

SHORT NOTE

Keeping it clean: bird bath hygiene in urban and rural areas

Gráinne P. Cleary,^{1,2,*} Bill R. Coleman,¹ Adrian Davis,³ Darryl N. Jones,⁴ Kelly K. Miller,² and Holly Parsons⁵

¹National Parks Association of New South Wales, PO, Box 337, Newtown NSW 2042, Australia, ²School of Life and Environmental Sciences, Centre for Integrative Ecology, Deakin University, Geelong, 221 Burwood Highway, Burwood, Victoria 3125, Australia, ³School of Biological Sciences, The University of Sydney, Botany, New South Wales, Annex A13 2006, Australia, ⁴Environmental Futures Research Institute, Griffith University, Nathan QLD 4111, Australia and ⁵BirdLife Australia, 1 Jamieson Street, Sydney Olympic Park, NSW 2127, Australia

*Corresponding author. E-mail: g.cleary@deakin.edu.au

Abstract

In a dry continent like Australia where the provision of water in bird baths is a common and popular practice, very little is known about it. We describe the use of different types of bird baths and how these were maintained by residents ($n = 1,728$ respondents). The most commonly monitored bird baths were pedestal/elevated baths (>80%). Participants refilled bird baths more frequently in summer compared with winter (water changed once a day: winter respondents, 37.5%; summer respondents, 53.8%). Bird baths were also cleaned regularly ('Yes I do': 26.4%; winter respondents, 23.1%; summer respondents; 'I do but not every time', 55.6% winter respondents, 58.6% summer respondents). Overall our study indicates good hygiene practices for the maintenance of bird baths, which may help prevent the spread of avian diseases; and that residents are providing water seemingly based on the perceived need for water by birds.

Key words: Australia; avian; citizen science; seasonal effect; urbanisation; water

1. Introduction

Providing resources for birds, such as food or water, is an attempt by people to connect with nature in an urbanising world (Fuller et al. 2008) and such connections are associated with a range of important benefits for human well-being (Maller et al. 2005). There are, nonetheless, potential risks in attracting birds to feeders and baths with the transmission of avian disease, and potential overdependence upon unreliable or inadequate provisioning, being prominent concerns (Ball 1982; Cannon 1984; Robb et al. 2008). Birds are potentially susceptible to infectious diseases because many species and

individuals congregate at communal feeding or watering stations where infected individuals interact with other birds, or where infection may be transmitted via food and/or water (Robb et al. 2008; Galbraith et al. 2014). Major outbreaks of several avian diseases such as Trichomonosis, Salmonellosis and Psittacine Beak, and Feather Disease Virus, resulting in large numbers of avian fatalities, have been attributed to the use of feeders (Gerlach 1994; Robb et al. 2008) and bird baths (Tizfard 2004). Potential overdependence on artificial resources is also considered a risk especially where resources are episodically withdrawn or not adjusted to reflect the prevailing need (Fuller et al. 2008; Jones and Reynolds 2008). Concerns over

Submitted: 7 February 2016; Received (in revised form): 10 May 2016. Accepted: 13 July 2016

© The Author 2016. Published by Oxford University Press.

This is an Open Access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits non-commercial re-use, distribution, and reproduction in any medium, provided the original work is properly cited. For commercial re-use, please contact journals.permissions@oup.com

disease transmission and dependence issues have been invoked to justify bans on bird feeding in parts of Australia (NPWS 2015), although no such ban exists for the provision of water.

The practices of those providing food or water for birds may be a critical determinant of the risk of disease transmission or overdependence. Best practice guidelines for bird baths and feeders are available from a number of animal welfare and conservation groups, with most recommending that all equipment used by birds be cleaned daily, and disinfected regularly, followed by thorough rinsing and drying, to limit disease transmission (Plant 2008). Additionally, guidelines suggest that provisioning may be most beneficial when the needs of birds are intense, such as during winter or dry periods (Plant 2008). However no information as to whether or not people adhere to these principles is currently available.

We recruited citizen scientists from urban and rural regions from across Australia to monitor birds visiting their bird baths. As part of a broader enquiry (The Bathing Birds Study) we asked participants: (1) what type of bird bath are you monitoring for the Bathing Birds Study?; (2) how often do you replace the water in your bird bath?; and, (3) do you scrub and rinse your bird bath when you change the water?. As far as we are aware, this is the first study to describe bird bath maintenance protocols among a large sample of those who provide water for birds.

2. Methods

The Bathing Birds Study was undertaken during two 4-week survey periods during winter (June/July) 2014 and summer (January/February) 2015 (see Cleary et al. 2016). Participants were recruited via: (1) media coverage (television, radio and newspapers); (2) social media (e.g. Facebook); (3) communication networks of project partners; and, (4) ornithological associations. We classified respondents into two categories of urbanisation: 'urban' areas had human populations of 1,000–100,000+ people and 'rural' areas had < 999 people (after the Australian Bureau of Statistics which uses Australian Standard Geographical Classifications to define areas). Rural areas may contain large natural areas as well as low-density human settlement.

Each participant was asked (1) 'what type of bird bath are you monitoring for this study?' (response options were: 'saucer on the ground', 'pot on the ground', 'pedestal/elevated bath', 'hanging bath/saucer', 'pond', 'water feature/fountain', 'other'). To describe maintenance activities we asked: (2) 'how often do you replace the water in your bird bath?' (response options were: 'once a day', 'once a week', 'once every 2 weeks', 'once a month', 'infrequently/occasionally', 'rainwater refills it' or 'never'); and (3) 'do you scrub and rinse the bath when you change the water?' (response options were: 'yes I do', 'no I don't', 'I do but not every time', 'I change the water only', or 'I never change the water'). For all questions respondents were asked to select a single answer that best described their circumstances. Each respondent answered these questions once only when they registered to take part in the winter or summer survey. This ensured no respondent answered questions in both seasons and data points were independent.

Chi-Square Test for Independence (IBM SPSS v22) analysed differences in responses to the questions regarding water change frequency and cleaning frequency in association with urbanisation type (urban versus rural) and season (summer versus winter).

3. Results

In both surveys and regardless of urbanisation type the most commonly monitored bird bath type by participants was

pedestal/elevated baths (83.2 and 85.3% during winter ($n=1,189$) and summer ($n=539$) surveys, respectively). Other types of bird baths monitored were as follows; saucer on the ground (4.2%), other bath types (3.7), pot on the ground (2.7%), ponds (2.4%), and water feature/fountain (1.5%).

Comparisons of participants' responses in association with urbanisation type and season revealed statistically significant differences in reported water change and cleaning frequencies (Table 1). Urban respondents replaced water more frequently in summer than in winter (*once a day*: winter 37.3%, summer 55.2%; Table 2). There was a slight trend for rural respondents showing water change was more common in summer compared with winter (*once a day*: winter 38.1%, summer 50.6%; Tables 1 and 2).

For cleaning frequency, respondents from rural areas scrubbed and rinsed their bird baths less often than urban respondents (Tables 1 and 2). There was a marginal trend for rural respondents indicating they clean their bird baths less often during summer (*No cleaning*: winter 10.1%, summer 16.1%, Table 2).

4. Discussion

Australia is an arid inhabited continent with a low and variable rainfall and as a result water can be a limiting factor especially during summer (Hunt 2009; Ummenhofer et al. 2009) when wildlife may rely more on artificial water sources. A common and popular means of providing water to birds, is through bird baths with our study showing the most frequently monitored types were pedestal/elevated baths. As mentioned earlier there are concerns over risk of disease transmission and overdependence on this artificial provision of water.

However our finding showed that respondents changed the water (*once a day*: winter respondents 37.5%; summer respondents 53.8%) and cleaned their bird baths ('I do but not every time': winter respondents 55.6%; summer respondents 58.6%) frequently. These behaviours align with guidelines for responsible provisioning of resources for birds (Plant 2008; Galbraith et al. 2014) and whilst reported behaviours do not always match actual behaviours (Barker et al. 1994), our results suggest at least a broad awareness of what constitutes responsible provision of water for birds.

When the data were analysed by urbanisation type and season, we found that in urban areas, and with a tendency in rural areas, respondents refilled their bird baths more frequently in summer. This behaviour is presumably in response to a perception of an enhanced need for water by birds, increased evaporation of water and less rain in some areas during summer. As a consequence, during periods of drought or dry periods birds may become reliant on these water sources although, as far as we are aware, this has not yet been investigated.

In both seasons respondents from rural areas cleaned their bird baths slightly less frequently compared with their urban counterparts. The reasons for this are unclear but may include larger gardens/property or less pollution in rural areas, while in urban areas, baths may need more frequent cleaning and higher densities of humans, cats, dogs and other threats may alter attitudes concerning wildlife (Lepczyk et al. 2004; Tryanowski et al. 2015).

Although we acknowledge that our respondents are likely to be 'conservation-minded' given their participation in the monitoring study, our finding on hygiene and the provision of water at bird baths may represent a benefit to many of Australia's birds inhabiting gardens.

Table 1. Chi-Squared tests of independence tested for association in answers to questions 'how often do you change the water in your bird bath?' (Frequency of water change) and 'do you scrub and rinse your bird bath when you change the water?' (Frequency of cleaning) across urbanisation type and season

Question	Urban Winter versus Summer	Rural Winter versus Summer	Winter Urban versus Rural	Summer Urban versus Rural
Frequency of Water Change	$\chi^2 = 39.517$, df = 6, Cramer's V = 0.183 P = 0.001*	$\chi^2 = 9.446$, df = 5, Cramer's V = 0.133 P = 0.092	$\chi^2 = 7.859$, df = 6, Cramer's V = 0.082 P = 0.249	$\chi^2 = 12.023$ df = 6, Cramer's V = 0.150 P = 0.061
Frequency of Cleaning	$\chi^2 = 7.381$, df = 4, Cramer's V = 0.079 P = 0.117	$\chi^2 = 8.397$, df = 4, Cramer's V = 0.126 P = 0.078	$\chi^2 = 10.877$, df = 4, Cramer's V = 0.096 P = 0.028*	$\chi^2 = 12.218$ df = 4, Cramer's V = 0.151 P = 0.016*

Significant values are indicated by *.

Table 2. Percentage of each response to questions: 'how often do you change the water in your bird bath?' (frequency of water change) and 'do you scrub and rinse your bird bath when you change the water?' (frequency of cleaning)

Frequency of water change	Urban (standardised residuals)		Rural (standardised residuals)	
	% Winter n = 809	% Summer n = 375	% Winter n = 375	% Summer n = 162
Once a day	37.3 (-2.5)	55.2 (3.6)	38.1 (-1.1)	50.6 (1.7)
Once a week	42.9 (1.2)	34.6 (-1.7)	40.3 (0.7)	32.7 (-1.1)
Once every two weeks	7.4 (1.4)	3.4 (-2.1)	6.4 (0.1)	6.1 (-0.1)
Once a month	7.4 (0.8)	2.1 (-1.2)	3.2(1.0)	0.6 (-1.5)
Infrequently/occasionally	5.3 (1.5)	1.8 (-2.2)	6.4 (0.2)	5.5 (-0.3)
Rainwater refills it	2.8 (0.4)	2.1 (-0.6)	5.3 (0.3)	4.3 (-0.4)
Never	0.5 (0.0)	0.5 (0.1)	0.0	0.00

Frequency of cleaning	Urban (standardised residuals)		Rural (standardised residuals)	
	% Winter n = 808	% Summer n = 374	% Winter n = 370	% Summer n = 162
Yes I do	28.3 (1.1)	24.6 (0.6)	22.4 (-1.7)	19.7 (-0.9)
No I don't	10.2 (-0.1)	7.2 (-1.6)	10.8(0.2)	16.1 (2.5)
I do but not every time	52.9 (-1.0)	60.1 (0.4)	61.6 (1.5)	54.9 (-0.6)
I change the water only	7.1 (1.1)	6.1 (0.1)	4.1 (-1.7)	5.5 (-0.2)
I never change the water	1.2 (0.1)	1.8 (-0.7)	1.1 (-0.2)	3.7 (1.0)

Chi-Squared test for Independence results are presented with standardised residuals shown in brackets. The largest residuals for a given analysis are emboldened to indicate the greater contribution of the answer to the magnitude of the resulting significant Chi-Squared value (Table 1).

Acknowledgements

This research was conducted with the support of National Parks Association of New South Wales to G.C. and we also acknowledge the support from the board and staff, in particular we would like to thank the CEO Kevin Evans and President Samantha Newton. We would like to extend a huge thanks to all the citizen scientists who worked hard to collect this data for us.

Funding Source

Grainne Cleary was funded by National Parks Association of New South Wales through a salary as she was employed by National Parks Association during the collection of data.

Conflict of interest : None declared.

References

- Ball, A. P. (1982) *Notes on Infectious Diseases*. Edinburgh: Churchill Livingstone, New York.
- Barker, K., et al. (1994) 'Comparison of Self-Reported Recycling Attitudes and Behaviours with Actual Behaviour', *Psychological Reports*, **75**: 571–77.

- Cannon, C. E. (1984) 'Movements of Lorikeets with an Artificially Supplemented Diet', *Australian Wildlife Research*, **11**: 173–9.
- Fuller, R. A., et al. (2008) 'Garden Bird Feeding Predicts the Structure of Urban Avian Assemblages', *Diversity Distribution*, **14**: 131–7.
- Galbraith, J. A., et al. (2014) 'Risks and Drivers of Wild Bird Feeding in Urban Areas of New Zealand', *Biological Conservation*, **180**: 64–74.
- Gerlach, H. (1994) 'Circoviridae-Psittacine Beak and Feather Disease Virus', in Ritchie BW, Harrison GT, Harrison LR (eds.) *Avian Medicine: Principles and Practice*, pp. 894–903. Lake Worth, FL: Wingers Publishing Incorporation.
- Hunt, B. G. (2009) 'Multi-annual dry episodes in Australian climatic variability', *International Journal of Climatology*, **29**: 1715–30.
- Jones, D. N. and Reynolds, S. J. (2008) 'Feeding Birds in Our Towns and Cities: A Global Research Opportunity', *Journal of Avian Biology*, **39**: 265–71.
- Lepczyk, C. A., Mertig, A. G. and Liu, J. (2004) 'Assessing Landowner Activities Related to Birds Across Rural-to-Urban Landscapes', *Journal of Environmental Management*, **33**: 110–25
- Maller, C., et al. (2005) 'Healthy Nature Healthy People: "Contact with Nature" as an Upstream Health Promotion Intervention for Populations', *Health Promotion International*, **21**: 45–54.

- Robb, G. N., et al. (2008) 'Food for Thought: Supplementary Feeding as a Driver of Ecological Change in Avian Populations', *Frontiers in Ecology and the Environment*, 6: 476–84.
- NPWS. (2015) The dangers of feeding lorikeets. NSW National Parks and Wildlife Service, Sydney. <http://www.environment.nsw.gov.au/animals/The_DangersOfFeedingLorikeets.htm> accessed 16 Dec 2015.
- Plant, M. (2008) 'Good Practice When Feeding Birds', *Wingspan* 18: 20–3.
- Tizard, I. (2004) 'Salmonellosis in Wild Birds', *Seminars in Avian and Exotic Pet Medicine*, 2: 50–66.
- Tryjanowski, P., et al. (2015) 'Urban and Rural Habitat Differ in Number and Type of Bird Feeders and in Bird Species Consuming Supplementary Food', *Environmental Science and Pollution Research International*, 22: 15097–03.
- Ummenhofer, C. C., et al. (2009) 'What Causes Southeast Australia's Worst Droughts?', *Geophysical Research Letter*, 36: 1–5.