

An assessment of the biology and ecology of *Sicydium* spp. (Family Gobiidae) from Yallahs and Swift Rivers, Jamaica.

Una evaluación de la biología y la ecología de *Sicydium* spp. (Family Gobiidae) de Yallahs y Swift Rivers, Jamaica.

Une évaluation de la biologie et de l'écologie de *Sicydium* spp. (Family Gobiidae) de Yallahs et Swift Rivers, Jamaïque.

CANDIECE DUSCENT¹ AND ERIC HYSLOP²

^{1&2} Department of Life Sciences, Faculty of Science and Technology, The University of the West Indies, Mona Campus, Kingston 7, Jamaica)

Email: ¹candiece.duscent@mymona.edu and ²eric.hyslop@gmail.com

EXTENDED ABSTRACT

The suckstone goby (*Sicydium* sp.) is from one of the most speciose and widely distributed fish families in tropical and subtropical zones of the world (Figure 1). *Sicydium* sp., is abundant in Jamaican rivers; even so little is known about the biology of these species in this country and throughout the Caribbean. *Sicydium* sp. are migratory freshwater fishes that spend most of their life cycle in rivers, but larvae emerge and drift downstream to the sea where further development of juveniles occurs (Bell 1995). The aims of this study were to determine length weight relationship (LWR), Fulton's condition factor, compare feeding habits and estimate absolute fecundity of *Sicydium* sp. in two Jamaican rivers.

Sicydium were captured using dip nets and bottom kick nets at three sites along a south coast, (Yallahs River) and north coast river (Swift River). A total of 850 gobies were captured, measured and weighed. Specimen collection was done between March 2016 and December 2017 in both locations. The following parameters were analyzed; LWR was calculated in SPSS using the formula $W=aSL^b$ of Pauly (1984), where, 'w' is weight(g), 'SL' is the standard length (mm), 'a' the intercept describes the rate of change of weight with length, b is the allometric coefficient. Fulton's condition factor (K) was calculated using the equation $K=100*(W/L^3)$ provided by Froese (2006) where, 'K' is the index for condition, 'W' is the weight (g) and 'L' is length (cm). Stomach content analysis was done by dissecting fish stomachs and the composition and percentage volume of food items in the diet analysed. Fish eggs were also removed from gravid females were counted and weighed and absolute fecundity calculated.

The results indicate that the exponent b in the LWR's ranged from 2.868 to 3.681 and was significantly different among genders ($p < 0.05$). The growth pattern derived from LWR's was positive for Yallahs River females and juveniles and Swift River juveniles, isometric for Swift river females and Yallahs river males and negative for Swift river males. The mean Fulton's condition factor was 1.195 (+/- 0.261) and 1.143 (+/- 0.234) in Swift River and Yallahs River respectively. An analysis of stomach contents revealed that *Sicydium* sp. from the Swift River are omnivorous and feed primarily on organic detritus and algae. *Sicydium* from Yallahs River consume similar items in addition to *Oscillatoria*, *Fragillaria*, *Spirogyra*, *Cladophora* and *Ultorix*. The absolute fecundity of *Sicydium* ranged from 5,193 (41.37mm, 1.017g) to 29,370 eggs (50.01mm to 2.875g) in Yallahs River and from 8,073 (53.52mm, 2.115g) to 38, 681 (62.2mm, 3.105g) in Swift River.

An assessment of the LWR of two populations indicates that the growth pattern was generally positive and fish generally become disproportionately heavier or fatter as they grow in length. Stomach content analysis showed that both populations are omnivorous. Given the diet composition of *Sicydium* in the Yallahs River and Swift River (and the fact that this species feeds predominantly organic detritus and algae) this species contributes significantly to nutrient availability and cycling in tropical rivers. Stomach fullness was higher in the Swift river population of *Sicydium* and this may be linked to the higher levels of nutritionally – poor detritus in the diet of Swift River specimens. This represents intake of large volumes of poor quality food while Yallahs River *Sicydium* supplement their diet with fish eggs and insects and had lower stomach fullness. This in turn may explain the similarity in condition factor between the two population ($F_{1,763}=1.030$, $P > 0.05$) and suggests that both populations are healthy.

The absolute fecundity in Yallahs and Swift River was 12,849 and 17, 778. Mature ovaries were observed in specimens between April and May which equates to the spawning period of *Sicydium* spp. in both watersheds (Figure 2). This corresponds with the rainy period which is necessary for dispersal of larvae to marine environments. *Sicydium* forms an important component of many Caribbean riverine ecosystems.

As such, it is essential to study and map this species biology and distribution because according to IUCN it is data deficient. This baseline study is therefore even more relevant and necessary for the implementation of proper management and conservation strategies for this migratory species.

KEYWORDS: *Sicydium* sp., Jamaica, length weight relationship, Fulton's condition factor, fecundity, feeding



Figure 1. External morphology of a 60.54mm female *Sicydium sp.* (Photo by the author)



Figure 2. Gonads of *Sicydium sp.* Captured in Jamaica (Photo by Author)

LITERATURE CITED

- Bell, K.N., and J.A. Brown. 1995. "Active salinity choice and enhanced swimming endurance in 0 to 8-d-old larvae of diadromous gobies, including *Sicydium punctatum* (Pisces), in Dominica, West Indies." *Marine Biology* 121:409-417.
- Bell, K.N. 1999. "An Overview of Goby-Fry Fisheries." *The ICLARM Quarterly* 22 (4):30-36.
- Froese, R. 2006. "Cube law, condition factor and weight-length relationships: history, metanalysis and recommendations." *Journal of Applied Ichthyology* 22:241-253.
- Pauly, Daniel. 1984. *Fish population dynamics in tropical waters: a manual for use with programmable calculators*. Vol. 8. WorldFish.