

37-O Research of R.A. Vollenweider in the Istituto Italiano di Idrobiologia as a contribute to the development of watershed phosphorus load - lake trophic state models. *Rosario Mosello,*

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Richard A. Vollenweider (Zürich, 1922–Burlington, 2007) developed one of the first and probably the most used predictive model of lake eutrophication, relating nutrient loading to the biological response.

In this presentation, we follow his early career to identify the cultural environment that allow him to develop his model. After getting his Ph. D. in Biology in the University of Zürich (1951), he spent several years studying the limnology of Italian lakes at the Istituto Italiano di Idrobiologia Dott. Marco De Marchi in Verbania Pallanza (now the Institute of Ecosystem Study of the National Research Council of Italy), where he was awarded a study grant from 1954 to 1955, later being engaged as a contract researcher from 1959 to 1966. He considered very different aspects of limnological research, such as the regional hydrochemistry of subalpine lakes in relation to the geo-lithology of the watersheds, the mixing pattern of the deep lakes of the area (lakes Maggiore, Como, Lugano), the impact of River Toce flood events on the distribution and sedimentation of particulate matter in Lake Maggiore, phytoplankton primary production measured using the light and dark bottle technique and, later, with the ¹⁴C method of Steemann-Nielsen. Primary production of the two lakes Maggiore and Mergozzo were compared, and experiments of nutrient enrichment of water performed. Other studies, all of them important from a limnological standpoint, involved a diverse range of topics; for example, laboratory experiments on the vitamin B12 requirements of *Fragilaria crotonensis* and composition of new media for algal cultures.

These activities were performed in strict contact and agreement with Italian researchers, such as the director of the Institute Vittorio Tonolli, Oscar Ravera, Carlo Saraceni, Luigi Provasoli, and with foreign limnologist, frequently present in the Institute. The high quality and number of his publications testify to his tireless activity; 11 of them were published in the Memorie dell'Istituto Italiano di Idrobiologia (since 1999 published under the title of Journal of Limnology).

In 1996 he got from the Organization for the Economic Cooperation and Development (OECD) a contract for the study of the causes of freshwater eutrophication. In this task he used all the experience he had accumulated and conspicuous available literature to produce in 1968 a work, where the role of phosphorus in determining the increase of lake trophic status was recognized and a preliminary predictive model linking phosphorus load to the lake trophy was proposed. This approach was fertile of developments and signed a remarkable progress in the freshwater studies and management.

The presentation will discuss the different aspects which determined the approach of R.A. Vollenweider to this topic, considering the status of research on the theme, and his personal experiences, based on the papers he produced and on documents of the historical archive of the Institute.

37-O Improving our predictions of cyanobacteria occurrence. *Alessandra Giani¹ - Zofia E. Taranu² - Marcele Laux¹ - Irene Gregory-Eaves³*

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There is growing evidence that cyanobacterial blooms are becoming more common in different parts of the world; within this context, predictive cyanobacteria models have an essential part in lake management. Several models have been successfully used in temperate systems to describe the main drivers of cyanobacterial blooms, but relatively less work has been conducted in the tropics. To address this gap, we evaluated how different models could be applied to temperate and tropical systems. For this purpose, we analyzed data from six Brazilian reservoirs and from five Canadian lakes, and, using a combination of variance partitioning and regression tree analyses, we identified the common versus unique drivers of cyanobacteria biomass in both regions.

We will also conducted metagenomic analyses in one reservoir, to open the discussion on how this new technique may improve our ability to predict processes in aquatic communities. Our results showed that some predictors, like total phosphorous, were common to all water bodies, but we also observed that more parameters were needed to explain the cyanobacteria biomass in more variable systems such as the reservoirs. Among the temperate lakes, we observed similar slopes describing the relationships between cyanobacteria biomass and phosphorus. However, in the tropical