Overview of Aquatic Ecosystem in Jinsha River

Summary

In recent years, the aquatic ecosystem of Jinsha River has experienced significant changes due to the construction of hydropower stations. Further, cold water fish species which are mostly distributed in Jinsha River, will be increasingly under pressure due to climate change. This research provides an overview of the aquatic ecosystem of Jinsha River, with a special focus on the fish communities and habitats. The results provide detailed information on the diversity of aquatic organisms and current ecosystem health level, which offers fundamentals for future research activities. The result reveals the high abundance and vulnerability of the aquatic ecosystem, indicating needs for ecosystem protection and restoration.

Objective

- Present current composition and distribution of aquatic organism
- Interpret endemic and protected fish community and their habitat
- Set up habitat suitability curves of sensitive fish species
- Evaluation of aquatic ecosystem health of Jinsha River

Approach

Fish community similarities and fish assemblage structure were analyzed using cluster analysis and nonmetric multidimensional scaling based on field survey data (2012-2014). Habitat suitability curves were developed using the selected environmental factors based on the in-stream flow incremental methodology. The ecosystem health was assessed by the Integrity Biological Index (IBI).

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Results and Outcomes

Analysis of Fish Community Structure

Cluster analysis reveals fish community structures showed a characteristic of typical longitudinal distribution in rivers, and could be classified into three groups (Fig.1). Test of One-way ANOSIM showed significant differences in fish community structures between these groups (R=0.65， p<0.01).

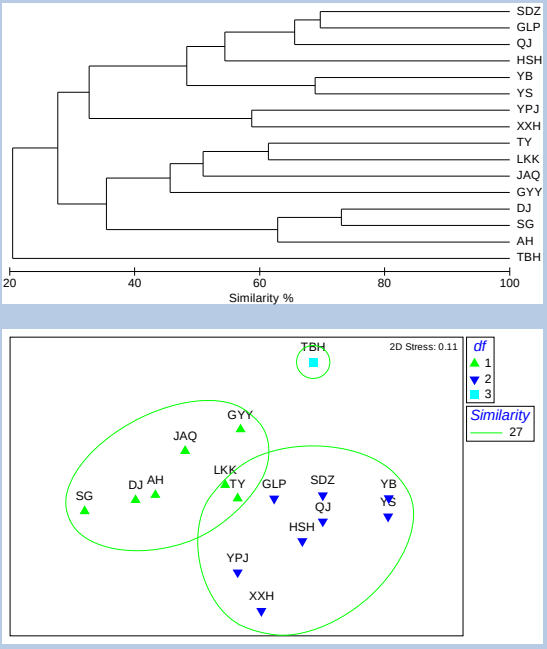

Fig.1: Cluster analysis and non-parameter multi-dimensional scale analysis of fish community structures in the middle and lower reaches of Jinsha River

Setup of fish habitat suitability curves

Based on the information about the spatial distribution and their habitat characteristics, three sensitive fish species (*Coreius guichenoti*, *Schizothorax prenanti*, *Jinshaia sinensis*) were chosen to setup their habitat preference curves, in order to provide the basic data for the model simulation and prediction referring to the climate change of this project For example, spawning grounds of *Coreius guichenoti* are widely distributed in the JRB and their most suitable water temperature for spawning is from 20 to 25 degrees (Fig.2).

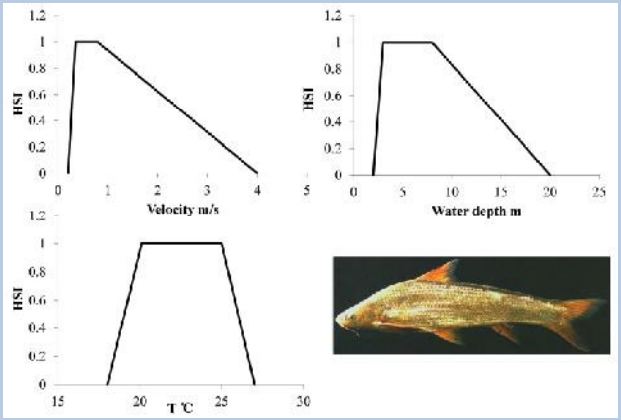

Fig.2: Habitat suitability curves of parental Coreius guichenoti (Sauyage et Dabry)

Assessment of ecosystem health

The Index of Biotic Integrity (named Index Fish Index of Biotic Integrity (F-IBI)) based on 3 aspects and 12 indicators were calculated. Results shows fish community structures in Ahai reach and the upstream were at the grade of excellent; F-IBIs in sections in the middle reaches of Jinsha River except Geliping were at the grade of fair; F-IBIs in Qiaojia and Sanduizi sections in the lower reaches of Jinsha River got relatively well grades (Fig.3).

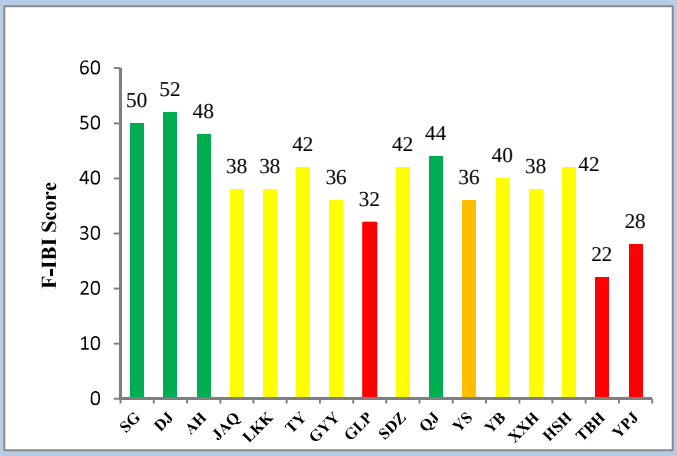

Fig.3: F-IBI values in sections in the stem stream and tributaries in the middle and lower reaches of Jinsha river. Colors of green, yellow and red represent the F-IBI grades of good, fair and poor, respectively.

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