模擬水道中硬莖水生植物之抗流機制研究

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摘要

Ecological design concept has been the consensus in practical engineering fields recently. However, most studies stressed the vegetation coverage and survival ratio of certain vegetation. There has been relatively little field evidences to verify the specifically on the effects of vegetation on channel and flow resistance mechanisms. The present study is planned to follow the preliminary work carried out in a simulated channel to examine how stiff stem aquatic macrophytes respond to different channel flow velocities in terms of changes in their flow resistance mechanisms.

The native species Hygrophila salicifolia (Vahl) Nees was chosen as the planting material for examining the different responses of flow resistance between stiff stem and flexible stem aquatic macrophytes. Experimental data showed that the growth rate of Hygrophila salicifolia (Vahl) Nees was inhibited by flow rates. Not only the growth rate, diameter of this planting material decreased but also the erect stems became parallel stems as flow velocities increased. The parallel stem pattern increased the flow resistance ability of water plants as well as the survival rate with higher chances to touch water for inducing the growth of adventitious buds. By the way, the way of vegetative propagation of Hygrophila salicifolia (Vahl) Nees between water environment and terrestrial environment was different in this experiment. Study results showed the Hygrophila salicifolia (Vahl) Nees propagates itself by adventitious buds when planted in water channels. It was different from most of the terrestrial Hygrophila salicifolia (Vahl) Nees, which usually propagates itself by reproductive growth.

This research is anticipated to verify the suitable planting materials or precursors for riverbanks and, additionally, to clarify the roles and limitations of applying aquatic macrophytes in ecological engineering.

Keywords: flow resistance mechanism, simulated channel, aquatic macrophytes, ecological engineering.

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