



水生植物浮床对城市污染水体的净化效果研究

赵丰¹, 张勇², 黄民生¹, 吴小慧¹, 张一璠¹, 何岩¹

1. 华东师范大学 环境科学系, 上海 200062; 2. 安徽建筑工业学院, 合肥 230022

Study on the purification effects of aquatic plant floating-beds for urban polluted water

ZHAO Feng¹, ZHANG Yong², HUANG Min-sheng¹, WU Xiao-hui¹, ZHANG Yi-fan¹, HE Yan¹

1. Department of Environment Science, East China Normal University, Shanghai 200062, China; 2. Anhui Institute of Architecture and Industry, Hefei 230022, China

- 摘要
- 参考文献
- 相关文章

全文: PDF (1048 KB) HTML (1 KB) 输出: BibTeX | EndNote (RIS) 背景资料

摘要 以香菇草 (*Hydrocotyle vulgaris*)、睡莲 (*Nymphaea tetragona*) 和西伯利亚鸢尾 (*Iris sibirica*) 3种水生植物为试材, 制成植物浮床, 研究3种植物以及无植物浮床对城市污染水体中污染物的净化效果, 试验共持续35 d. 结果表明: 3种植物在污染水体中能保持较强生命力, 试验结束时, 其株高、根长及生物量均有显著增加, 增长率表现为睡莲>香菇草>西伯利亚鸢尾; 3种植物对水体中COD_{Cr}、NH₄⁺-N、TN和TP均有明显去除效果, 香菇草、睡莲、西伯利亚鸢尾对水体中的TN去除率分别为90.0%、85.7%和81.2%, 对TP的去除率分别为68.6%、57.0%和62.8%; 3种植物浮床去除率显著大于对照浮床(P<0.05). 试验表明, 3种植物对污染水体均有很好的净化效果和一定的景观价值, 可作为城市景观污染水体治理的优良物种而推广使用.

关键词: 水生植物 污染水体 浮床 净化效果

Abstract: Three kinds of ecological floating-beds were made of *Hydrocotyle vulgaris*, *Nymphaea tetragona* and *Iris sibirica*, respectively, to study their purification effects on removing pollutants of urban polluted water. The experiment lasted for 35 days. The results indicated that the three aquatic plants were adaptable to grow in the urban polluted water, and their biomass, height and root increased significantly at the end of the experiment. The growth rates were *Nymphaea tetragona*>*Hydrocotyle vulgaris*>*Iris sibirica*. Three plants had strong ability to remove COD_{Cr}, NH₄⁺-N, TN and TP, which were higher than that in the control treatments (P<0.05). The removal rates of TN by *Hydrocotyle vulgaris*, *Nymphaea tetragona* and *Myriophyllum verticillatum* were 90.0%, 85.7% and 81.2%, respectively. In addition, the removal rates of TP by *Hydrocotyle vulgaris*, *Nymphaea tetragona* and *Myriophyllum verticillatum* were 68.6%, 57.0% and 62.8%, respectively. Based on their significant effects on nitrogen and phosphorus removal, the three plants are recommended as species of aquatic plants in ecological restoration engineering of urban polluted water.

Key words: aquatic plants polluted water floating-bed purification effect

收稿日期: 2010-12-01; 出版日期: 2011-04-01

引用本文:

· 水生植物浮床对城市污染水体的净化效果研究[J]. 华东师范大学学报(自然科学版), 2011, 2011(6): 57-64.

· Study on the purification effects of aquatic plant floating-beds for urban polluted water[J]. Journal of East China Normal University(Natural Sc, 2011, 2011(6): 57-64.

服务








- ▶ 把本文推荐给朋友
- ▶ 加入我的书架
- ▶ 加入引用管理器
- ▶ E-mail Alert
- ▶ RSS

作者相关文章

[1] SOOKNAH R D, WILKIE A C. Nutrient removal by floating aquatic macrophytes cultured in anacrovically digested flushed dairy manure waste water[J]. Ecol Eng, 2004, 22: 27-42.

[2] 吴湘, 杨肖娥, 李廷强, 等. 漂浮植物对富营养化景观水体的净化效果研究[J]. 水土保持学报, 2007, 21(5): 128-133.

WU X, YANG X E, LI Y Q, et al. Study on purified efficiency of phosphorus and nitrogen from eutrophicated sight water by several floating

- [3] 罗固源,郑剑锋,许晓毅,等.4种浮床栽培植物生长特性及吸收氮磷能力的比较[J].环境科学学报, 2009, 29(2): 285-220.
LUO G Y, ZHENG J F, XU X Y, et al. Comparison of the growth characteristics and nutrient uptake of four kinds of plants cultivated on a floating-bed[J]. Acta Scientiae Circumstantiae, 2009, 29(2): 285-220.
- [4] 童昌华,杨肖娥,濮培民.富营养化水体的水生植物净化试验研究[J].应用生态学报,2004, 15(8): 1447-1450. 
- [5] TONG C H, YANG X E, PU P M. Purification of eutrophicated water by aquatic plant[J]. Chinese Journal of Applied Ecology: 2004, 15(8): 1447-1450.
- [6] 周小平,王建国,薛利红,等.浮床植物系统对富营养化水体中氮、磷净化特征的初步研究[J].应用生态学报, 2005, 16(11): 2199-2203. 
ZHOU X P, WANG J G, XUE L H, et al. N and P removal characters of eutrophic water body under planted float[J]. Chinese Journal of Applied Ecology, 2005, 16(11): 2199-2203.
- [7] 宋祥甫,邹国燕,吴伟明,等.浮床水稻对富营养化水体中氮磷的去除效果及规律研究[J].环境科学学报,1998, 18(5): 489-494.
SONG X F, ZOU G Y, WU W M, et al. Study on the removal effect and regulation of rice plants on floating-beds to main nutrients N and P ineutrophicated water bodys[J]. Acta Scientiae Circumstantiae, 1998, 18(5): 489-494.
- [8] 李先宁,宋海亮,朱光灿,等.组合型浮床生态系统的构建及其改善湖泊水源地水质的效果[J].湖泊科学, 2007, 19(4): 367-372. 
LI X N, SONG H L, ZHU G C, et al. Effect of combined floating bed ecosystem on water quality improvement in lake water source area[J]. Journal of Lake Sciences, 2007, 19(4): 367-372.
- [9] 金卫红,付融冰,顾国维.人工湿地中植物生长特性及其对TN和TP的吸收[J].环境科学研究,2007, 20(3): 75-81. 
JIN W H, FU R B, GU G W. Plant growth characteristics and nutrient uptake from eutrophic water in constructed wetlands[J]. Reserch of Environmental Science, 2007, 20(3): 75-81.
- [10] GERKE S, BAKER L A, XU Y. Nitrogen transformations in a wetland receiving lagoon effluent:sequential model and implications for water reuse[J]. Water Res, 2001, 35(16): 3857-3866. 
- [11] 周明真,叶青,沈春花,等.3种浮床植物对富营养化水体净化效果研究[J].环境工程学报, 2010, 4(1): 91-95.
ZHOU M Z, YE Q, SHEN C H, et al. Study on purification effects by there floating-bed plant systems in eutrophic water bodies[J]. Chinese Journal of Environmental Engineering, 2010, 4(1): 91-95. 
- [12] 国家环境保护总局.水和废水监测分析方法[M]. 4版. 北京: 中国环境科学出版社, 2002.
- [13] State Environmental Protection Administration. Water and Wastewater Monitoring Analysis Method[M]. 4th ed. Beijing: China Environmental Science Press, 2002.
- [14] 王超,张文明,王沛芳.黄花水龙对富营养化水体中氮磷去除效果的研究[J].环境科学,2007, 28(5): 975-981. 
WANG C, ZHANG W M, WANG P F. Removal of nitrogen and phosphorus in eutrophic water by *Jussiaea stipulacea* Ohwi [J]. Environment Science, 2007, 28(5): 975-981.
- [15] 周晓红,王国祥,冯冰冰,等.3种景观植物对城市河道污染水体的净化效果[J].环境科学研究,2009, 22(12): 108-113.
ZHOU X H, WANG G X, FENG B B, et al. Purification effect of nitrogen and phosphorus in polluted water of urban rivers by three landscape plants[J]. Reserch of Environmental Science, 2009, 22(12): 108-113.
- [16] 卢少勇,金相灿,余刚.人工湿地的氮去除机理[J].生态学报,2006,26(8):2670-2677.
LU S Y, JIN X C, YU G. Nitrogen removal mechanism of constructed wetland[J]. Acta Ecologica Sinica, 2006, 26(8): 2670-2677.
- [17] FENNESSY M S, CRONK J K, MITSCHA W J. Macrophyte productivity and community development in created freshwater wetlands under experimental hydrological conditions[J]. Ecol Eng, 1994, 3(4): 469-484. 
- [18] 许桂芳.4种观赏植物对富营养化景观水体的净化效果[J].中国农学通报, 2010, 26(7): 299-302.
XU G F. Study on purified efficiency of phosphorus and nitrogen from eutrophicated landscape water by four floating ornamental plants[J]. Chinese Agriculture Science Bulletin, 2010, 26(7): 299-302.
- [1] 徐玉荣;张 勇;黄民生;赵 丰;高 尚;何 岩. 梯级生态浮床净化城市黑臭河水中氮污染物的试验研究[J]. 华东师范大学学报(自然科学版), 2011, 2011(1): 104-110.
- [2] 陈玉辉;张 勇;黄民生;何 岩;曹承进. 梯级生态浮床系统净化富营养化水体的示范工程研究[J]. 华东师范大学学报(自然科学版), 2011, 2011(1): 111-118, .
- [3] 徐 欢;张 勇;黄民生;罗锦洪;何 岩. 梯级生态浮床系统处理黑臭河水除磷性能研究[J]. 华东师范大学学报(自然科学版), 2011, 2011(1): 119-125.
- [4] 吴小慧;张 丹;黄民生;张 勇;何 岩. 梯级浮床修复黑臭河道过程中浮游植物动态研究[J]. 华东师范大学学报(自然科学版), 2011, 2011(1): 95-103.

版权所有 © 2011 《华东师范大学学报(自然科学版)》编辑部
本系统由北京玛格泰克科技发展有限公司设计开发 技术支持: support@magtech.com.cn