

用于农村生活污水处理的常见外来湿地植物的环境风险评估与管理

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Environmental Risk Assessment and Management of Exotic Wetland Plants Used for Treatment of Rural Domestic Sewage

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摘要 对用于农村生活污水处理的8种常见外来湿地植物的环境风险进行分析, 并利用改良的澳大利亚杂草评估系统和国内的外来物种入侵风险指数评估体系进行综合评价。水葫芦 (*Eichhornia crassipes*) 和大藻 (*Pistia stratiotes*) 已被界定为入侵植物, 风险最大, 应该尽量避免使用; 粉绿狐尾藻 (*Myriophyllum aquaticum*) 和再力花 (*Thalia dealbata*) 具有一定的潜在入侵风险, 应该慎用; 旱伞草 (*Cyperus alternifolius*)、美人蕉 (*Canna indica*)、梭鱼草 (*Pontederia cordata*) 和纸莎草 (*Cyperus papyrus*) 的风险性相对较低, 可以适当用于人工湿地。利用最大熵 (MaxEnt) 模型对除水葫芦和大藻以外的上述其他6种外来湿地植物在我国的潜在适生区进行分析的结果表明, 这些植物的主要适生区位于我国南方地区。我国南方农村地区分布广泛的稻田、河流、湖库和鱼塘等生态系统极易受到威胁。应加强对人工湿地和湿地植物的管理, 从可替代的本土植物、选址、生长管理、隔离和再利用等方面进行管控, 降低外来湿地植物的风险, 使其更好地应用于农村生活污水的处理, 改善农村地区的生态环境。

关键词: 农村生活污水 人工湿地 湿地植物 环境风险 管理措施

Abstract: Constructed wetlands have been being used more and more extensively in treatment of rural domestic sewage. The plants used in constructed wetlands are mostly alien garden plants, which might pose threats to rural ecological environment. Environmental risks of eight exotic plants used for this purpose were analyzed for comprehensive evaluation, using a modified Australian weeds risk assessment system and a Chinese alien plants invasion risk assessment index system. *Eichhornia crassipes* and *Pistia stratiotes* have been defined as invasive plants, which are very risky and should be used sparingly; *Myriophyllum aquaticum* and *Thalia dealbata* have a high potential risk of invasion and should be used with caution; *Cyperus alternifolius*, *Canna indica*, *Pontederia cordata* and *Cyperus papyrus* are relatively lower in invasion risk and may be appropriately used in constructed wetlands. Analysis of the above-mentioned exotic wetland plants, except the first two for suitable distribution shows that all the wetland plants are suitable to grow in South China, where paddy fields, rivers, lakes, reservoirs and fish ponds are extensively distributed. These wetland ecosystems are vulnerable to threats. It is, therefore, essential to intensify the management of constructed wetlands and wetland plants, by adopting measures likes use of native substitutes, site selection, growth management, isolation and re-use of biomass, etc. so as to reduce the risk of exotic wetland plants, to make better use of them in treating rural domestic sewage and to improve ecological environment of the rural areas.

Keywords: rural sanitary sewage constructed wetlands wetland plants environmental risk management measures

Received 2012-09-01; published 2013-03-25

Fund:

国家自然科学基金(51108239); 中国农业科学院基本科研业务费项目(2012ZL003)

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引用本文:

王文国, 苏小红, 汤晓玉, 侯远青, 胡启春. 用于农村生活污水处理的常见外来湿地植物的环境风险评估与管理[J] 生态与农村环境学报, 2013, V29(2): 191-196

WANG Wen-Guo, SU Xiao-Hong, TANG Xiao-Yu, HOU Yuan-Qing, HU Qi-Chun. Environmental Risk Assessment and Management of Exotic Wetland Plants Used for Treatment of Rural Domestic Sewage[J] Journal of Ecology and Rural Environment, 2013, V29(2): 191-196

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