

Life history, population structure, and movement of gobiid fishes in tropical urban and non-urban watersheds

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Introduction

Concerns about the impacts and threats to stream ecosystems are augmenting as urbanization in Puerto Rico is increasing at a rapid rate. Pollution, channelization and damming are some of these threats associated with urbanization increment. Previous studies have assessed urbanization impacts on macrobiota communities, as fishes and shrimps, in tropical streams. Most of these tropical island stream communities have marine ancestors. These species with marine-freshwater linkages at some point in their life cycle, are diadromous. In Puerto Rico, all seven native fish species are suspected to be diadromous species. Therefore, these species play an important role in streams as well as in coastal ecosystems. In addition, the native fish species have recreational and commercial fishery value. However, the ecology and life history of these species are not clearly studied. For this reason, assessing the impacts on population structure and migratory behavior of diadromous species will provide critical information needed to further understand and manage fish communities in tropical island streams.

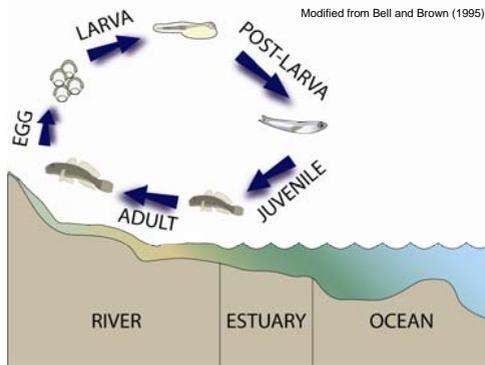


Figure 1: Goby diadromous life cycle

Objective 1

To determine the effect of urbanization on the age distribution of *Scydium* sp. (Pisces: Gobiidae)

Hypothesis 1

If the age assemblage of gobiid fishes is impacted by urbanization, then the *Scydium* sp. population will be dominated by juveniles

Methodology: Objective 1

Study Sites

The study will be conducted in an urban stream (Rio Piedras) and non-urban stream (Rio Mameyes). See Figure 2.

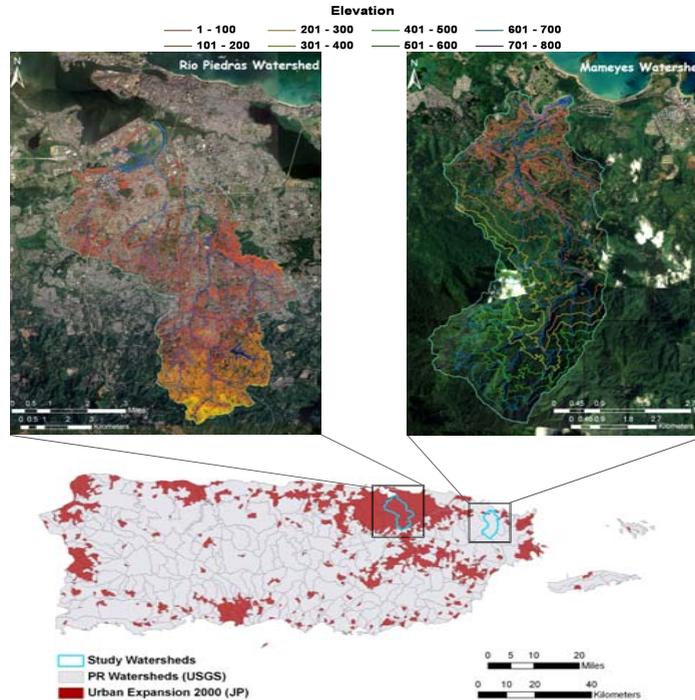


Figure 2: Study areas and elevation ranges

Sampling

Sampling will be conducted during spring (March and April). One of the sampling sites is going to be at 18-20‰ of salinity, and the rest of the sites are going to be every 100m from the first site. Three fish samples will be collected in each site by electrofishing and seine, according to Kwak (2007). Standard length and physicochemical data will be recorded as well.

Identification

Adults and juveniles will be identified according to the morphology descriptions of Erdman (1961) and Brockman (1965). As the post larvae grows, morphology changes in dentition, coloration and scale counts occur. These changes will be considered for identification.

Age determination

The determination of age has been made possible by the development of otolith microstructure analysis since Panella (1971). Fish otoliths are calcifying tissues that function as balance and audio structures. As the fish growth, daily increment sequences are formed in otoliths. These increments provide a chronological growth record (Figure 3). We will dissect sagittal otoliths from fishes captured and increments will be enumerated using wide field microscopy and field emission scanning electron microscopy (SEM)

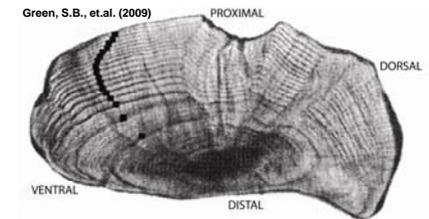


Figure 3: Sagittal otolith

Objective 2

To assess migration dispersal of *Scydium* sp. juveniles in urban and non-urban streams

Methodology: Objective 2

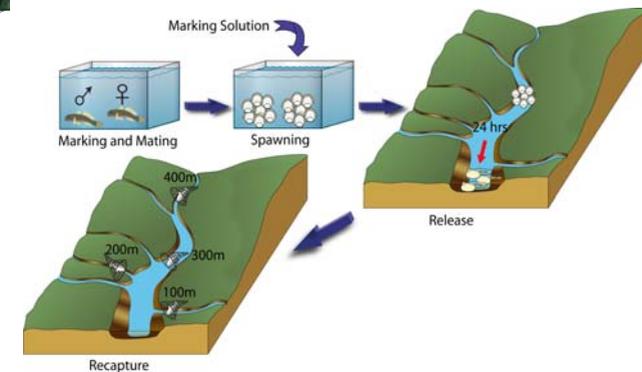


Figure 4: Methodology for objective 2

References

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