of the channel near the eastern shore, lower in the shallows toward the western shore, and negligible in the backwater near the concrete structure. In December, April, and July, stream discharge was 0.6-0.8 m^3/s ; in October it was $< 0.1 \text{ m}^3/\text{s}$.

The bluebarred pygmy sunfish was collected on all four visits to the location (Table 1). Most specimens were taken in the backwater. The total number of specimens taken was 41; 22 from quantitative fish-habitat surveys and 19 from supplemental collections made on 17 October 1996. The 19 specimens taken in supplemental collections were provided to other researchers (J. Jones, Fred C. Rohde) for use in genetic studies. Specimens ranged in size from 17-26 mm TL. We observed breeding coloration on 3 April 1996.

Although the numbers of specimens taken were low, the bluebarred pygmy sunfish was the fifth most abundant species (6.7% of total) of the 26 species collected here (Table 2). More abundant here than the bluebarred pygmy sunfish were the lined topminnow, bluespotted sunfish, pirate perch, and blackspotted sunfish. A single specimen of the banded pygmy sunfish was collected here also.

Table 1. Physical habitat and number of bluebarred pygmy sunfish collected by date in Boggy Gut Creek, Richmond County, Georgia. Water depth and velocity are reported as cross-sectional mean (standard deviation).

Parameter	8 Dec 95	3 Apr 96	16 Jul 96	17 Oct 96
Water temperature (C)	8.5	16.8	23.5	17.0
Conductivity (μ S)	28	22	24	20
Dissolved oxygen (mg/l)	10.2	8.8	4.9	5.9
pH	5.5	4.2	4.8	5.8
Turbidity (NTU)	2.8	3.7	9.6	2.2
Depth (cm)	43(21)	61(43)	71(50)	76(53)
Velocity (cm/s)	14(10)	14(7)	11(4)	1(2)
Number of specimens in 10 seine hauls	6	9	1	6

DISCUSSION

Faded museum specimens of pygmy sunfish suggest that populations existed of the bluebarred pygmy sunfish in Georgia tributaries of the Savannah River, including Boggy Gut Creek, but recent collections failed to substantiate this (Rohde and Arndt, 1987). Our record here, then, may constitute a rediscovery rather than a range extension or new state record. This population is notable for several reasons: it is the only confirmed report from the western Savannah drainage and is the first for Georgia; it is located approximately 90 km NW of the previous northernmost known locality; and it is approximately 250 km from the mouth of the Savannah River while all other documented populations occur within 40-150 km from the mouths of coastal rivers (Fig. 1).

The habitat and species associates of the bluebarred pygmy sunfish in Boggy Gut Creek are consistent with that reported for South Carolina populations, namely shallow, vegetated ditches or ponds, with stained, acidic water, and typically impacted by man (Rohde and Arndt, 1987; Rohde et al., 1994). Lined topminnow, pirate perch, swampfish, bluespotted sunfish, and blackspotted sunfish co-occur, as do other pygmy sunfishes, pickerels, and chubsuckers. Boggy Gut Creek, however, is more acidic (pH of 4.2 - 5.8), and with a greater

Table 2. Relative abundance of fishes that co-occurred with the bluebarred pygmy sunfish on four dates in Boggy Gut Creek, Richmond County, Georgia.

Species	Number collected	Percent of total
<i>Fundulus lineolatus</i> , lined topminnow	65	19.9
<i>Enneacanthus gloriosus</i> , bluespotted sunfish	40	12.6
<i>Aphredoderus sayanus</i> , pirate perch	36	11.0
<i>Lepomis punctatus</i> , blackspotted sunfish	36	11.0
<i>Elassoma okatie</i> , bluebarred pygmy sunfish	22	6.7
<i>Etheostoma fricksium</i> , Savannah darter	19	5.8
<i>Gambusia holbrooki</i> , eastern mosquitofish	13	4.0
<i>Chologaster cornuta</i> , swampfish	12	3.7
<i>Pteronotropis hypselopterus</i> , sailfin shiner	12	3.7
<i>Lepomis auritus</i> , redbreast sunfish	11	3.4
<i>Etheostoma serrifer</i> , sawcheek darter	10	3.1
<i>Esox americanus</i> , redbfin pickerel	8	2.4
<i>Notropis chalybaeus</i> , ironcolor shiner	8	2.4
<i>Erimyzon sucetta</i> , lake chubsucker	6	1.8
<i>Esox niger</i> , chain pickerel	5	1.5
<i>Acantharcus pomotis</i> , mud sunfish	3	0.9
<i>Erimyzon oblongus</i> , creek chubsucker	3	0.9
<i>Lepomis marginatus</i> , dollar sunfish	3	0.9
<i>Micropterus salmoides</i> , largemouth bass	3	0.9
<i>Percina nigrofasciata</i> , blackbanded darter	3	0.9
<i>Etheostoma fusiforme</i> , swamp darter	2	0.6
<i>Lepomis gulosus</i> , warmouth	2	0.6
<i>Notropis cummingsae</i> , dusky shiner	2	0.6
<i>Elassoma zonatum</i> , banded pygmy sunfish	1	0.3
<i>Lepomis macrochirus</i> , bluegill	1	0.3
<i>Noturus leptacanthus</i> , speckled madtom	1	0.3
Total number of species	26	
Total number of specimens	327	

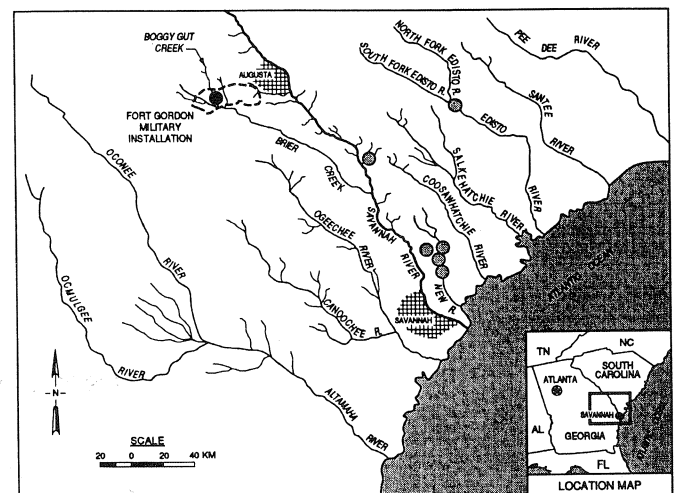


Figure 1. Distribution of the bluebarred pygmy sunfish (after Rohde and Arndt, 1987). Gray circles represent previous records; black circle represents the single locality in this report.

number of species associates present (26 species), than previously described habitats (pH 4.5-7.5; 10-18 species).

The bluebarred pygmy sunfish is listed as a species of special concern in South Carolina (Schmidt, 1996). The Nature Conservancy indicates that its status in South Carolina is unknown, but that the species is "imperiled globally" due to rarity, restricted distribution, or vulnerability (South Carolina Department of Natural Resources, 1996). This is the first confirmed report of the species in Georgia, and to date it has no status as a state-threatened species (Georgia Department of Natural Resources, 1992). Several fishes with restricted ranges within the state, however, are considered to be "special animals;" these include mud sunfish, Savannah darter, sawcheek darter, and sailfin shiner (Georgia Department of Natural Resources, 1996). The vulnerability of the bluebarred pygmy sunfish is suggested by the small number of known populations (Fig. 1) and by their proximity to disturbed habitat (Rohde and Arndt, 1987), and in Georgia by its restricted distribution. Listing as a species of special concern will likely be considered by the Georgia Natural Heritage Program (Robyn MacBeth, pers. comm., 1997).

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