
August 2023

Discovery of an introduced Florida Flagfish (*Jordanella floridae*) population in Coastal Mississippi

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Recommended Citation

Ellwanger, Robert; Hunt, Samuel E.; Rezac, Calvin R.; and Wagner, Matthew D. (2023) "Discovery of an introduced Florida Flagfish (*Jordanella floridae*) population in Coastal Mississippi," *Southeastern Fishes Council Proceedings*: No. 63.

<https://doi.org/10.7290/sfcp63anr7>

Available at: <https://trace.tennessee.edu/sfcproceedings/vol1/iss63/3>

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Discovery of an introduced Florida Flagfish (*Jordanella floridae*) population in Coastal Mississippi

Abstract

The recent discovery of *Jordanella floridae* (Florida Flagfish) in Harrison County, Mississippi represents the first known occurrence of the species in the state. Native along the Atlantic and Gulf Coasts of Florida from Jacksonville to Tallahassee, this species has been introduced outside of its range via aquarium introductions. We hypothesize that an aquarium introduction was also the source of the newly discovered population, which has persisted at the location since 2020. Multiple collections of the species have been taken from a small waterbody which has a direct connection to the Tchoutacabouffa River (25mm-47mm TL). While it is unknown if this represents the only population in the system, further surveys should be conducted to determine population numbers at the site of collection, the extent of the invasion within the Tchoutacabouffa, and the impact to the native fish fauna.

Keywords

Aquarium transplant, native invasion, Cyprinodontidae

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INTRODUCTION

In the Southeastern United States, only two species within the family Cyprinodontidae (pupfishes) inhabit the Gulf and Atlantic Coasts; *Cyprinodon variegatus* (Lacepède 1803) (Sheepshead Minnow), and *Jordanella floridae* (Goode & Bean 1879) (Florida Flagfish) (Fig. 1). Both prefer vegetated, sluggish streams and sloughs found in the brackish waters of the coast. In Mississippi, *C. variegatus* is the only native pupfish species, inhabiting waters along the Mississippi Sound from Grand Bay to the mouth of the Pearl River (Ross 2001). The native range of *C. variegatus* extends west to northern Mexico, and east to Massachusetts (Page and Burr 2011). Conversely, *J. floridae* is restricted to the Atlantic and Gulf Coasts of Florida from Jacksonville to Tallahassee (Robins et al. 2018).

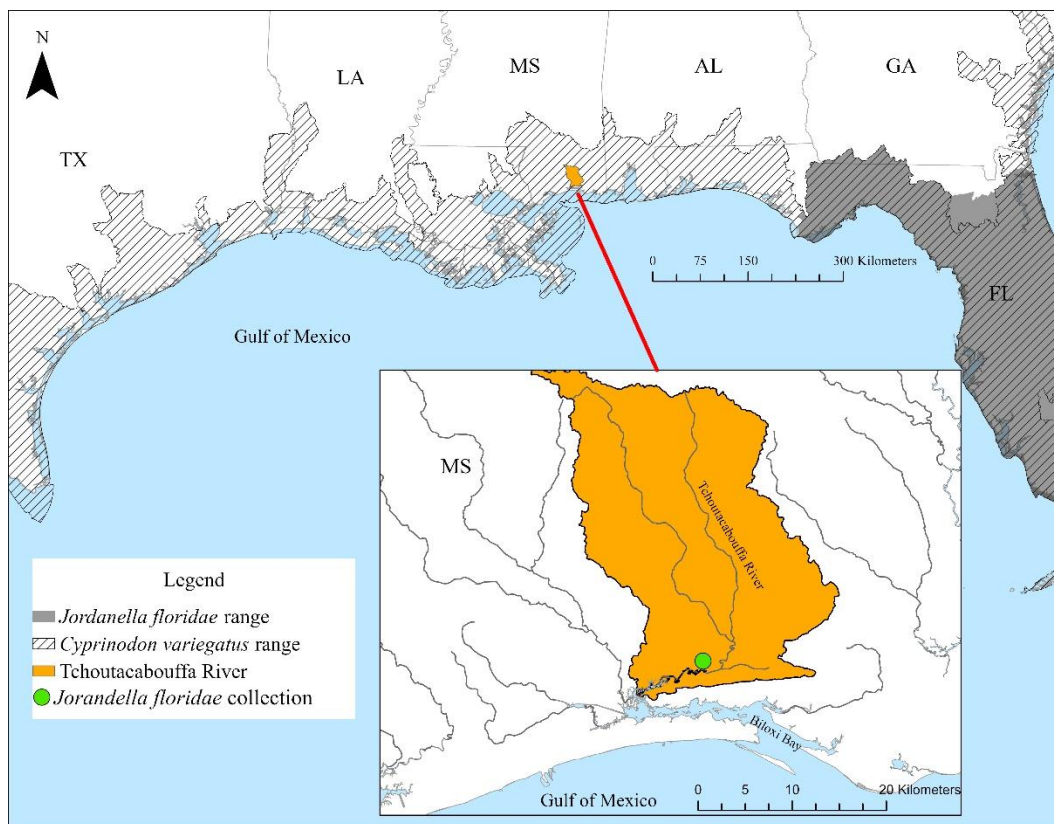


Figure 1. Range map of *C. variegatus* and *J. floridae* within the Gulf of Mexico with inset map showing the 2020 and 2021 collection site of *J. floridae* within the Tchoutacabouffa River system in Mississippi. Ranges for both species were based on species occurrences at the HUC 8 level.

Many pupfish species can withstand extreme environmental conditions including salinity greater than 142 ppt, temperatures ranging from 0-45°C, and dissolved oxygen as low as 0.13mg/liter (Page and Burr 2011). The wide environmental tolerance of these fish makes them desirable to many aquarium hobbyists, but also a concern to natural resource managers because of

their ability to become established in new areas. Furthermore, both *C. variegatus* and *J. floridae* are popular in the pet trade and have been introduced outside of their native range (Rohde et al. 2009; Fuller 2023; Nico and Fuller 2023).

RESULTS AND IMPLICATIONS

In September of 2020, a single unvouchered individual was collected via dipnet from a roadside ditch adjacent to an unnamed tributary of the Tchoutacabouffa River in Harrison County, Mississippi (Fig. 1). Sampling efforts a year later at the same location yielded 10 individuals, of which 3 were vouchered and deposited at the Mississippi Museum of Natural Science in Jackson, Mississippi (MMNS 96995; Fig. 2). The vouchered collection is represented by at least two-year classes (Male: 47 mm, Male: 35 mm, and Female: 25 mm), indicating that there is potential for *J. floridae* to reproduce and establish in southern Mississippi. While questions remain pertaining to the method of introduction, the duration of time since first introduced, and the extent of invasion, we hypothesize that this newly described population in Mississippi is the result of an aquarium release, and not a range expansion of the species. No other such occurrences of the species have been reported from Mississippi, and no other populations are known between the Tchoutacabouffa River and the most western Florida population of *J. floridae* within the Ochlockonee River basin, approximately 370 km away (Page and Burr 2011).

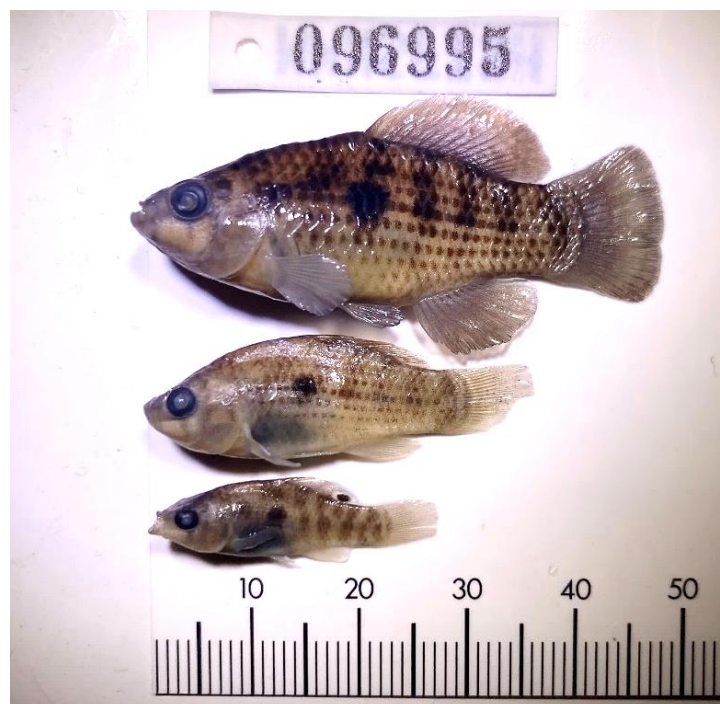


Figure 2. *Jordanella floridae* individuals (MMNS 96995) collected from an unnamed tributary to the Tchoutacabouffa River in Mississippi in 2021. From top to bottom: Male 47 mm, Male 35 mm, Female 25 mm.

Limited information is available on the behavioral and ecological interaction between *J. floridae* and *C. variegatus* where they co-occur. While introduced populations of *C. variegatus* are known to successfully hybridize with native *Cyprinodon* sp. following invasion (Echelle and Connor 1989; Echelle and Echelle 1997), previous literature suggests a low rate of hybridization success between *Cyprinodon* sp. and *J. floridae* (Cokendolpher 1980). Though the risk of hybridization between *C. variegatus* and *J. floridae* is small, further attention should be directed at the interaction between the two species as well as other native fishes within the Tchoutacabouffa River system. Non-game native transplants like *J. floridae* are considered an overlooked group of invasive species relative to non-native game fish and exotic species from outside of the country (Hartman and Larson 2023). The recent detection of *J. floridae* adds to the increasing list of non-game native transplant species within the Southeast. Future survey efforts at the site of invasion and habitat surrounding the site are needed to determine the full extent of the invasion and the potential impacts to the native aquatic fauna.

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