

## The Studies of Periphyton: From Waters to Soils

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The term 'periphyton' refers to the microfloral community attached to the surfaces of submerged objects in water [1], harbours algae, bacteria, fungi, protozoa, zooplankton and other invertebrates [2]. Periphyton accumulates on a dead or living surface/substrate ranging from clay particles, fine sand, pebbles, and rocks to short-lived filamentous algae, macrophytes, and animal bodies [1]. As with phytoplankton periphyton can be found in almost every type of water body from small ponds to large oceans and in trophic conditions that range from the most oligotrophic to the more eutrophic [3].

Attached (i.e. epiphytic) and floating (i.e. metaphytic) periphyton mats are one of dominant ecological feature of wetlands and may provide one of the earliest reliable indicators of marsh eutrophication [4]. Many studies have been investigated the periphyton ecology, which can be classified into 5 broad topics: 1) effects of environmental conditions and stress, 2) competitive interactions and the relationship with herbivores, 3) periphyton as environmental indicators, 4) the roles of periphyton in materials such as nutrient cycling, and 5) the removal of contaminants by periphyton. Generally, most of these studies focused on periphytons on "hard" surfaces such as the stone, bamboo, wood, plant surfaces.

Few studies have been paid much attention on the study of periphyton on "soft" surfaces such as sediments or soil surfaces. To foster the understanding of periphyton in ecology, the periphyton study in aquatic ecosystem is suggested to the interface between waters and soils. Essentially, the input or output of periphyton of soil systems is the increase or decrease of biological carbon. In this opinion, the role of periphyton in the interface between waters and soils might be a "bridge" to explore the interaction between waters and soils.

Besides the study of periphyton, the application of periphyton-based technologies is another hot topic. Many contaminants such as Cu, Cd and Hg can be removed by periphyton and their mechanisms involve in adsorption, degradation and both [5-9]. While the appearance of

some new contaminants such as TiO<sub>2</sub> nanoparticle and hormone, the traditional periphyton-technologies might be difficult to effectively work. It is wise to amend (update) some traditional periphyton technologies or combine with other functional technologies. From the opinion of soil sciences, the direction of polluted flux is from soils to waters. Thus, it might be a good way to control or purify contaminants from soils to waters using the "bridge" of periphyton in interface between soils and waters.

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Received July 15, 2013; Accepted July 17, 2013; Published July 22, 2013

Citation: Wu Y (2013) The Studies of Periphyton: From Waters to Soils. *Hydrol Current Res* 4: e107. doi:10.4172/2157-7587.1000e107

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