Diatom 8: 19-34 (英文)

墨田廸彰：北陸河川の有機汚濁に対する付着珪藻群集の種組成分析による考察（Ⅱ）群集構造とシヤノンの多様性指数

Michiaki Sumita : A study on the organic water pollution of rivers in the Hokuriku District based on the analysis of species components of epilithic diatom assemblages (Ⅱ) species component of epilithic diatom assemblage and Shannon's diversity index

Abstract

In this study, 474 epilithic diatom samples were obtained in 58 rivers in the Hokuriku District from 1974 to 1988. After examining these samples in terms of the DAIpo values, Shannon's diversity index (Di), number of taxa in each assemblage and contact-type, the following results were obtained.

1) The 474 sites, where the samples were obtained, were divided into 5 groups with 5 different degrees of water pollution according to the relationships, proposed by Watanabe et al. (1988), between the DAIpo values and saprobic levels. The xenosaprobic water area was again divided into two subgroups. All epilithic diatom assemblages in this survey were classified by the method proposed by Sumita (1990)： －by examining the contact-type of the first grade species (the first grade in terms of relative abundance) in each assemblage.

As a result, the diatom assemblages with their first grade species belonging to Type Ⅰ (total contact) appeared in all water areas and increased in number as degrees of water pollution progressed, while the assemblages with their first grade species belonging to Type Ⅲ (stalk contact) showed an opposite tendency. The assemblages with their first grade species belonging to Type Ⅱ (point contact) appeared frequently in areas with the intermediate degrees of water pollution. The assemblages with their grade species belonging to Type Ⅱ and Ⅲ did not appear in the most polluted water areas (DAIpo<30).

2) The correlation between DAIpo and Di of the diatom assemblages showed the pattern of a symmetric parabola between right and left halves separated by boundary of which the DAIpo values are around 50. This result corresponded fairly well with that obtained by Watanabe et al. (1988).

After examining the average values of Di of the diatom assemblages with their first grade species belonging to Type I, Ⅱ and Ⅲ in all water areas, the following results were obtained : in range of DAIpo 50-100, the diatom assemblages were mostly composed of mixture of Type Ⅰ, Ⅱ and Ⅲ. Those diatom assemblages seemed to share a common tendency showing that the Di values decreased as the DAIpo values

increased. But in the range of DAIpo 0-50, the diatom assemblages were mainly composed only of Type I. The Di values of those diatom assemblages seemed to decrease as the DAIpo values of the diatom assemblages of Type I decreased.

3) Distribution of the Di values of the diatom assemblages can be seen in the following three groups according to the type of the first grade species.

i) The Di values of the diatom assemblages with their first grade species belonging to Type I were distributed in all the range of Di from mesosaprobic to polysaprobic water areas (DAIpo<50).

ii) The Di values of the diatom assemblages with their first grade species belonging to Type Ⅱ were distributed in a comparatively narrow range of Di values between 1.5 and 3.5.

iii) The diatom assemblages with their first grade species belonging to Type Ⅲ were the main components of most of the assemblages with high values of Di in clean water areas (DAIpo>50).

Key index words

epilithic diatom assemblage, diatom assemblage index (DAIpo), Shannon's diversity index, first grade species in relative abundance.