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Adrian JFK Craig & Patrick E Hulley

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Bird-ringing in the Makhanda Botanical Gardens: 1990–2020

Adrian JFK Craig [*] ***& Patrick E Hulley*** [1]

Department of Zoology & Entomology, Rhodes University, Makhanda, 6140, South Africa

[1] *deceased*
[*] *email: a.craig@ru.ac.za*

Abstract

Over a 30-year period, opportunistic bird-ringing was carried out in the Makhanda Botanical Gardens, using mist nets. In total 3099 birds of 71 species were ringed, with 305 individuals of 34 species recaptured or recovered dead. Notable longevity records included a 12-year old Greater Double-collared Sunbird *Cinnyris afer*, and we also documented the arrival and establishment of Bronze Mannikins *Spermestes cucullata* as a breeding resident.

Introduction

The Botanical Gardens in Makhanda (formerly Grahamstown) were established in 1853 in the south-western corner of the city (Figure 1), adjoining the present Rhodes University campus, which was founded in 1903. The proximity of the gardens to the university made them a convenient site for student projects in biological sciences, and our ringing activities were consequently often focused around short-term research projects conducted within the academic year of February to October. Because the breeding season for most bird species in this region is in summer, spanning the examination and summer holiday period for undergraduate and honours students, a particular focus was on projects related to nectar-feeding birds attracted to the flowers available in winter (Craig & Simon 1991, Hulley & Craig 1994).

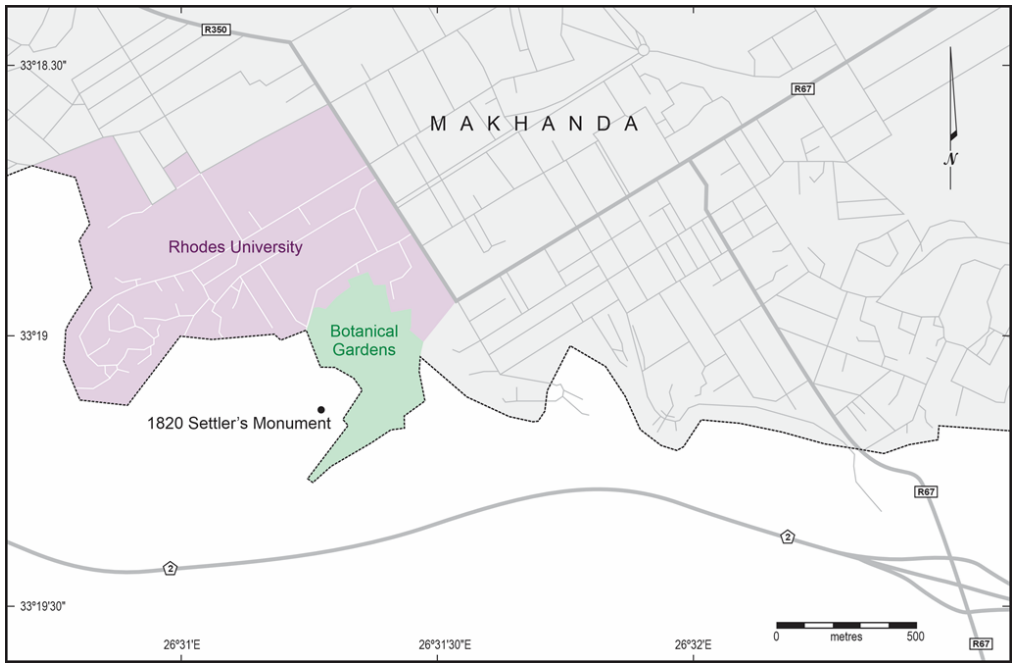

Figure 1: The Botanical Gardens within the city of Makhanda.

A popular article highlighted the bird species recorded in the gardens during the first few years (Craig 1996), and accounts of the birds found in the Makhanda urban area were provided by Craig et al. (2020) and Mullins & Craig (2024). Captures in the botanical gardens provided much of the data for publications on the Olive Thrush *Turdus olivaceus* and the Cape Robin-chat *Cossypha caffra* (Bonnevie et al. 2003), the Lesser Honeyguide *Indicator minor* (Craig et al. 2012), the Cape White-eye *Zosperops virens* (Hulley et al. 2004) and Eastern Cape sunbirds (Nectariniidae) (Bonnevie et al. 2023). All birds captured were ringed, generating a total of 3099 birds of 71 species. This paper provides an overview of this dataset. A complete list of the birds ringed is in the Appendix.

Study site and methods

Like most botanical gardens, the Makhanda Botanical Gardens contains a mixture of alien and indigenous vegetation. On the western section, where paths lead uphill to the 1820 Settlers' National Monument above the city, there is fynbos with ericas and proteas; we did not put mist-nets in this sector. Almost all mist-netting was done in a sector with large stands of aloes (*Aloe ferox, A. pluridens, A. africana* and some hybrids), and Cape honeysuckle *Tecomaria capensis*. We placed the mist-nets along established paths with tall vegetation on both sides. On occasion single nets were set near flowering coral trees *Erythrina caffra*.

Standard four-shelf 9-m and 12-m mist-nets were used, with mesh sizes suited to small birds; the largest species captured was an African Goshawk *Accipiter tachiro*. Along one path we often set a series of eight or nine nets covering about 90 m, but there was no attempt to maintain a constant effort site in terms of ringing hours or a consistent pattern of nets. The monthly distribution of the 229 ringing visits showed a bias towards autumn and winter (Figure 2). Most ringing sessions were on weekdays in the mornings between 07:00 and 12:00, when there were few visitors using these pathways. Standard measurements (wing-length and mass) were recorded for each bird, along with full details of wing-moult as well as the presence of moult on the head, body and tail regions (de Beer et al. 2000). Birds were also checked for brood patches.

Results and discussion

Regular bird-ringing at the same site increases the probability of recapturing the same individuals, which can confirm which species are long-term residents, which may breed at the site, and how long they survive. Table 1 lists the species which were recaptured, and the maximum intervals recorded; the column for recaptures reflects the number of individual birds recaptured. Since the exact age at first ringing could not be determined, and most birds were first captured as adults, this represents a minimum age for an individual bird.

There were few examples of long-distance movement by birds in this sample, and during a period when hundreds of sunbirds were ringed

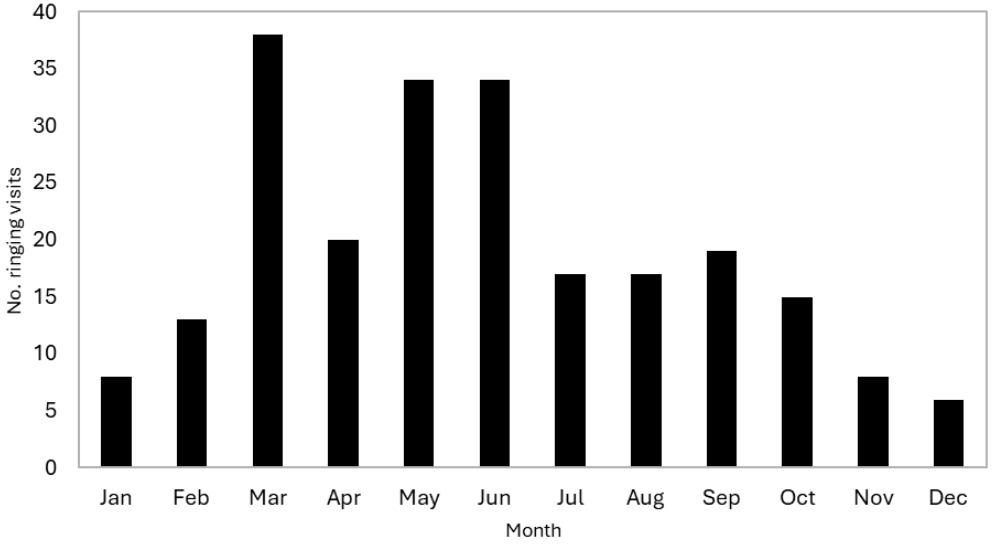

Figure 2. Number of ringing visits in different months for all years combined.

by us in Makhanda, and the late Tony Tree was ringing hundreds of sunbirds in Bathurst, 35 km distant, we never recorded movements between the two ringing sites (Bonnevie et al. 2023). The most surprising movement recorded was a Sombre Greenbul ringed in the Botanical Gardens and found dead 19 months later, on a farm near Riebeeck East, at a distance of 26 km. The intervening countryside is mostly open thornveld, unsuitable for a skulking bird which favours dense vegetation. A Cape Weaver ringed on the farm Slaaikraal, 8 km from Makhanda, was recaptured in the Botanical Gardens. All other bird movements were within the city limits, and involved these species: Black-collared Barbet, Red-fronted Tinkerbird, Lesser Honeyguide, Dark-capped Bulbul, Olive Thrush, Cape Robin-chat, Southern Boubou, Black-backed Puffback, Cape White-eye, Greater Double-collared Sunbird, Amethyst Sunbird, Collared Sunbird, Cape Weaver and Bronze Mannikin. One unresolved case involved a Cape Weaver; the ring was found in a Spotted Eagle Owl *Bubo africanus* pellet near a long-standing nest site at St Andrew's College. The date and place of death are unknown.

Considering survival, of the 13 species in Table 1 for which at least five birds were recaptured, in 10 species there was a record of birds surviving more than 48 months after ringing, and this was also the case for four other species with fewer recaptures. A striking exception was the Bronze Mannikin; for this species than 400 birds were ringed in Makhanda and elsewhere, and the longest interval for a recapture was 23 months. Similarly in a long-term study in Zimbabwe, with 342 birds ringed, Woodall (1975) reported a maximum lifespan of 28 months. The latest information on longevity for this species reported one bird found 3.4 years after ringing (Nuttall 2005). However, birds of similar body size such as sunbirds and white-eyes evidently have much larger survival rates (Table 1). In the Botanical Gardens, Malachite Sunbirds were captured only during the winter flowering period of the aloes, and four birds were recaptured once each (after 24, 39, 48 and 61 months). Only the Greater Double-collared Sunbird seemed to qualify as "resident" with two birds recaptured on five and six occasions respectively; no other sunbirds were recaptured more than twice.

The Cape White-eye was the subject of several studies, including plumage coloration (Craig et al. 2017), moult (Craig & Hulley 1996, Hulley et al. 2004), anting (the behaviour of picking up live ants and passing them through the plumage) (Lunt et al. 2004), and the genetic relatedness of birds in the flock (Brown et al. 2001). This was the most-ringed bird, and consequently also produced the greatest number of recaptures. Four birds originally ringed in gardens elsewhere in town were later caught in the Botanical Gardens, and six birds ringed in the Botanical Gardens were found dead at other locations in town; two had been killed by cats, and four were hit by vehicles. Most recaptures (39 birds) occurred within three months of ringing, and only 21 birds were recaptured more than once, three of them on five to six occasions. The oldest white-eye (124 months) had been recaptured six times. The intervals in years since ringing (excluding all recaptures more than six months after ringing) ae shown in Figure 3. Clearly the 10-year old bird is exceptional.

The Botanical Gardens ringing site also was used for public demonstrations of bird-ringing during SciFest (an annual event, aimed particular at high school children) and also on other occasions for school groups of varying ages. Thus in addition to the valuable data

Table 1. Species ringed and recaptured in Makhanda Botanical Gardens, with maximum time interval in months

Common name	Scientific name	Ringed	Recaptured	Max. interval
Laughing Dove	*Spilopelia senegalensis*	7	1	30
Speckled Mousebird	*Colius striatus*	4	1	8
Black-collared Barbet	*Lybius torquata*	24	5	30
Red-fronted Tinkerbird	*Pogoniulus pusillus*	54	10	32
Lesser Honeyguide	*Indicator minor*	31	4	27
Dark-capped Bulbul	*Pycnonotus tricolor*	94	9	57
Sombre Greenbul	*Andropadus importunus*	20	16	63
Terrestrial Brownbul	*Phyllastrephus terrestris*	2	2	19
Black-headed Oriole	*Oriolus larvatus*	39	5	62
Olive Thrush	*Turdus olivaceus*	84	17	148
Cape Robin-chat	*Cossypha caffra*	66	17	92
Fiscal Shrike	*Lanius collaris*	10	1	7
Southern Boubou	*Laniarius ferrugineus*	10	2	7
Black-backed Puffback	*Dryoscopus cubla*	7	2	29
Southern Tchagra	*Tchagra tchagra*	5	2	27
Cape Batis	*Batis capensis*	17	4	68
African Paradise Flycatcher	*Terpsiphone viridis*	11	1	12
Karoo Prinia	*Prinia maculosa*	9	2	13
Neddicky	*Cisticola ruficapilla*	7	1	13
Green-backed Camaroptera	*Camaroptera brachyura*	5	1	8
Bar-throated Apalis	*Apalis thoracica*	22	7	78
Cape White-eye	*Zosterops virens*	1055	123	124
Malachite Sunbird	*Nectarinia famosa*	68	4	61
Greater Double-collared Sunbird	*Cinnyris afer*	164	18	134
Southern Double-collared Sunbird	*Cinnyris chalybeus*	124	11	50
Grey Sunbird	*Cyanomitra veroxii*	50	1	67
Amethyst Sunbird	*Chalcomitra amethystina*	230	8	50
Collared Sunbird	*Hedydipna collaris*	8	1	13
Cape Weaver	*Ploceus capensis*	61	4	38
Bronze Mannikin	*Spermestes cucullata*	326	18	15
African Firefinch	*Lagonosticta rubricata*	19	1	6
Swee Waxbill	*Coccopygia melanotis*	47	2	14
Yellow-fronted Canary	*Crithagra mozambica*	73	2	38
Streaky-headed Seedeater	*Crithagra gularis*	74	2	62

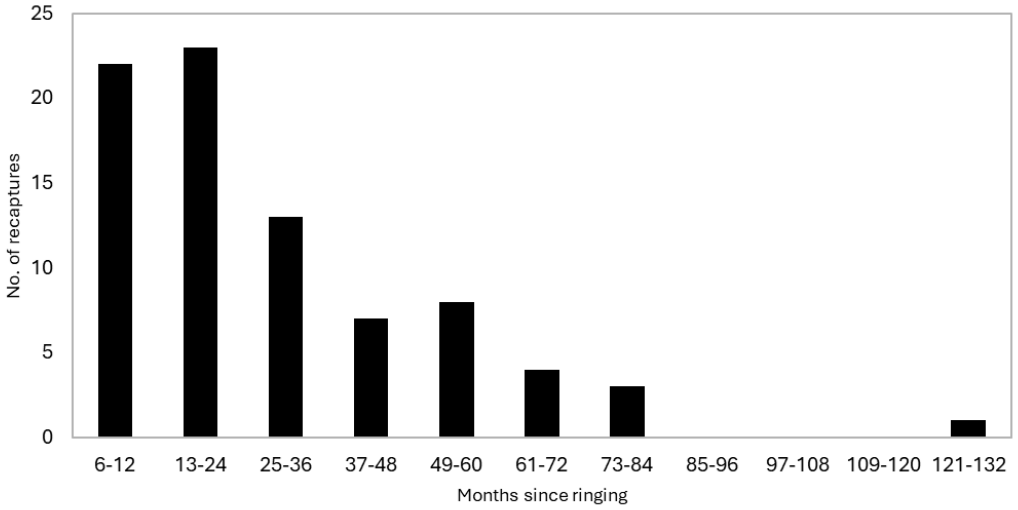

Figure 3: Recaptures of Cape White-eyes after particular time intervals in months.

collected, these ringing sessions had an educational purpose. Later feedback suggested that seeing birds in the hand made a lasting impression on some learners.

Acknowledgements

Over the years many people assisted at this site; Bo Bonnevie, Chris Brown and Mark Galpin did some of their training as bird-ringers here. Our thanks to all the helpers, and to the municipal and university caretakers of the gardens for access to the site. Ethics clearance for handling the birds was provided by the Rhodes University Ethical Standards Committee. All the ringing records are in the SAFRING database housed at the University of Cape Town, or can be obtained on request from Adrian Craig. Research grants from Rhodes University covered the cost of rings and other equipment, some of which was expertly manufactured by Terry Butterworth in the departmental workshop.

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Appendix: Complete list of birds ringed in Makhanda Botanical Gardens, 1990-2020

Species	Scientific name	No. ringed	Recaptured
Little Sparrowhawk	*Accipiter minullus*	2	
African Goshawk	*Accipiter tachiro*	1	
Speckled Mousebird	*Colius striatus*	5	1
Red-faced Mousebird	*Urocolius indicus*	4	
African Hoopoe	*Upupa africana*	4	
Red-eyed Dove	*Streptopelia semitorquata*	3	
Laughing Dove	*Spilopelia senegalensis*	8	1
Tambourine Dove	*Turtur tympanistra*	2	
Emerald-spotted Dove	*Turtur chalcospilas*	1	
Half-collared Kingfisher	*Alcedo semitorquata*	1	
Brown-hooded Kingfisher	*Halcyon albiventris*	8	
African Pygmy Kingfisher	*Isipidina picta*	1	
Black-collared Barbet	*Lybius torquatus*	24	5
Red-fronted Tinkerbird	*Pogoniulus pusillus*	53	10
Cardinal Woodpecker	*Dendropicos fuscescens*	2	
Knysna Woodpecker	*Campethera notata*	3	
Lesser Honeyguide	*Indicator minor*	30	4
Brown-backed Honeybird	*Prodotiscus regulus*	1	
Dark-capped Bulbul	*Pycnonotus tricolor*	94	9
Sombre Greenbul	*Andropadus importunus*	66	14
Terrestrial Brownbul	*Phyllastrephus terrestris*	6	2
Black Cuckooshrike	*Campephaga flava*	6	
Fork-tailed Drongo	*Dicrurus adsimilis*	23	
European Golden Oriole	*Oriolus oriolus*	1	
Black-headed Oriole	*Oriolus larvatus*	39	5
Olive Thrush	*Turdus olivaceus*	85	17
Cape Robin-chat	*Cossypha caffra*	68	17
Chorister Robin-chat	*Cossypha dichroa*	2	
Fiscal Shrike	*Lanius collaris*	11	2
Southern Boubou	*Laniarius ferrugineus*	10	2
Black-backed Puffback	*Dryoscopus cubla*	7	2
Southern Tchagra	*Tchagra tchagra*	5	2
Olive Bush Shrike	*Chlorophoneus olivaceus*	4	
Grey-headed Bush Shrike	*Malaconotus blanchoti*	9	

Appendix: continued...

Species	Scientific name	No. ringed	Recaptured
Bokmakierie	*Telophorus zeylonus*	1	
Cape Batis	*Batis capensis*	16	4
Chinspot Batis	*Batis molitor*	1	
AfricanParadise Flycatcher	*Terpsiphone viridis*	11	1
African Dusky Flycatcher	*Muscicapa adusta*	9	
Southern Black Flycatcher	*Melaenornis pammelaina*	1	
Fiscal Flycatcher	*Melaenornis silens*	2	
Yellow-throated Woodland Warbler	*Phylloscopus ruficapilla*	1	
Karoo Prinia	*Prinia maculosa*	9	2
Neddicky	*Cisticola fulvicapilla*	7	1
Green-backed Camaroptera	*Camaroptera brachyura*	5	1
Bar-throated Apalis	*Apalis thoracica*	22	7
Red-winged Starling	*Onychognathus morio*	33	
Cape Wagtail	*Motacilla capensis*	2	
Cape White-eye	*Zosterops virens*	1089	124
Cape Sugarbird	*Promerops capensis*	1	
Malachite Sunbird	*Nectarinia famosa*	68	4
Greater Double-collared Sunbird	*Cinnyris afer*	164	18
Southern Double-collared Sunbird	*Cinnyris chalybeus*	127	12
Grey Sunbird	*Cyanomitra veroxii*	50	1
Amethyst Sunbird	*Chalcomitra amethystina*	229	7
Collared Sunbird	*Hedydipna collaris*	8	1
Southern Grey-headed Sparrow	*Passer diffusus*	5	
Spectacled Weaver	*Ploceus ocularis*	2	
Cape Weaver	*Ploceus capensis*	61	4
Village Weaver	*Ploceus cucullatus*	4	
Southern Masked Weaver	*Ploceus velatus*	1	
Thick-billed Weaver	*Amblyspiza albifrons*	1	
Bronze Mannikin	*Spermestes cucullata*	327	18
African Firefinch	*Lagonosticta rubricata*	19	1
Swee Waxbill	*Coccopygia melanotis*	47	2
Dusky Indigobird	*Vidua funerea*	9	
Cape Canary	*Serinus canicollis*	2	
Forest Canary	*Crithagra scotops*	12	
Yellow-fronted Canary	*Crithagra mozambica*	73	2
Brimstone Canary	*Crithagra sulphurata*	17	
Streaky-headed Seedeater	*Crithagra gularis*	74	2

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