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## New Drainage Records and Revised Ranges for Sympatric Pirate Perch Species in Alabama, Florida, and Georgia

Tyler Muller

North Carolina State University, [tmuller@ncsu.edu](mailto:tmuller@ncsu.edu)

Bryson Hilburn

University of Georgia, [Bryson.Hilburn@uga.edu](mailto:Bryson.Hilburn@uga.edu)

Lily Hughes

North Carolina State University, [lhughes7@ncsu.edu](mailto:lhughes7@ncsu.edu)

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# New Drainage Records and Revised Ranges for Sympatric Pirate Perch Species in Alabama, Florida, and Georgia

## Abstract

We report updated ranges for four sympatric species of Pirate Perches following a recent taxonomic revision of *Aphredoderus*. Using observations from recent sampling by the North Carolina State Museum of Natural Sciences and reidentifying cataloged specimens from the Georgia Museum of Natural History and Auburn University Museum collections, we were able to refine the distributions of four species throughout a complicated sympatric zone spanning coastal plain drainages in Alabama, Florida, and Georgia. We find that *A. gibbosus* is present in low numbers in the Flint, Escambia, Choctawhatchee, and Chattahoochee basins. These additional records nearly link the previously reported disjunct distribution of *A. gibbosus* into a more continuous distribution, though it still appears to be rare in this part of its range. We identified *A. ornatus* in Patsiliga Creek (Flint basin), and *A. mesotrema* in basins between the Mobile River and the Escambia River, and in the Alabama River. Following field observations that *A. retrodorsalis* is only present at low elevations, we narrow the range this species to being generally below 65 meters elevation in basins from the Blackwater River in Florida to the Ogeechee River in Georgia. This pattern contrasts with the sympatric species *A. ornatus*, which extends to (and at times past) the Atlantic Coastal Plain fall line in Georgia.

## Keywords

Biogeography, *Aphredoderus*, Percopsiformes

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## Cover Page Footnote

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## INTRODUCTION

The freshwater ichthyofauna of the Southeastern United States is both species rich and possesses high intraspecific genetic diversity (Bermingham & Avise, 1986; Darden, 2008; Nagle & Simons, 2012). Given the complex biogeography of the Southeastern Coastal Plain with changing coastlines over glacial cycles, it has been long recognized that this region harbors more taxonomic diversity than currently described. Several models of vicariant speciation have been proposed for the Gulf Coastal Plain (GCP) specifically, suggesting major historical refugia (Near et al., 2003; Wiley & Mayden, 1985). Large intergrade zones have been observed in morphological studies of lowland fishes such as American Pickerels, *Esox americanus* (Crossman, 1966) and Pirate Perches, *Aphredoderus* (Boltz & Stauffer, 1993) though the latter was recently revised and consists of five distinct species (Muller & Simons, 2024). Genetic analyses of other widespread Southeastern taxa have supported significantly higher levels of species-level diversity. Recent genetic analyses in *Elassoma* have shown highly structured population partitioning and provide good evidence for several species within nominal *E. zonatum* (Sandel, 2012) and *E. evergladei* (Pounders, 2024). As our understanding of species boundaries in this region improves with the use of genetic data, species ranges need to be re-examined to reflect current taxonomic knowledge.

*Aphredoderus* was recently revised to contain five species following a range-wide systematic evaluation leveraging both genetic and morphological data (Muller & Simons, 2024). The unexpected widespread sympatric distributions and disjunct ranges of species within the recently revised genus likely confounded previous attempts at species delimitation. Notably, *A. gibbosus* was found to extend through the Great Lakes, Mississippi River Valley and GCP drainages into Florida, but was conspicuously absent between the Mobile River basin and Aucilla River in Florida. *Aphredoderus ornatus*, a predominantly Atlantic Coastal Plain (ACP) species extending from the Potomac River in the north to the St. Johns River to the south, also has disjunct populations in the Apalachicola and Ochlockonee drainages in the GCP. *Aphredoderus* species are morphologically conserved and can be challenging to identify in both museum collections and the field. This presents issues in reidentifying the numerous older collections of *Aphredoderus* spp. in museums, as over 9000 *Aphredoderus* lots documented in FishNet2 were collected before the taxonomic revision in 2024. Of these, 2770 lots are from Alabama, Florida or Georgia where a high degree of sympatry has been observed (Accessed through the Fishnet2 Portal, [www.fishnet2.org](http://www.fishnet2.org), 2024-11-17).

Records recently emerged of *A. gibbosus* dip-netted in an unnamed tributary of Ichawaynochaway Creek in Calhoun County, Georgia (Flint River basin) and from a recently accessioned collection from Pea River in Pike County, Alabama. Recent collections by the North Carolina State Museum of Natural Sciences in the Georgia ACP noted that *A. retrodorsalis* was syntopic with *A. ornatus* through much of the lower coastal plain but absent from the middle and upper coastal plain. Here we supplement existing distributional data in Alabama, Florida, and Georgia of four Southeastern species in widespread sympatry by identifying several hundred lots of *Aphredoderus* from five Southeastern U.S. museums. We also compare elevational differences in distribution of *A. ornatus* and *A. retrodorsalis* within the Georgia ACP.

## METHODS

Following initial observations of new populations, we used iNaturalist to search for additional species-specific *Aphredoderus* records outside previous range estimates followed by either museum searches or subsequent collections. Species were identified by the authors following the *Aphredoderus* identification key and characters in Muller & Simons (2024). We then reidentified numerous lots from Alabama, Georgia and Florida *Aphredoderus* specimens from the Georgia Museum of Natural History (GMNH; 180 lots), Auburn University Ichthyology Collection (AUM; 335 lots), and North Carolina State Museum of Natural Sciences (NCSM; 7 lots), and combined these with existing distributional data from Muller & Simons (2024). We received photos of three lots from the University of Tennessee Etnier Ichthyology Collection to verify a questionable record, and reidentified one lot from the Bell Museum of Natural History (JFBM). All collections are abbreviated following Sabaj (2020). When location metadata was insufficient for exact georeferencing, sites were referenced to the most downstream portion of the waterbody (e.g., county line or stream mouth if within county). In cases where only a drainage name was used and the drainage spanned more than one county, records were not georeferenced. In determining elevational limits of *A. retrodorsalis* we plotted all known collections and observations in ArcGIS Pro over a topographic raster file of 250 meters resolution (Commission for Environmental Cooperation, 2023).

## RESULTS

Table 1. New major drainage basin records of *Aphredoderus*. Two lots with \* could not be georeferenced. Creeks in parentheses are the tributaries containing unnamed streams with records. ACF = Apalachicola-Chattahoochee-Flint.

| Species             | N  | Creek             | River          | Major basin    | State | County     | Museum | Catalog # | Lat     | Long     |
|---------------------|----|-------------------|----------------|----------------|-------|------------|--------|-----------|---------|----------|
| <i>A. ornatus</i>   | 3  | Patsiliga         | Flint          | ACF            | GA    | Taylor     | AUM    | 7387      | 32.6053 | -84.3572 |
| <i>A. ornatus</i>   | 4  | Patsiliga         | Flint          | ACF            | GA    | Taylor     | UT     | 80.55     | 32.6209 | -84.2409 |
| <i>A. gibbosus</i>  | 1  | Halawakee         | Chattahoochee  | ACF            | AL    | Lee        | AUM    | 24050     | 32.6944 | -85.2547 |
| <i>A. gibbosus</i>  | 2  | (Ichawaynochaway) | Flint          | ACF            | GA    | Calhoun    | NCSM   | Observ.   | 31.5831 | -84.6052 |
| <i>A. gibbosus</i>  | 3  | Kiokee            | Flint          | ACF            | GA    | Dougherty  | GMNH   | 69486     | 31.528  | -84.3595 |
| <i>A. gibbosus</i>  | 1  | Big Cypress       | Flint          | ACF            | GA    | Baker      | GMNH   | 25483     | 31.202  | -84.4979 |
| <i>A. gibbosus</i>  | 1  | (Big Slough)      | Flint          | ACF            | GA    | Mitchell   | AUM    | 7348      | 31.1576 | -84.2372 |
| <i>A. gibbosus</i>  | 1  | Big Drain         | Flint          | ACF            | GA    | Miller     | GMNH   | 69469     | 31.09   | -84.7057 |
| <i>A. gibbosus</i>  | 1  | Rocky Branch      | Escambia       | Escambia       | FL    | Escambia   | JFBM   | 50218     | 30.6654 | -87.2924 |
| <i>A. gibbosus</i>  | 2  | Beeman            | Conecuh        | Escambia       | AL    | Pike       | NCSM   | 100217    | 31.8848 | -86.0334 |
| <i>A. gibbosus</i>  | 16 |                   | Pea            | Choctawhatchee | AL    | Pike       | GMNH   | 68607     | 31.9457 | -85.6205 |
| <i>A. gibbosus</i>  | 13 |                   | Pea            | Choctawhatchee | AL    |            | GMNH   | 69355*    | -       | -        |
| <i>A. gibbosus</i>  | 1  | Holmes            | Choctawhatchee | Choctawhatchee | FL    |            | AUM    | 86627*    | -       | -        |
| <i>A. gibbosus</i>  | 2  | Gum               | Choctawhatchee | Choctawhatchee | FL    | Washington | AUM    | 28836     | 30.7214 | -85.778  |
| <i>A. mesotrema</i> | 2  | Big Swamp         | Alabama        | Mobile         | AL    | Dallas     | AUM    | 7950      | 32.2353 | -87.1933 |

### *Aphredoderus gibbosus*

Eight individuals were observed from five collections in the Flint River drainage of the Apalachicola-Chattahoochee-Flint (ACF) basin. Within the Ichawaynochaway Creek system, two specimens were collected while dip-netting in a western tributary of Ichawaynochaway Creek between Merrett and Little Creeks in Calhoun County, GA. From museum specimens, a third individual was found in Big Cypress Creek near the confluence with Ichawaynochaway Creek, and three additional *A. gibbosus* were found in lots upstream in Kiokee Creek (Fig. 3C). In total,

16 lots were examined from the Ichawaynochaway Creek basin and contained six *A. gibbosus* and 94 *A. mesotrema*. Remaining ACF *A. gibbosus* were observed in a tributary of Big Slough (Fig. 1) in the Flint River basin, where only one *Aphredoderus* was available, and Big Drain (Fig. 1). The remaining nine lots from Spring Creek tributaries contained 55 *A. mesotrema*. In the middle Chattahoochee River basin, a single *A. gibbosus* was observed in Halawakee Creek, a direct tributary of the Chattahoochee River, while nearby lots contained only *A. mesotrema*.

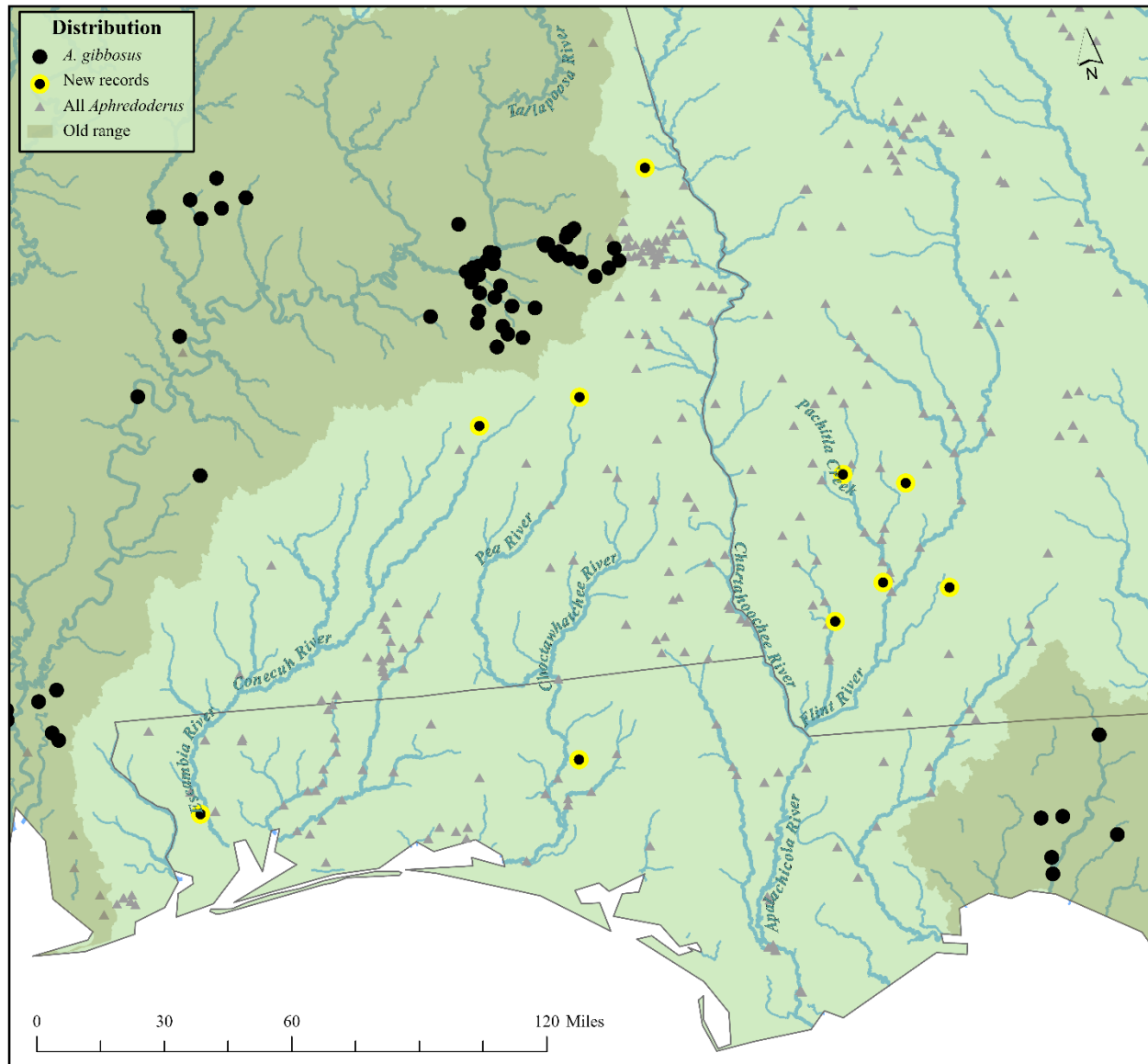


Figure 1. Light grey triangles - all identified *Aphredoderus*, black dots identified as *A. gibbosus*, yellow highlighted dots are specimens found outside of previous range estimates. Dark green shading is the former range estimate in Alabama, Florida, and Georgia. From west to east several new drainage records from Escambia, Choctawhatchee, Chattahoochee and Flint river basins. GMNH 69355 (Pea River) and AUM 86627 (Holmes Creek, Choctawhatchee River basin) did not have coordinates and localities were too broad to map. See Table 1 for additional sample details.

We examined five lots in Florida's portion of the Escambia River (17 individuals). A single individual was found in Rocky Branch, while the remaining four lots (16 individuals) contained

only *A. mesotrema*. Upstream in Beeman Creek, a tributary of the Conecuh River, an individual was reported on iNaturalist (rbassham 2019. iNaturalist observation: <https://www.inaturalist.org/observations/21215427>. Accessed on April 29, 2024). Following the report of this record, Dr. Alvin Diamond (Troy Univ., Troy, AL) surveyed this site and found two *A. gibbosus* and six *A. mesotrema*. Further sampling in this region is sparse in museum collections. In the nearby Pea River, under 25 miles ENE from Beeman Creek, a single collection yielded 16 *A. gibbosus* and 13 *A. mesotrema* (Fig. 3D). An additional Pea River collection with the locality listed only as “Alabama” had 13 *A. gibbosus* and one *A. mesotrema*. We found an additional two lots containing *A. gibbosus* in Gum Creek and Holmes Creek, tributaries of the Choctawhatchee River.

### *Aphredoderus ornatus*

Seven individuals were observed in two collections dating May 12, 1972 and July 25, 1996 (Fig. 3E-F) from Patsiliga Creek in the Flint River basin (Fig. 2; Taylor County, GA). Each lot was mixed with *A. mesotrema*. In total, we looked at three lots (seven *A. ornatus*, 11 *A. mesotrema*) from Patsiliga Creek, and three lots from tributaries of Patsiliga Creek where *A. ornatus* was not observed (18 *A. mesotrema*). The closest known population connected by watershed is in the Florida and Apalachicola Rivers in Liberty County, Florida, over 172 miles away. The nearest recorded population by air distance is just over 28 miles East, in Mossy Creek (Ocmulgee-Altamaha River basin).

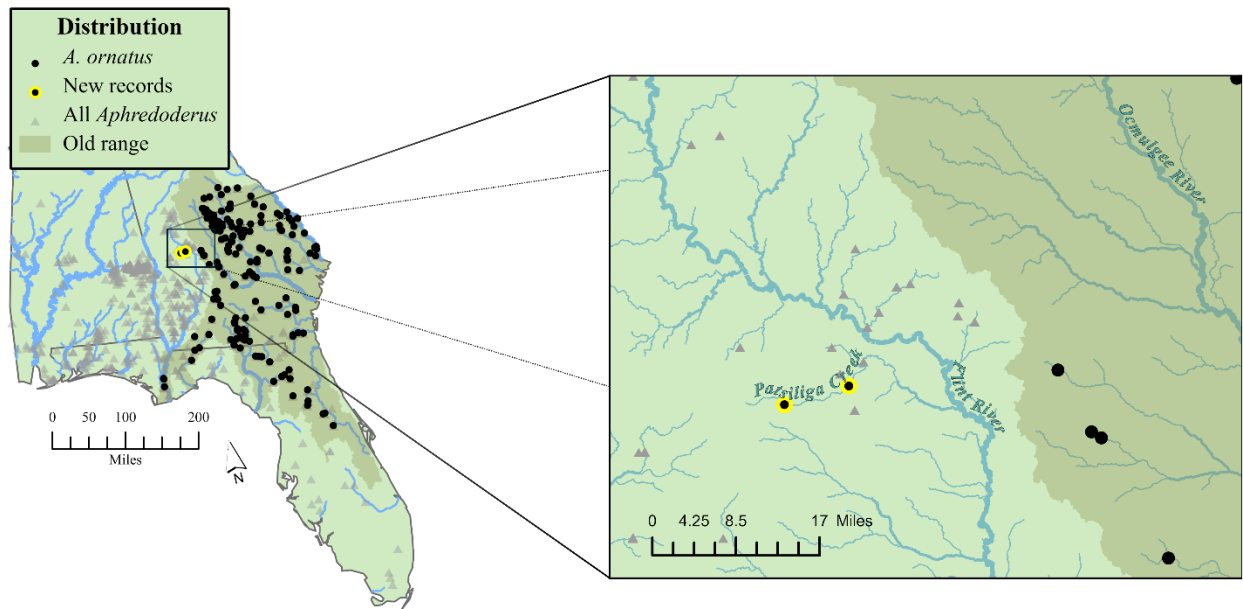


Figure 2. Light grey triangles - all identified *Aphredoderus*, black dots - *A. ornatus*, yellow highlighted dots are newly recognized *A. ornatus* from Patsiliga Creek, Taylor County, Georgia (Flint River basin). Dark green shading is former range estimate in Florida, and Georgia. See Table 1 for additional sample details.

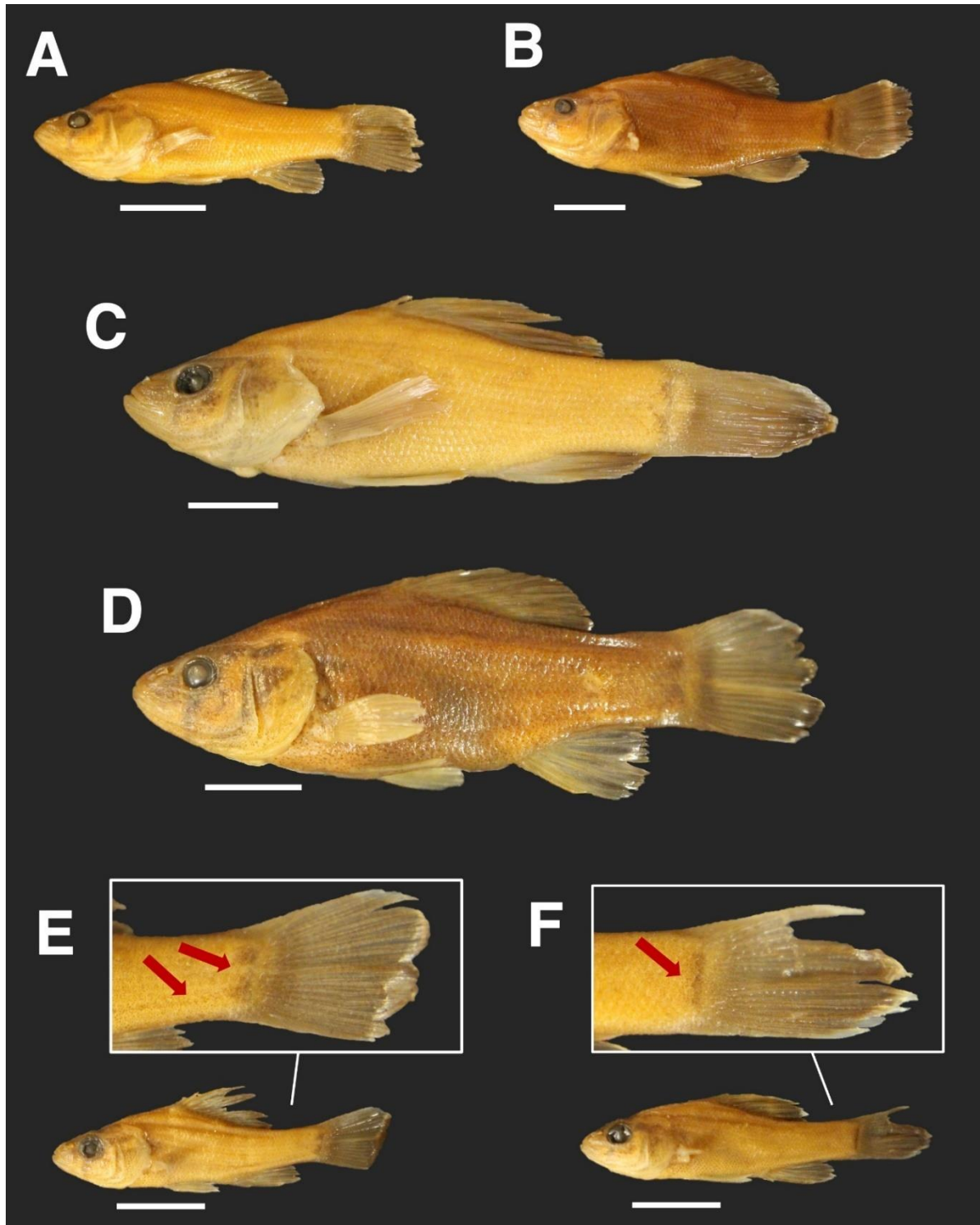


Figure 3. Representative specimens from newly recognized drainage records of *Aphredoderus*. All scale bars = 1 cm. A) *A. gibbosus* from Kiokee Creek, Flint River basin, Georgia (36 mm SL; GMNH 69486), and B) syntopic *A. mesotrema* (43 mm SL; from the same former lot GMNH 17119). C) *A. gibbosus* from Cypress Creek, Flint River basin, Georgia (63 mm SL; GMNH 25483). D) *A. gibbosus* from the Pea River, Choctawhatchee River basin, Alabama (59 mm SL; GMNH 68607). E) *A. ornatus* from the Patsiliga Creek, Flint River basin, Georgia (29 mm SL; UT 80.55) and F) syntopic *A. mesotrema* (30 mm SL; same lot). Red arrows in panels E and F highlight diagnostic pigmentation patterns on the caudal peduncle for *A. ornatus* and *A. mesotrema*, respectively.

*Aphredoderus mesotrema*

This species is widespread through the Uphapee Creek system in the Tallapoosa River drainage existing at almost every site alongside *A. gibbosus*. AUM has extensive records of *Aphredoderus* from this system — 446 individuals in 62 lots. No less than 20 of the 55 lots examined from this drainage contained *A. mesotrema*. In Big Swamp Creek, in the Alabama River, two individuals were observed. Further upstream in Big Swamp Creek a single collection contained eight *A. gibbosus*. Between the Mobile River and Perdido River, all eight collections (40 individuals) were *A. mesotrema*. This species is also present in small numbers throughout several points of the Mobile and Alabama River basins. Additional sampling and sorting of material may be needed to determine the full extent of *A. mesotrema* in the Mobile River, though between the Mobile Bay and Perdido River it is the dominant *Aphredoderus* species. This was previously only inferred from a single lot by Muller & Simons (2024).

*Aphredoderus retrodorsalis*

Of 156 field collections and museum specimens of *A. retrodorsalis*, 155 were from elevations of 65 meters or less (Fig. 4). All other *Aphredoderus* species can be readily found well above this elevation (*A. gibbosus* up to 195 m, *A. ornatus* up to 224 m, and *A. mesotrema* up to 280 m). A single specimen was collected in the upper reaches of the Ochlockonee River, NW of Moultrie, GA, at 92 meters elevation. Extensive identifications above 65 meters have not uncovered more *A. retrodorsalis*. It is possible that *A. mesotrema* in the Ochlockonee resembles *A. retrodorsalis*, as postopercular lengths are more intermediate. Through the remaining range, we find this 65-meter arc to be a reliable upper elevational limit for *A. retrodorsalis*.

## DISCUSSION

Four *Aphredoderus* species are frequently syntopic in Southeastern Coastal Plain streams, presenting challenges for range delimitation. Expanding on previous work that examined hundreds of lots across the genus (Muller & Simons 2024), we were able to identify rare populations and new drainage records in Alabama, Florida, and Georgia. Pirate perches are not of interest in angling, bait, or the aquarium trade, so the translocation of these populations by humans is relatively unlikely.

*Aphredoderus gibbosus* was initially reported to have a disjunct distribution, absent from the GCP after the Tallapoosa River and reappearing in the Aucilla River in Florida. However, our expanded survey confirms uncommon populations in the ACF system, particularly in the lower Flint River (Fig. 1). The presence of *A. ornatus* in a single creek in the Flint River basin is noteworthy as predominantly ACP species are rare in this drainage. Specific to this region, only *Pteronotropis cummingsae* shares this similar disjunct population and similarly is only found in Patsiliga Creek over much of the Flint River below the fall line, though this species also has GCP populations in the middle Chattahoochee, and lower ACF rivers. Given the proximity of the Ocmulgee River basin, stream capture is a plausible source of this population as similar

distributional trends have been observed in other species (Bart et al., 1994), though in several lots from tributaries on the eastern side of the Flint we could only find *A. mesotrema*. Alternatively, this could be a relict population from a previously larger population that would have connected the Apalachicola and ACP populations.

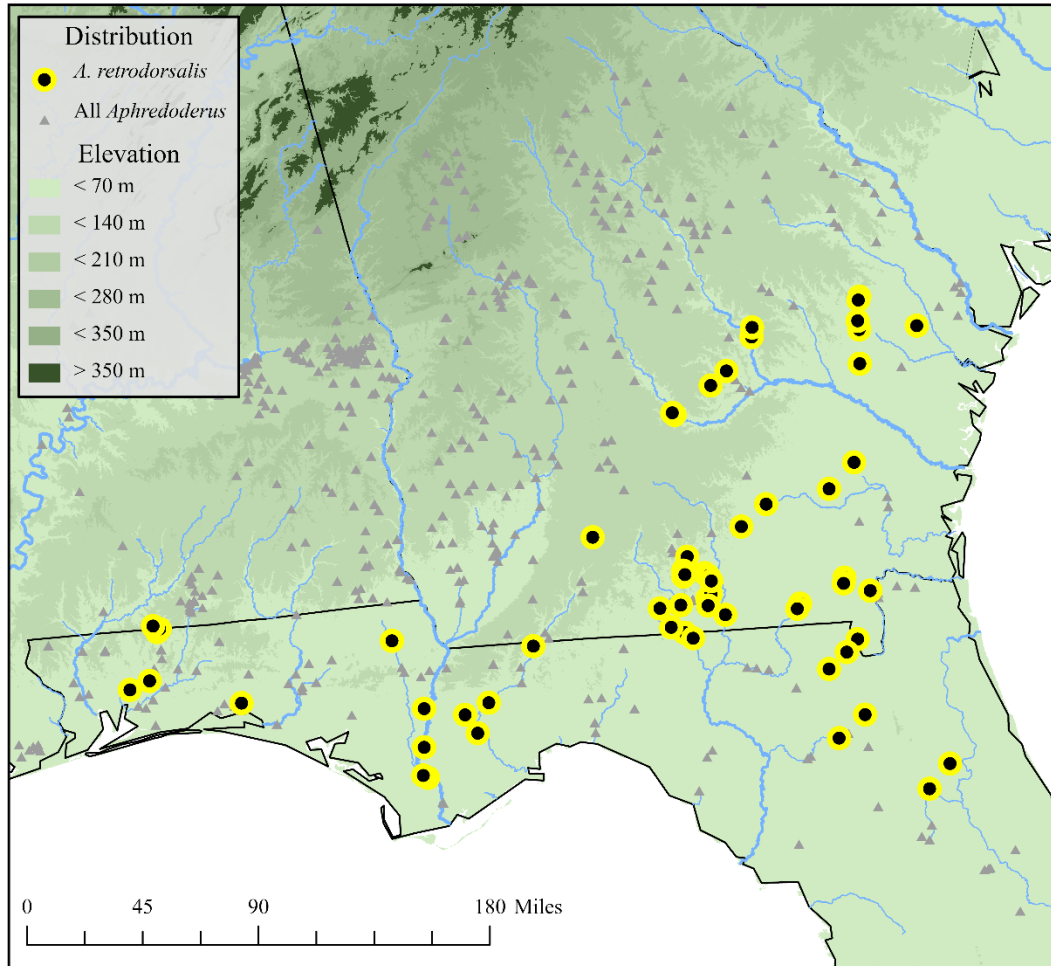


Figure 4. *Aphredoderus retrodorsalis* range and elevation. Highlighted black dots represent *A. retrodorsalis* localities, and small grey triangles represent all identified *Aphredoderus* spp. The lightest green layer represents elevation up to 70 meters, above this only one individual has been tentatively identified.

Stream capture events between the Tallapoosa and Chattahoochee River basins have been supported by previous studies (Hilburn & Dattilo, 2023; Jarrett et al., 2017), and both *A. gibbosus* and *A. mesotrema* show evidence of inter-basin dispersal in this region. Geological evidence and species distributions suggest reciprocal stream captures between the Chattahoochee and Tallapoosa River basins above the fall line (Hilburn & Dattilo, 2023; Jarrett et al., 2017). Likewise, abundant populations of Mobile River basin lowland species (e.g., *Etheostoma zonifer*, *Erimyzon claviformis*, *Alburnops baileyi*) in select western Chattahoochee tributaries suggest that lowland inter-basin stream captures may have occurred (Boschung & Mayden, 2004; Hilburn & Dattilo, 2023). *Aphredoderus mesotrema* is extremely abundant in the Apalachicola River basin but comparatively uncommon in the adjacent Mobile River basin, whereas *A. gibbosus* is the most

common *Aphredoderus* species in the Mobile River basin and rare in the adjacent Apalachicola River basin. Current distributional trends in *Aphredoderus* lend additional support to either lowland Tallapoosa-Chattahoochee stream capture events or connections through historical inter-basin swamps.

The fall line is a significant barrier in the distribution of many lowland species like *Aphredoderus* but less is known about lower-elevation barriers. In the Southeastern Coastal Plain, we find evidence of a possible low-elevation barrier in *A. retrodorsalis*. This species is syntopic with *A. ornatus* up to 65 meters elevation, above which *A. retrodorsalis* is conspicuously absent (Fig. 4). In contrast, *A. ornatus* is common to elevations up to approximately 200 m. Given the widespread range through western Florida to the Ogeechee River, it is likely upper coastal plain stream habitats or ecology limit *A. retrodorsalis* to lower elevations rather than dispersal capabilities. The exact mechanism is unknown, but similar patterns of mid-coastal plain distributional limits of Gulf to Atlantic slope species are seen in *Enneacanthus obesus* (compared to *E. gloriosus*) and *Elassoma evergladei* (compared to *E. zonatum*) (Robins et al., 2018).

While we improved understanding of *Aphredoderus* distributions, we suspect that future collecting efforts may reveal additional undiscovered populations of *Aphredoderus* spp. outside their currently defined range. Extensive identification efforts are still needed, particularly in the GCP region, and further collections are likely needed to determine connectivity of putative disjunct populations within these species. Given the presence of *A. gibbosus* in the Conecuh and Pea River, it is likely they may be present through other eastern Alabama and west Florida GCP streams. We recommend increased genetic sampling of these new populations to determine if any constitute geographically isolated distinct genetic lineages. Some populations in this region remain challenging – such as some populations in the Ochlockonee River where we find the most fish with intermediate characters despite the presence of clearly identifiable *A. mesotrema*, *A. retrodorsalis* and *A. ornatus* in other tributaries of the watershed. Sequencing would likely be needed to determine if these are local population characteristics of one of these species, or if there is local hybridization.

## MATERIAL EXAMINED

In addition to lots in Muller & Simons (2024), the following lots were reidentified for this study. Bolded lots are new drainage records.

*Aphredoderus gibbosus*: AUM: 2756, 2837, 4155, 5534, 5553, 5649, 6547, **7348**, 7455, 7851, 8293, 11828, 19519, 19585, 20976, 21949, 22854, **24050**, 25061, **28836**, 29139, 29342, 29639, 29740, 29824, 29839, 29859, 29884, 30810, 30850, 30859, 30898, 31386, 31780, 31790, 31846, 31882, 32814, 32925, 33382, 33776, 33862, 34388, 34404, 35028, 36703, 37849, 39362, 41277, 41697, 46848, 46872, 47232, 48931, 51493, 51852, 55016, 57225, 57322, 58367, 58505, 58708, 58961, 62622, 63571, 65519, 67705, 67711, 68449, 72319, 74376, 74420, **86627**; GMNH: **25483**, 53566, 67082, 67228, 67275, **68607**, 68726, 68792, 68971, 69146, 69186,

69226, **69355**, **69469**, 69485, **69486**; JFBM: **50218**; NCSM: **100217**. Observations (uncataloged) from authors: **31.58311**, **-84.60515**

*Aphredoderus mesotrema*: AUM: 333, 478, 849, 1180, 1336, 1442, 1511, 1822, 1892, 1947, 2009, 2773, 2814, 3398, 6350, 6656, 6667, 6681, 6976, 7029, 7041, 7064, 7092, 7115, 7127, 7138, 7197, 7255, 7328, 7373, 7387, 7402, 7950, 9182, 9418, 9859, 9870, 10581, 10642, 10771, 10821, 11554, 11590, 12306, 12341, 12582, 12616, 13372, 13382, 14232, 14266, 14375, 14754, 14903, 15160, 15168, 15722, 16742, 16888, 18313, 18335, 19830, 20976, 21433, 21949, 23276, 24069, 24170, 25061, 25949, 25964, 26525, 26723, 26751, 26768, 27164, 27568, 27583, 27617, 28865, 28886, 29190, 29201, 29974, 30128, 30436, 30505, 30537, 30732, 30753, 30979, 31060, 31238, 31405, 31430, 31454, 31471, 31487, 31516, 31882, 31924, 32051, 32063, 32408, 32844, 33884, 33899, 34363, 35212, 35324, 36703, 37347, 37356, 37374, 37381, 39424, 46461, 46822, 46872, 47232, 49560, 51843, 53375, 54638, 54814, 55489, 55505, 56277, 56338, 57624, 58221, 58286, 58499, 58659, 60165, 60193, 61219, 61234, 61249, 61256, 61352, 61709, 61715, 61724, 61729, 61749, 61820, 61904, 61960, 61973, 62282, 62458, 62564, 62571, 63076, 63411, 63790, 63856, 63911, 64051, 64092, 64304, 64383, 64424, 64703, 64773, 64865, 64904, 65104, 67238, 67249, 67268, 67279, 67295, 67492, 67711, 67722, 67874, 67884, 67901, 68327, 68424, 68459, 68884, 69266, 70063, 70077, 70082, 70110, 71326, 71514, 71541, 71611, 71699, 71715, 72344, 73505, 73586, 74156, 74266, 74647, 74920, 74950; GMNH: 13433, 13459, 13719, 13939, 14166, 14191, 14213, 14227, 15675, 15711, 15719, 16366, 16533, 16903, 16959, 16970, 16983, 17021, 17057, 17073, 17119, 17510, 18917, 18936, 21190, 21211, 21221, 21245, 21338, 21366, 21391, 21407, 21440, 21464, 21480, 46272, 46292, 46341, 46391, 46413, 46428, 46506, 46549, 46806, 46927, 46958, 47041, 47162, 47153, 47637, 47229, 47328, 47455, 47555, 47601, 43330, 43257, 43102, 35646, 47898, 51289, 53716, 62796, 66789, 66808, 66820, 66887, 66907, 66938, 66956, 66995, 66996, 66997, 67015, 69391; NCSM: 115563; UT: 80.48, 80.55, 80.56.

*Aphredoderus ornatus*: AUM: 5013, 5039, 5980, 5997, **7387**, 7435, 8936, 8974, 8982, 9006, 10168, 10212, 10251, 10272, 10291, 10299, 10347, 11255, 11275, 11343, 12374, 12643, 12878, 12901, 12909, 12914, 12923, 12938, 12949, 14667, 19306, 22077, 24234, 24569, 26300, 27460, 27475, 27512, 27528, 29938, 31109, 31135, 31858, 32742, 32750, 33919, 34124, 42743, 47194, 53364, 60165, 60193, 72116, 72129; GMNH: 3246, 8424, 10521, 13688, 13775, 13783, 17156, 17821, 17837, 17856, 17902, 17926, 17964, 17996, 18007, 18020, 18033, 18065, 18090, 18100, 18125, 18155, 18185, 18239, 18261, 18277, 18291, 18302, 18346, 18356, 18416, 18433, 18446, 18487, 18532, 18547, 18556, 18571, 18599, 19043, 19057, 19180, 19362, 19386, 19422, 33880, 33897, 33912, 44769, 44752, 41130, 41096, 37329, 37334, 38691, 33472, 32813, 33455, 46194, 47890, 47972, 60496, 62575, 60682, 60943, 60967, 61166, 61237, 61245, 61255, 61273, 61277, 61290, 61301, 61311, 61328, 61488, 61530, 61570, 61579, 61587, 61695, 61733; NCSM: 115559, 115560, 115561, 115562, 115565; UT: **80.55**. Observations (uncataloged) from authors: 33.615556, -83.6424444. Observations (uncataloged) from NCSM: GMH-2024-01, GMH-2024-03, TAM24-04, TAM24-05, TAM24-07, TAM24-09, TAM24-10, TAM24-12, TAM24-13, TAM24-14, TAM24-16, TAM24-20, TAM24-22.

*Aphredoderus retrodorsalis*:

AUM: 5013, 11255, 11343, 32742, 32750, 47194, 73485, 4202, 4783, 10329, 11228, 11382, 12356, 13966, 14510, 60193, 73516; GMNH: 60727, 60742, 60955, 61184, 61245, 61352, 61739, 61751, 61791, 69471, 69472, 69474, 69476, 69477, 69478, 69480, 69481, 69482, 69483; NCSM: 115564, 115566. Observations (uncataloged) from NCSM: TAM24-04, TAM24-05, TAM24-07.

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