

Small Nearest-neighbour Distances Between Bowers in the Great Bowerbird *Ptilonorhynchus nuchalis*

NATALIE R. DOERR

Department of Ecology, Evolution and Marine Biology, University of California, Santa Barbara, Santa Barbara, CA 93106, United States of America
(Email: doerr@lifesci.ucsb.edu)

Summary

This study documents the mean nearest-neighbour distance (NND) for 13 active bowers of the Great Bowerbird *Ptilonorhynchus nuchalis* at Mary Valley Station, Cape York Peninsula, Queensland. Mean NND for the 13 bower sites was 396 m (range: 177–1454 m), the lowest recorded to date for this species. It is possible that the mean NND is so low because most bowers were relatively close to the homestead buildings, where resources may have been unusually abundant. Further research into the determinants of intraspecific variation in mean NND is required.

Introduction

The Great Bowerbird *Ptilonorhynchus nuchalis* has an extensive range that covers most of northern Australia (Frith & Frith 2004). Like other *Ptilonorhynchus* species that live in dry, open environments, its bowers are said to be more widely spaced than species that construct bowers in or along the edge of rainforest (Lenz 1993). To date, there have been only two studies documenting the mean nearest-neighbour distance (NND) between active bowers of Great Bowerbirds (Frith *et al.* 1995, 1996), and both have supported the idea that bowers are more widely spaced than those of rainforest species. However, the Great Bowerbird has such an extensive distribution that additional studies are needed to determine whether NNDs vary across its range. Such knowledge may help identify the ecological, behavioural or geographic factors that permit high-density display in some locations but not in others. I report the mean NND for 13 active bowers of the Great Bowerbird at Mary Valley Station, Cape York Peninsula, Queensland.

Methods

From 19–25 November 2007, I searched for active bowers of the Great Bowerbird at Mary Valley Station (15°02'S, 143°45'E). The habitat type at Mary Valley is dry eucalypt woodland with little understorey vegetation, although the grass grows vigorously during the wet season (M. Dalla Costa pers. comm.). I located bowers by listening for the males' advertisement calls. The station-owner found additional bowers while riding a quad-bike around the property. For each bower, I recorded its location using a GPS unit (accuracy ≤ 5.1 m), and calculated the distance to its nearest neighbour (NND).

Results

General observations

The 13 bowers located were closely associated with Dead Horse Creek, which was dry during the study, and most bowers were within 100 m of its banks. Though Mary Valley had not received rain for 6 months, males nonetheless advertised their

bowers each morning. In addition to rocks, shells and man-made decorations, bowers contained perishable decorations, such as leaves and fruit, suggesting that they were actively maintained.

Mean NND

The mean NND for the 13 bower sites was 396 m (range 177–1454 m). Twelve of the 13 had NNDs <535 m.

Discussion

I recorded a mean NND of 396 m for 13 active bowers at Mary Valley of the Great Bowerbird, the lowest mean NND recorded for this species. In the city suburbs of Townsville, Queensland, the mean NND was 790 m (Frith *et al.* 1996), and near the south-eastern edge of its range, the mean NND was 1370 m (Frith *et al.* 1995). Additionally, the mean NND at Mary Valley is lower than that recorded for any *Ptilonorhynchus* species that lives in a dry, open environment, being most similar to the mean NND reported for Archbold's Bowerbird *Archboldia papuensis*, a New Guinea mossforest species (mean NND 370 m: Frith & Frith 2004). Eight rainforest species have mean NNDs ranging from 61 to 500 m (reviewed by Frith & Frith 2004).

It is possible that the mean NND is so low because the search was concentrated around Dead Horse Creek, which runs past the Mary Valley homestead. If bower-site density is influenced by the availability of critical resources such as food and water, the homestead may support an atypically large population of bowerbirds. Indeed, Frith *et al.* (1995) found a clustering of Spotted Bowerbirds *Ptilonorhynchus maculatus* around a homestead in north-central Queensland, with bowers having a mean NND of 870 m, which is lower than previous records for that species (1059 m: Miles & Madden 2002; 1830 m: Borgia & Mueller 1992).

However, further studies are required before it can be concluded that proximity to humans is a primary explanation for intraspecific variation in bower-site density. I have studied Great Bowerbirds extensively at Dreghorn Station (20°15'S, 146°42'E), where the mean NND for 17 bowers along the Burdekin River was <500 m, yet these bowers were largely isolated from human activity (Doerr in prep.). Studies relating bower-site density to the availability and distribution of food resources across the landscape are particularly desirable, and the data presented here, together with previous studies (Frith *et al.* 1995, 1996), may facilitate research into this area.

Acknowledgements

I thank Michael Dalla Costa for assistance in finding bowers, Luis Gonzalez Reynoso for general assistance in the field, and Dr John Endler for facilitating the study. Thanks also to Stephen Debus and two anonymous referees for helpful comments on the manuscript. This study was carried out with permission from Queensland Parks & Wildlife and the James Cook University Ethics Committee.

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Received 19 December 2007

