



## THE USE OF A CLEARWATER COASTAL STREAM BY THE CATFISH *Scleromystax barbatus* IN THE ATLANTIC FOREST

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### INTRODUÇÃO

Habitat use by fishes is often related with species' requirements according to their feeding and reproductive habits (Aranha *et al.* 1993), and morphological characteristics. On the other hand, spatial resources (Gorman and Karr, 1978), and microhabitat availability (Sazima *et al.* 2006) are also important to comprehend how fishes use habitats and how they are spatially distributed. *Scleromystax barbatus* is a small air-breathing callichthyid catfish which inhabit clearwaters, and it is subjected to commercial interest by the aquarium trade industry (Reis, 2003). Few studies regarding the species' ecology investigated its behavior in backwaters of shallow streams in the Atlantic forest.

### OBJETIVOS

We investigated the use of a clearwater coastal stream by *S. barbatus* in the Atlantic forest, southeastern Brazil. We evaluated the species' habitat selectivity and behavior, using habitat availability measures and focal-fish observations.

### MATERIAL E MÉTODOS

Study was conducted in Bogueá stream (24°28'54.71''S and 47°13'02.05''W) at Juréia-Itatins reserve, a protected area in pristine conditions of Atlantic forest in São Paulo state, southeastern Brazil. The main river of Juréia-Itatins reserve is Una do Prelado, a lowland and medium-sized river (100 m), which runs parallel to the sea shore and surrounds the Juréia mountain range. Bogueá is a 2nd order clearwater stream (considering scale maps of 1:50.000), tributary of the Una do Prelado River. Data collection was conducted in a stretch of 40 m length and 2.8 m width ( $\pm 1.5$  sd) on 24-25 February 2011. We used the focal-fish method with observers positioned outside the water at the stream borders. The behavior of 11 individuals of *S. barbatus* was observed with naked eye on diurnal periods (9:00 to 15:00h). Each individual was observed interruptedly during one-hour (whenever possible), and the following variables were recorded in sampling bouts conducted every five minutes: fish activity (foraging, moving without foraging, or inactive), mesohabitat and bottom type used, its position in the water column, and its social interaction (grouped or solitary). Six caught specimens were measured to obtain the standard length (SL, in mm). Their stomach contents were analyzed and food items were identified up to the lowest taxonomic level possible under a stereomicroscope. The stream habitat structure was evaluated in 40 linear transects. For each one meter of each transect, we registered the following variables: channel depth (cm), predominant bottom type (clay: < 0.05 mm, sand: 0.05-2 mm, gravel: 2-10 mm, and plant debris), and mesohabitat type (pools, runs, and riffles). The selectivity (here termed as preference) of *S. barbatus* on habitat variables, such as mesohabitat, bottom type, and position on water column, was evaluated by Ivlev electivity index (E). This index varies from -1 (avoidance) to +1 (preference), and electivity is absent when  $E = 0$  (Ivlev, 1961).

## RESULTADOS

*Scleromystax barbatus* was frequently registered in an active way (N = 105 or 78.4% of sampling bouts), than inactive (N = 29 or 21.6 % of sampling bouts). Active and inactive individuals were recorded both solitary (N = 96 or 70.1% of sampling bouts) and grouped with conspecifics (2-6 individuals, mean =  $2.5 \pm 0.9$  sd; N = 41 or 29.9% of sampling bouts). It preferred depths between 11 to 50 cm, clay and sandy bottoms, pools and runs. Depths from 0-10 cm, gravel and plant debris bottom, and riffles were avoided. Individuals foraged close to the bottom in a head-down posture, speculating and revolving the substrate. Their long snout and small barbels were used to dislodge the food items of the substrate, which were quickly sucked by mouth. The six individuals collected ranged from 37 to 58 mm SL. All specimens were females with full stomachs. Aquatic immature insects of autochthonous origin (mainly trichopterans) were predominant in the stomach contents. Three fish species (Characidae: *Deuterodon iguape*, *Mimagoniates microlepis*; Cichlidae: *Geophagus brasiliensis*) were firstly registered following *S. barbatus* during its foraging activity. The brilliant golden body color with darkish spots of *S. barbatus* strongly resembles to stream bottom. In risky situations, individuals ceased the foraging activity and became inactive, 'mixing' with the stream bottom. Fishes returned to forage when disturbing condition ended, which suggests that this species is benefited by disruptive camouflage.

## DISCUSSÃO

Individuals of *S. barbatus* selected pools and runs with sandy bottom and avoided gravels mostly in shallower riffles. The unique study with *S. barbatus* reported lentic sites, however with predominance of plant debris as preferential habitat used by this species (Aranha *et al.* 1998). Our results indicated an active diurnal foraging of *S. barbatus* in opposition with the usually crepuscular and/or nocturnal habits registered among Callichthyidae (Paxton, 1997, see references therein). *Scleromystax barbatus* fed mainly on aquatic immature insects, mostly trichopterans buried in the sand. The grubber excavation while moving foraging strategy also creates possibilities to *S. barbatus* acts as a nuclear species of diurnal species, such as *Deuterodon iguape*, *M. microlepis*, and *G. brasiliensis*. Camouflage associated with disruptive colors is one of the most displayed defense mechanism by bottom species (Carvalho *et al.* 2006). Regarding the resemblance of the golden-and-black body color of *S. barbatus* with the color of the most available bottoms in the stream stretch, i.e. sand and plant debris, we suggest that this species strongly rely on disruptive camouflage during its foraging activity.

## CONCLUSÃO

Individuals of *S. barbatus* selected pools and runs with sandy bottom. Individuals were active during the day, consuming mainly trichopterans. The observed behavior and species' color pattern suggest that it strongly rely on disruptive camouflage.

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