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Properties of the DA_Ipo (diatom assemblage index to organic pollution) elucidated by structural equation modeling: a case study of agricultural drainage canals

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Abstract

Structural equation modeling (SEM) elucidated the properties of DA_Ipo (diatom assemblage index to organic pollution) as a water quality index. Those properties have been little-known despite DA_Ipo's frequent application to water quality assessment in Japan. The main drainage canals for agricultural effluent those are directly connected to Lake Biwa were selected for a case-study site since monitoring of their water quality, especially nutrient loadings, is required by the government. In December 2005 and May 2006, diatom assemblage samples were collected from clay bricks submerged about a month previously at a water depth of 30 cm. DA_Ipo values ranged between 27.6 and 53.9, suggesting that most sites were at a β -mesosaprobic level. SEM revealed that DA_Ipo values were affected by many water-quality factors. High nitrite and phosphate concentrations and low dissolved oxygen are suggested to reduce those values, whereas high electric conductivity and nitrate concentrations do not. Significantly higher DA_Ipo values in May than in November implied that DA_Ipo did not indicate short-term concentrated nutrient loadings of the kind generally reported on rainy days in May.

Key Words: [diatom assemblage index to organic pollution \(DA_Ipo\)](#), [dissolved oxygen](#), [nitrite](#), [phosphate](#), [seasonality](#), [structural equation model \(SEM\)](#)

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