

Effects of a tributary on macroinvertebrates at the downstream of of Yahagi-dam.

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1. INTRODUCTION

Dams are a common feature of stream and river systems throughout the temperate zone. It should come as no surprise that the modification of flow caused by dams alters the structure and function of river ecosystem since water flow governs the fundamental nature of streams and rivers. Then, managements of dams need to be improved considering such environmental perspectives of dams. However, decisions toward biological conservations are complex in no small part because vast scientific uncertainty still exists especially in Japan, as little quantitative observation is made. Tributaries are expected as a major source of recovery in river system but that is still ambiguous. Therefore, macroinvertebrate assemblages at three reaches (dam: downstream of the dam, confluence: downstream of the confluence, and tributary) were sampled to confirm the impact of long-term impoundment and the role of a major tributary (Akechi River) in community shift.

2. METHODS

Research was conducted around Yahagi-Daini Dam (dam wall 38m high), central Honsyu, Japan from 10 to 21 February 2004. Four Surber samples and associated physical measurements (depth, velocity, substrate composition) were taken from four riffle zones at each study reach. Drifting materials (POM and bedload sediment), and periphyton were also sampled. These variables were first analyzed with one-way ANOVA to assess differences among reaches, then TWINSPAN classification and CCA ordination were made to examine differences in fauna among reaches related to environmental variables.

3. RESULTS AND DISCUSSION

Significant differences in the macroinvertebrate fauna among reaches were observed. Dam faunas were severely altered with high macroinvertebrate abundance and low taxa richness in contrast to those in the tributary. TWINSPAN classification clearly distinguished dam samples from those from the confluence and the tributary. Based on CCA ordination, these differences in community structure reflected changes in substrate composition, and quantity and quality of FPOM (Fig.1). Our observations suggest that while reduced flow and sediment transportation had a great impact

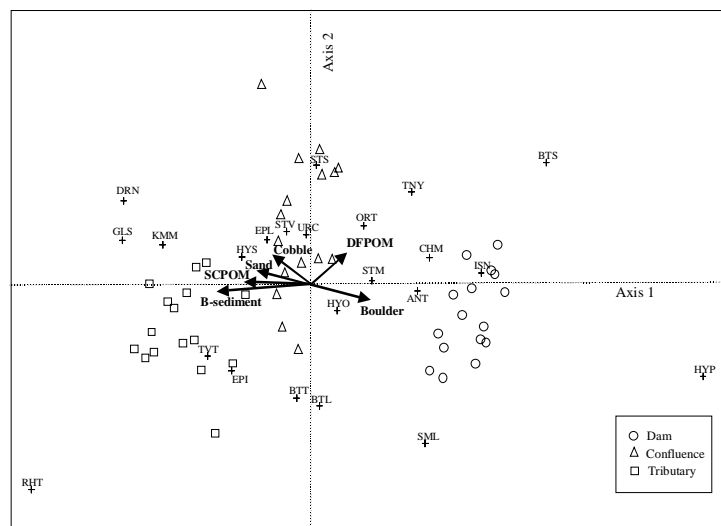


Fig. 1 CCA ordination

on the fauna, a major tributary acted as a source of sediment. Further empirical and conceptual studies about the river impairment are needed to comprehend biotic and abiotic processes in regulated stream ecosystems.