Notornis, 2017, Vol. 64: 44-47
0029-4470

SHORT NOTE

Foraging flight times in the New Zealand (*Rhipidura fuliginosa*) and grey (*R. albiscapa*) fantails

BEN D. BELL
Centre for Biodiversity & Restoration Ecology, Victoria University of Wellington, New Zealand

The New Zealand fantail (pīwakawaka, *Rhipidura fuliginosa*) overlaps considerably with other small insectivores in its use of habitat, feeding mostly on the wing (Gill 1980). Diamond (1970) noted that conspicuous differences in foraging methods among bird populations of the same species on different islands in the south-west Pacific are infrequent, but exceptions occurred where birds catch insects in mid-air. One exception was *R. fuliginosa* in New Zealand, Diamond noting (p. 534) that it "may be seen spinning in the air to catch insects for long times in the air-space over ponds … where this flycatcher's behavior appears ludicrous to anyone familiar with the same species in Australia or with its New Guinea congeners". To examine this difference quantitatively, over the period 1983-1984 I recorded flight times of the grey fantail (*R. albiscapa*) on two visits to Australia and compared them with flight times I recorded for *R. fuliginosa* in New Zealand over 1983-2016. Formerly *R. albiscapa* and *R. fuliginosa* were regarded as conspecific (*R. fuliginosa*), but now are regarded as separate members of a superspecies group with the chestnut-bellied fantail (*R. hyperythra*) and friendly fantail (*R. albolimbata*) of New Guinea, and the mangrove fantail (*R. phasiana*) of northern Australia and New Guinea (Schodde & Mason 1999; Boles 2006; del Hoyo et al. 2006; Christidis & Boles 2008; Gill et al. 2010).

In Australia in September 1983 and 1984 (Table 1) I timed 778 foraging flights of 14 *R. albiscapa* in Queensland (Conondale National Park) and New South Wales (Govett's Leap, Jenolan Caves, Netley Hill, St. Columbia's Flat and Springwood). In New Zealand, mostly during the spring and early summer (Table 1), I timed 853 foraging flights of 30 *R. fuliginos*a in Marlborough Sounds, Wellington, Wairarapa and Hawkes Bay. Successive times of a fantail's feeding flights to and from its perches were measured at $^{1}/_{100}$ second intervals using a digital stopwatch.

Received 10 January 2017; accepted 15 January 2017
Correspondence: *ben.bell@vuw.ac.nz*

Table 1. Summary of dates and locations at which flights of *Rhipidura albiscapa* and *R. fuliginosa* were timed.

Species	Month	Year	State/Province	Location	No. birds with flights timed
R. albiscapa	September	1983	Queensland	Conondale Ranges	3
R. fuliginosa	September	1983	Wellington	Otari-Wilton Bush	3
R. fuliginosa	October	1983	Wellington	Rimutaka Forest Park	1
R. fuliginosa	November	1983	Marlborough	Maud Island	8
R. fuliginosa	December	1983	Wellington	Lower Hutt	2
R. fuliginosa	January	1984	Marlborough	Stephens Island	1
R. fuliginosa	February	1984	Wairarapa	Carter's Bush	1
R. fuliginosa	May	1984	Marlborough	Maud Island	7
R. albiscapa	September	1984	New South Wales	Springwood	6
R. albiscapa	September	1984	New South Wales	Netley Hill	1
R. albiscapa	September	1984	New South Wales	Govett's Leap	1
R. albiscapa	September	1984	New South Wales	Jenolan Caves	2
R. albiscapa	September	1984	New South Wales	St. Columbia's Flat	1
R. fuliginosa	October	2016	Wellington	Zealandia	1
R. fuliginosa	November	2016	Hawke's Bay	Hastings	1
R. fuliginosa	November	2016	Wellington	Zealandia	4
R. fuliginosa	November	2016	Wellington	Seatoun	1

Statistical analysis of flight times between species was undertaken using Linear Mixed Models in IBM SPSS Statistics for Macintosh, Version 24, with bird individual identity as a random effect and natural log transformation of times to correct for non-normality of the residuals. The flight times of NZ fantails were significantly longer than grey fantails ($F_{1,1629}$=18.082, $P < 0.0005$), as evident in medians of those times (Table 2) and in flight time frequency distributions (Fig. 1).

The difference in median flight times was 1.5 seconds. The longest timed flight in *R. albiscapa* was 10.8 seconds, though one *R. fuliginosa* feeding along a coastal cliff face took 81.5 seconds (Table 2). In *R. albiscapa,* most flight times (90.9%) were 3.0 seconds or less, 7.1% were 3.0-6.0 seconds, 1.8% were 6.0-9.0 seconds and only 0.3% were over 9.0 seconds (Fig. 1). In contrast, in *R. fuliginosa* 55.2% of times were 3.0 seconds or less, 24.7% were 3.0-6.0 seconds, 9.5% were 6.0-9.0 seconds, 5.0% were 9.0-12.0 seconds, and 5.5% were over 12.0 seconds (Fig. 1).

Most fantails I timed were feeding alone. To compare the two species, all flight timings were included in the analysis, rather than by classification of feeding method and context used elsewhere (e.g. Ude Shankar 1977; McLean 1984, 1989; Cameron 1985). The feeding behaviour of *R. albiscapa* and *R. fuliginosa* has been well studied in Australia and New Zealand (Boles 2006; del Hoyo *et al.* 2006; Higgins *et al.* 2006). Both species are arboreal, foraging at nearly all levels of vegetation, though most often in mid-levels of the forest, usually by sallying or flush-pursuit, less often by gleaning or snatching from foliage and branches of trees and shrubs, and occasionally on the ground (Boles 2006; del Hoyo *et al.* 2006; Higgins *et al.* 2006). In Five Day Creek Valley, New South Wales, Cameron (1985) found *R. albiscapa* made long roundabout flights in the open air after launching from vantage perches, especially in tall trees, which lasted for up to 20 seconds (Higgins *et al.* 2006). In *R. fuliginosa* in Christchurch, Ude Shankar (1977) differentiated various methods of prey capture including direct 'hawking forays' and 'aerial feeding' involving longer flights. Mean

Table 2. Median foraging flight times in *Rhipidura albiscapa* and *R. fuliginosa.*

Species	Location	Number of birds	Number of timings	Median time (seconds)	Minimum time (seconds)	Maximum time (seconds)
R. albiscapa	South-east Australia	14	778	1.14	0.25	10.76
R. fuliginosa	New Zealand	30	853	2.59	0.35	81.49

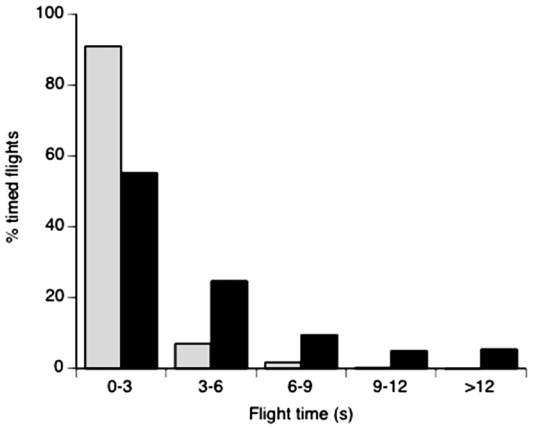

Fig. 1. Percentage of foraging flight times in *Rhipidura albiscapa* (grey) and *R. fuliginosa* (black) across increasing time intervals.

hawking foray time was 1.0 second (range 0.5-2.5 seconds; n = 50) and mean aerial feeding time 6.9 seconds (range 2.9-15.0 seconds; n = 44; see Appendix 7 in Ude Shankar (1977)). On Hauraki Gulf islands, McLean (1989) noted that *R. fuliginosa* takes flying prey by hawking from a perch, flushes prey by disturbing vegetation and may form feeding associations with other species. McLean (1989) suggested these different flight behaviours allowed *R. fuliginosa* to utlilise more of its habitat for feeding than it could by using one method only.

The present study has demonstrated that most flight times are shorter in *R. albiscapa* than for *R. fuliginosa* (Table 2; Fig. 1), but that both species are capable of flights of over 10 seconds (Table 2). These results are consistent with Diamond's (1970) earlier hypothesis that reduction of competition on species-poor islands like New Zealand permits some colonising species to expand their feeding niches and foraging techniques, although there has been debate on the role of competition in determining island communities (e.g. Diamond 1975; Connor & Simberloff 1979). The behavioural, ecological and evolutionary significance of feeding flight times and foraging modes in *R. albiscapa, R. fuliginosa* and other members of their superspecies complex warrant further study.

ACKNOWLEDGEMENTS

I thank Chris Corben for assistance in Conondale National Park, Queensland, Gill Brackenbury offered helpful comments on a draft of this short note and I am indebted to Lisa Woods of the School of Mathematics, Statistics and Operations Research, Victoria University, for helpful statistical advice.

LITERATURE CITED

Boles, W.E. 2006. Family Rhipiduridae (fantails). *In:* del Hoyo, J.; Elliott, A.; Christie, D.A. (editors). *Handbook of the birds of the world. Volume 11, Old world flycatchers to old world warblers*. Barcelona, Lynx Edicions,

Cameron, E. 1985. Habitat use and foraging behaviour of three fantails (*Rhipidura*: Pachycephalidae). pp. 177-199 *In:* Keast, A.; Recher, H.F.; Ford, H.A.; Saunders, D. (editors) *Birds of eucalypt forests and woodlands: ecology, conservation, management*. Chipping Norton, New South Wales, Surrey Beatty.

Christidis, L.; Boles, W.E. 2008. *Systematics and taxonomy of Australian birds*. Clayton, Victoria, CSIRO Publishing,

Connor, E.F.; Simberloff, D. 1979. The assembly of species communities: chance or competition? *Ecology 60*: 1132-1140.

del Hoyo, J.; Elliott, A.; Christie, D.A. 2006. *Handbook of the birds of the world. Volume 11, Old world flycatchers to old world warblers*. Barcelona, Lynx Edicions.

Diamond, J.M. 1970. Ecological consequences of island colonization by southwest Pacific birds, I. Types of niche shifts. *Proceedings of the National Academy of Sciences 67:* 529-536.

Diamond, J.M. 1975. Assembly of species communities. pp. 342-444 *In:* Cody, M.L.; Diamond, J.M. (editors) *Ecology and evolution of communities*. Cambridge, Massachusetts, Harvard University Press.

Gill, B.J. 1980. Abundance, feeding, and morphology of passerine birds at Kowhai Bush, Kaikoura, New Zealand. *New Zealand Journal of Zoology 7*: 235-246.

Gill, B.J.; Bell, B.D.; Chambers, G.K.; Medway, D.G.; Palma, R.L.; Scofield, R.P.; Tennyson, A.J.D.; Worthy, T.H. 2010. *Checklist of the birds of New Zealand, Norfolk and Macquarie Islands, and the Ross Dependency, Antarctica*. Fourth edition. Te Papa Press, Wellington in association with the Ornithological Society of New Zealand Inc.

Higgins, P.J.; Peter, J.M.; Cowling, S.J. (editors) 2006. *Handbook of Australian, New Zealand & Antarctic birds. Volume 7, Boatbill to starlings*. Melbourne, Oxford University Press.

McLean, I.G. 1984. Feeding associations between fantails and saddlebacks: Who benefits? *New Zealand Journal of Ecology 7*:165-168.

McLean, I.G. 1989. Feeding behavior of the fantail (*Rhipidura fuliginosa*). *Notornis 36*: 99-106.

Schodde, R.; Mason, I.J. 1999. *The directory of Australian birds. A taxonomic and zoogeographic atlas of biodiversity of birds of Australia and its territories. Passerines.* Collingwood, Victoria, CSIRO Publishing.

Ude Shankar, M.J. 1977. Aspects of the behaviour of the South Island fantail, *Rhipidura fuliginosa fuliginosa*. Unpublished MSc thesis, University of Canterbury, Christchurch, New Zealand.

Keywords foraging niche; grey fantail; interspecific competition; island faunas; New Zealand fantail