

1 Use of a communal display area by Rufous Whistlers (*Pachycephala rufiventris*)

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18 19 **Background**

20 The Rufous Whistler (*Pachycephala rufiventris*) is a small passerine bird distributed across
21 mainland Australia (BirdLife Australia 2023). During its breeding season (approximately July–
22 February), territory-holding males perform ritualized courtship displays with females typically in
23 attendance (Jack 1949, Bridges 1994b, McDonald 2001, BirdLife Australia 2023). The most
24 common of these displays are *courtship pursuit-flights*, during which a female initiates the pursuit
25 by crouching and spreading and quivering her wings and a male chases the female throughout its
26 territory in an erratic fashion (Jack 1949, Erickson 1950, Erickson 1951). Between courtship
27 flights, males perform *bob displays*, in which males bob up and down while puffing out their chests
28 and erecting their tails, and short whistle calls (McDonald 2001). These displays have only been
29 recorded as occurring between pairs of birds (Jack 1949, Erickson 1950, Erickson 1951, McDonald
30 2001).

31 32 **Study Site**

33 Observations were made at our study site on the western side of Lake Samsonvale (27°16'S,
34 152°51'E), Queensland. The habitat at Samsonvale is varied, with large areas of grassland planted
35 with *Eucalyptus* spp., remnant dry sclerophyll forest dominated by Myrtaceae species particularly
36 of the genus *Eucalyptus*, and secondary regrowth dry sclerophyll forest. Remnant rainforest is also
37 present in gullies at the site. In each habitat, the understory is often dominated by the introduced
38 and invasive *Lantana camara*.

39
40 The site supports a diverse avifauna including a healthy population of Rufous Whistlers, and hosts
41 a long-term study into the resident avifauna, with a principal focus on the ecology of Red-backed
42 (*Malurus melanocephalus*), Superb (*M. cyaneus*), and Variegated Fairy-wrens (*M. lamberti*),
43 along with White-browed Scrubwrens (*Sericornis frontalis*) and the brood parasitic cuckoos that
44 parasitise them (e.g. Boersma et al. 2023, Carr et al. 2020, Feeney et al. 2018, Kennerley et al.
45 2019, Poje et al. 2019, Richardson et al. 2019).

46
47 **Observations**

48 On 30 October 2023, WPK observed five adult male and two adult female Rufous Whistlers
49 engaging in courtship behaviour in the lower branches of eucalypts ringing a small clearing. When
50 perched in these branches, all the individuals were no further than approximately two meters apart.
51 All the birds performed rapid, erratic flights through the trees, with males closely chasing females
52 and sometimes other males. Between courtship flights and chases, the two females sat still in
53 different locations while all the males perched around them within a two-meter radius and
54 exhibited frantic bob displays and short whistle calls and songs. Occasionally, one of the males
55 moved closer to the females before continuing to bob up and down. WPK also observed females
56 move either closer to or further away from the males. After one of these bob display sessions, a
57 copulation occurred between one of the males and a female bird.

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59 On 2 November 2023, WPK observed another courtship event between Rufous Whistlers at the
60 same location as the 30 October event, again between five male and two female birds. All five
61 males exhibited courtship flights, during which they chased females and occasionally other males.
62 Between courtship flights, males gave bob displays and vocalized while females perched nearby.

63 Copulation did not occur following this event, and the group of birds dispersed after one final
64 courtship flight.

65
66 On 14 November 2023, WPK observed courtship behaviour between three male Rufous Whistlers
67 and one female at the same location. The males again chased each other and the female in erratic
68 courtship flights. Between chases, the males positioned themselves around the perched female and
69 gave bob displays and short whistles and songs. During one of these bob display sessions, one of
70 the males moved closer to the female. Copulation did not occur during this observation, which
71 ended before the birds dispersed.

72

73 **Discussion**

74 Rufous Whistlers are a monogamous species with biparental care that is known to have complex
75 courtship rituals (Jack 1949, McDonald 2001, Bridges 1994b); however, courtship displays within
76 aggregations of individuals have hitherto never been observed in this species. Each of our
77 observations consisted of a group of males displaying to a smaller group of females within a two-
78 meter-squared-sized section of eucalypt branches. In lekking species, males hold small territories
79 in which they display for females (Höglund & Alatalo 1995); however, the male Rufous Whistlers
80 we observed pursued other males and females rather than hold established territories. This suggests
81 that these aggregations were communal display areas rather than formalised leks, which would
82 also be unusual for a monogamous species with biparental care. In other passerine species,
83 communal display areas are used as a location where pair bonds are formed before pairs disperse
84 to establish breeding territories (Summers-Smith 1954, Nakamura 1991). To better understand the
85 function of communal displays for Rufous Whistlers, the colour banding of a population and
86 following individuals during and after communal displays is a potential avenue of future research.
87 This may help determine whether communal display areas function as areas where individuals
88 socialize and establish pair bonds before dispersing to breed, or whether they act as arenas in which
89 males gather to display for extra-pair copulations (e.g. Wagner 1992).

90

91 Documenting the presence of unique behaviours are critical for more substantive studies into how
92 and why traits evolve. In addition to providing new insights into the courtship displays of this
93 species, our documentation of communal display use underscores the importance of

94 comprehensive, species-specific behavioral studies for advancing our understanding of the
95 complex interplay between ecology and evolution in avian populations.

96

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104 **References**

105

106 BirdLife Australia. 2023. Rufous Whistler. Birdlife Australia.

107 <https://hanzab.birdlife.org.au/species/rufous-whistler>. Last accessed 3 January 2024.

108 Boersma, J., Thrasher, D. J., Welklin, J. F., Baldassarre, D. T., Feeney, W. E., & Webster, M. S.
109 2023. Plural breeding among unrelated females and other insights on complex social structure
110 in the cooperatively breeding variegated fairywren. *Emu* 123(3): 232-43.

111 Bridges, L. 1994. Breeding biology of a migratory population of the Rufous Whistler
112 *Pachycephala rufiventris*. *Emu* 94(2): 106-115.

113 Bridges, L. 1994. Territory and mate fidelity in a migratory population of the Rufous Whistler
114 *Pachycephala rufiventris*. *Emu* 94(3): 156-165.

115 Carr, H. H., Kennerley, J. A., Richardson, N. M., Webster, M. S., & Feeney, W. E. 2021. First
116 record of black feathering in a female Red-backed Fairy-wren ‘*Malurus melanocephalus*’
117 under natural conditions. *Australian Field Ornithology* 37: 150–154.

118 Erickson, R. 1950. From Field and Study: Bowing Displays of Rufous Whistlers. *The Western*
119 *Australian Naturalist* 2(6): 140-141.

120 Erickson, R. 1951. Notes on Rufous Whistlers. *Emu* 51(2): 153-165.

121 Feeney, W. E., Ryan, T. A., Kennerley, J. A., Poje, C., Clarke, L., Scheuering, M., & Webster, M.
122 S. 2018. A photographic guide for ageing nestlings of two Australian brood-parasitic cuckoo
123 species: Horsfield’s Bronze-Cuckoo ‘*Chalcites basalus*’ and the Fan-tailed Cuckoo
124 ‘*Cacomantis flabelliformis*’. *Australian Field Ornithology* 35: 8-12.

- 125 Höglund, J., & Alatalo, R. V. 2014. Leks. *Princeton University Press*.
- 126 Jack, N. 1949. Territory and nesting in the Rufous Whistler. *Emu* 49(1): 26–34.
- 127 Kennerley, J. A., Grundler, M. R., Richardson, N. M., Marsh, M., Grayum, J., & Feeney, W. E.
128 2019. Observations on the behaviour and ecology of the Pallid Cuckoo ‘*Heteroscenes*
129 *pallidus*’ in south-eastern Queensland. *Australian Field Ornithology* 36: 109-115.
- 130 McDonald, P. G. 2001. The function of vocalisations and aggressive behaviour used by male
131 Rufous Whistlers, *Pachycephala rufiventris*. *Emu* 101(1): 65–72.
- 132 Nakamura, H. 1991. Dispersal of the Oriental Greenfinch *Carduelis sinica* from communal display
133 areas and social organization in breeding season (Aves: Fringillidae). *Journal of the*
134 *Yamashina Institute for Ornithology* 22(1): 9-55.
- 135 Poje, C., Kennerley, J. A., Richardson, N. M., Cowan, Z.-L., Grundler, M. R., Marsh, M., &
136 Feeney, W. E. 2019. Notes on the parasitic ecology of newly-fledged Fan-tailed Cuckoos
137 ‘*Cacomantis flabelliformis*’. *The Sunbird: Journal of the Queensland Ornithological Society*
138 48: 162-167.
- 139 Richardson, N. M., Kennerley, J. A., & Feeney, W. E. 2019. First record of intraspecific adoption
140 by a female Superb Fairy-wren ‘*Malurus cyaneus*’. *The Sunbird: Journal of the Queensland*
141 *Ornithological Society* 48: 159–161.
- 142 Summers-Smith, D. 1954. The communal display of the House Sparrow *Passer domesticus*. *Ibis*
143 96: 116-128.
- 144 Wagner, R. H. 1992. Extra-pair copulations in a lek: The secondary mating system of
145 monogamous razorbills. *Behavioral Ecology and Sociobiology* 31(1): 63–71.