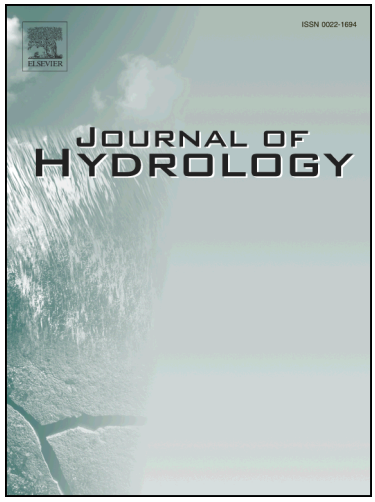

Research papers

Exploring Methods to Minimize the Risk of Mosquitoes in Rainwater Harvesting Systems

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Exploring Methods to Minimize the Risk of Mosquitoes in Rainwater Harvesting Systems

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Abstract

Rainwater harvesting in residential homes is emerging as an important complement to centralized water supplies in urban centres around the world. Domestic rainwater harvesting systems provide a variety of benefits for water management and contribute to sustainable and integrated urban water management. There are however risks associated with rainwater harvesting that requires appropriate mitigation. One such risk is that systems can become breeding grounds for mosquitoes. This can constitute a significant health risk through the spread of mosquito-borne diseases (i.e. arbovirus and malaria). This paper explores the extent to which mosquitoes breed in rainwater harvesting systems as well as the effectiveness of different risk mitigation actions. Data were sourced from a large-scale domestic rainwater tank inspection survey undertaken in Melbourne and were analysed using simple Bayesian Network models. The observed rate of mosquito breeding was too high and was identified as a serious concern for health officials and water managers. The most common access routes into the tank system were found to be through the tank inlet or overflow. By exploring different system set-ups it was found that in order to mitigate the risk of mosquito breeding in tanks, all potential access routes must be adequately sealed. The complete eradication of mosquitos in rainwater tanks, however,, may need further investigation, as 4% of systems with adequate protection at the inlet and overflow were still found to have mosquitoes in them.

Keywords: rainwater tanks; mosquitoes; decentralised systems; Bayesian Networks; sustainable urban water management; asset management