

Kent Academic Repository

Full text document (pdf)

Citation for published version

Gardner, Charlie J. and Jasper, Louise D. (2018) Miscellaneous behavioural observations of Malagasy birds. *Madagascar Conservation & Development*, 13 . pp. 70-74.

DOI

Link to record in KAR

<https://kar.kent.ac.uk/84361/>

Document Version

Author's Accepted Manuscript

Copyright & reuse

Content in the Kent Academic Repository is made available for research purposes. Unless otherwise stated all content is protected by copyright and in the absence of an open licence (eg Creative Commons), permissions for further reuse of content should be sought from the publisher, author or other copyright holder.

Versions of research

The version in the Kent Academic Repository may differ from the final published version.

Users are advised to check <http://kar.kent.ac.uk> for the status of the paper. **Users should always cite the published version of record.**

Enquiries

For any further enquiries regarding the licence status of this document, please contact:

researchsupport@kent.ac.uk

If you believe this document infringes copyright then please contact the KAR admin team with the take-down information provided at <http://kar.kent.ac.uk/contact.html>

1 Submission type: Short Notes

2

3

4 **Miscellaneous behavioural observations of Malagasy birds**

5

6 Charlie J. Gardner^{1,3}, Louise D. Jasper²

7

8

9 ¹ Durrell Institute of Conservation and Ecology (DICE), University of Kent, Canterbury,
10 Kent, CT2 7NR, United Kingdom

11 ² 5 Fen Lane, Ashwicken, Norfolk, PE32 1LR, United Kingdom

12 ³ Corresponding author, e-mail: C.Gardner-399@kent.ac.uk

13

14 ABSTRACT

15 Madagascar possesses a unique avifauna characterized by high endemism rates at
16 species and higher taxonomic levels, but little is known about the behaviour, diets and
17 interspecific interactions of many species. We present a number of opportunistic observations
18 of Malagasy birds collected during 2012–2015, including a foraging association between
19 Hook-billed vanga *Vanga curvirostris* and White-breasted mesite *Mesitornis variegatus*,
20 aggressive interaction between a fledgling Madagascar cuckoo *Cuculus rochii* and its Common
21 jery *Neomixis tenella* host, records of carnivory in Green-capped coua *Coua ruficeps*
22 *olivaceiceps* and frugivory in Lafresnaye’s vanga *Xenopirostris xenopirostris*, an unusual
23 aggregation of Alpine swift *Tachymarptis melba* around a telecommunications tower,
24 entrapment of Madagascar mannikin *Lepidopygia nana* in a spider’s web, and anti-predator
25 behaviour (mobbing) of potentially predatory reptiles in Souimanga sunbird *Nectarinia*
26 *souimanga*, Madagascar magpie robin *Copsychus albospectularis*, Madagascar paradise
27 flycatcher *Terpsiphone mutata*, Common newtonia *Newtonia brunneicauda* and Crested
28 drongo *Dicrurus forficatus*.

29

30 RÉSUMÉ

31 L’avifaune de Madagascar est unique, caractérisée par des taux d’endémisme élevées aux
32 niveaux d’espèces, genres, familles et ordres. Cependant, nous ne connaissons encore peu
33 concernant le comportement, le régime alimentaire et les interactions interspécifiques de
34 beaucoup d’espèces. Nous présentons une série d’observations opportunistes que nous avons
35 collectés dans la période 2012-2015, incluant : i) une interaction fourragère entre un Vanga
36 écorcheur *Vanga curvirostris* et une paire de Mésite variée *Mesitornis variegatus*, ii) une
37 interaction agressive entre un oisillon du Coucou de Madagascar *Cuculus rochii* et son hôte,
38 une Petite éroesse *Neomixis tenella*, iii) la prédation d’un lézard (*Tracheloptychus*

39 *madagascariensis*) par un coua à tête verte *Coua ruficeps olivaceiceps*, iv) la frugivorie par
40 un Vanga de Lafresnaye *Xenopirostris xenopirostris*, v) une agrégation inhabituelle des
41 Martinet à ventre blanc *Tachymarptis melba* autour d'une installation de télécommunication,
42 vi) le piégeage d'un Capucin de Madagascar *Lepidopygia nana* dans une toile d'araignée
43 (*Nephila* sp.), et vii) le harcèlement des reptiles incluant des serpents (*Ithycythus miniatus*,
44 *Acrantophis madagascariensis*) et un caméléon (*Furcifer pardalis*) par le Souimanga
45 malgache *Nectarinia souimanga*, Shama de Madagascar *Copsychus albospecularis*, Tchitrec
46 malgache *Terpsiphone mutata*, Newtonie commune *Newtonia brunneicauda* et Drongo
47 malgache *Dicrurus forficatus*.

48

49 **KEYWORDS:** avian ecology; bird-snake interaction; cuckoo-host interaction; Madagascar;
50 mobbing;

51

52 Madagascar possesses a unique avifauna characterized by high levels of endemism at
53 species and higher taxonomic levels. One-hundred-and-six out of 256 regularly occurring
54 species are endemic, while 40 genera and six families are restricted to Madagascar and the
55 neighbouring Comoros archipelago (Safford and Hawkins 2013). Unfortunately, the paucity of
56 observers and researchers on the island means that little is known about the behaviour, diets
57 and interspecific interactions of many species, yet an improved understanding of species
58 ecology may be useful for conservation efforts as well as for academic reasons. Here, we
59 contribute to filling this gap with a series of opportunistic field observations, largely concerning
60 endemic species, collected during the period 2012-2015 from around Madagascar (additional
61 behavioural observations can be found in Gardner et al. 2011; Gardner and Jasper 2014).
62 Herein we follow the taxonomy adopted by Safford and Hawkins (2013).

63

64 Association between White-breasted mesite *Mesitornis variegatus*, Madagascar blue vanga
65 *Cyanolanius madagascarinus*, and Hook-billed vanga *Vanga curvirostris*

66 At 1111h on 29 April 2015, south of Campement Anilotra (Campement des Anglais)
67 in Ankarana National Park (E049° 06' 27", S12° 54' 37", Diana Region), we encountered a
68 mixed flock containing Madagascar blue vanga *Cyanolanius madagascarinus*, Crested drongo
69 *Dicrurus forficatus* and Red-tailed vanga *Calicalicus madagascariensis*. We tried to elicit a
70 response from a Madagascar blue vanga with the use of call playback (using a recording from
71 Hugué and Chapuis 2003), but the call instead triggered a duet by a nearby pair of White-
72 breasted mesite, and this duet was in turn answered by a duet from a distant pair of conspecifics.

73 In total we played the call of Madagascar blue vanga three times and each time it elicited a duet
74 from the White-breasted mesite pair.

75

76 Having been obscured by dense undergrowth, the White-breasted mesites came into
77 view after several minutes as they foraged in the leaf litter. They were followed at a distance
78 of about 2 m by an adult Hook-billed vanga, which hopped through the undergrowth, perching
79 in shrubs and lianas at a height of about 1 m, constantly observing the mesites foraging beneath.
80 We observed the birds for approximately 10 min, during which time the vanga remained close
81 to the mesites and watched their movements closely (though sometimes distracted by us), and
82 regularly emitted a muted version of its ‘whistle’ call. It also emitted a soft, cat-like ‘meow’
83 call and a number of bill snaps, often in response to the singing of the mesites. However, we
84 did not see the vanga descend to the ground to take prey, or capture any prey in the vegetation.

85

86 The three species of mesite (Mesitornithidae) forage in pairs or small groups in areas
87 of thick leaf litter of the forest floor, slowly and deliberately searching amongst fallen leaves
88 for invertebrates. They may be followed by a range of birds which take invertebrates flushed
89 by their actions. For example, groups of Subdesert mesite *Monias benschi* are frequently
90 followed by Crested drongo (85/174 mesite group encounters, Seddon 2001) and more rarely
91 by Lafresnaye’s vanga *Xenopirostris xenopirostris* and Madagascar hoopoe *Upupa marginata*
92 (1.2% and 0.8% of group encounters, Seddon and Tobias 2013). Species known to follow
93 groups of White-breasted mesite include Crested drongo, Madagascar paradise flycatcher
94 *Terpsiphone mutata*, Madagascar magpie robin *Copsychus albospectularis*, Long-billed tetraka
95 *Bernieria madagascariensis* and Rufous vanga *Schetba rufa* (Langrand 1990, Eguchi 1998,
96 Hawkins 2013). However this behaviour has never been observed in Hook-billed vanga. Since
97 this species consumes vertebrates much more frequently than other vangas (Schulenberg and

98 Hawkins 2013b), we speculate that the bird may have been hunting for *Brookesia* dwarf
99 chameleons (Chamaeleonidae), which forage within leaf litter and were said to be common in
100 that area by our guide.

101

102 Carnivory by Green-capped coua *Coua ruficeps olivaceiceps*

103 On 6 April 2014 at 0931h, at the Arboretum Antsokay (E043° 45' 18", S23° 24' 53",
104 Atsimo Andrefana Region), we observed an adult Green-capped coua predated a Madagascar
105 girdled lizard *Tracheloptychus madagascariensis* (Gerrhosauridae) (Fig. 1). The lizard was
106 captured on the ground in an area of bare sand.

107

108 The nine extant species of *Coua* are omnivorous, feeding on insects and other
109 invertebrates, plant matter (fruits, flower buds, seeds, tree gum), small reptiles (skinks, geckos,
110 chameleons) and the eggs of reptiles and birds (Milon et al. 1973, Goodman et al. 1997, Safford
111 and Hawkins 2013). However this is the first record of vertebrate carnivory in *Coua ruficeps*
112 (Safford and Hawkins 2013). The only remaining coua species not known to consume
113 vertebrates is the running coua *Coua cursor* (Safford and Hawkins 2013); however this may
114 simply reflect a lack of observations.

115

116 [FIG 1]

117

118 Aquatic habitat use by Verreaux's coua *Coua verreauxi*

119 On 18 April 2013 at 1004h, we observed an adult Verreaux's coua in aquatic vegetation
120 on a small tributary of the Onilahy River, south of the spring known as Andoharano (E043°
121 46' 56", S23° 32' 36", Atsimo Andrefana Region) (Fig. 2). The bird appeared to be foraging
122 within a dense, 1.5 m tall bed of the fern *Acrostichum aureum*, but when disturbed by the

123 approach of our vessel flew into the spiny thicket vegetation on the slopes of the limestone
124 plateau on the opposite bank. Verreaux's coua is endemic to the South Malagasy Spiny Forest
125 Endemic Bird Area (Stattersfield et al. 1998), which covers the driest region of the country and
126 contains few wetlands. The habitat adjacent to the wetland, into which the coua flew, was
127 typical of the species - described as "spiny thicket on and around limestone outcrops of
128 Mahafaly Plateau and close to coast, often dominated by plants in the families Didiereaceae and
129 Euphorbiaceae" (Goodman 2013a). However, we are not aware of any previous records of the
130 use of aquatic vegetation by this species.

131

132 [FIG 2]

133

134 Unusual interaction between fledgling Madagascar cuckoo *Cuculus rochii* and its Common
135 jery *Neomixis tenella* host

136 On 30 December 2012 at 1121h, between Talatakely and Vatoharanana in Ranomafana
137 National Park (approx. E047° 25' 30", S21° 16' 34", Haute Matsiatra Region), we observed an
138 interaction involving a fledgling Madagascar cuckoo and its host, a Common jery (Fig. 3). The
139 host perched next to the cuckoo and began feeding it, but within 1 sec the cuckoo had grasped
140 the jery by the leg in its bill. The host immediately began struggling, knocking the cuckoo from
141 its perch; however the cuckoo retained its grip on the jery while dangling suspended from the
142 branch. After 4-5 sec of continued struggle, the cuckoo released its grip on the branch and fell,
143 at which point the jery escaped.

144

145 We are aware of only one comparable incident, in which a Common cuckoo *Cuculus*
146 *canorus* grasped the head of its host, a Dunnock *Prunella modularis*, as it delivered food to its
147 gape, and killed it (Hens 1949). Both incidents likely represent 'overenthusiastic' attempts to

148 grasp food by the cuckoo parasites, rather than predation attempts upon their hosts (N. B.
149 Davies 2017, pers. comm.).

150

151 [FIG 3]

152

153 Unusual aggregation of Alpine swift *Tachymarptis melba*

154 On 28 May 2012 at 1137h, LDJ observed a flock of at least 215 Alpine swift flocking
155 around the emitters of a telecommunications pylon in the village of Belalanda (E043° 38' 42",
156 S23° 17' 48", Atsimo Andrefana Region) (Fig. 4). The birds appeared to be attracted to
157 particular panels which they flew towards feet first, although they did not land. Magnification
158 of the images reveals no clouds of insects around the tower, and there were no nests on the
159 structure.

160

161 There is evidence that electromagnetic radiation can interfere with bird orientation
162 (Engels et al. 2014), however most research has focused on low frequencies (<50kHz) rather
163 than the high frequencies (typically >900kHz) used in telecommunication signals (C. Meier
164 2018, pers. comm.). The Alpine swift is a presumed resident in Madagascar which forms
165 nesting colonies on cliffs and buildings elsewhere in its range: however, its nesting sites in
166 Madagascar remain unknown (Safford 2013a). We are not aware of any information on
167 maximum flock sizes of this species in the southern hemisphere though 200+ individuals

168 appears to be unusually large. In Europe flocks of more than 1000 individuals have been
169 observed (C. Meier 2018, pers. comm.).

170

171 [FIG 4]

172

173 Mobbing of chameleon by Souimanga sunbird *Nectarinia souimanga*

174 At 1120h on 14 April 2015, on the southernmost limestone karst (*tsingy*) outcrop of the
175 Ankarana Massif (E048° 59' 06", S13° 03' 45", Diana Region), we observed two adult and
176 one juvenile Souimanga sunbird mobbing a large panther chameleon *Furcifer pardalis*
177 (Chamaeleonidae; total length < 38 cm, Glaw and Vences 2007)). All three birds were alarm
178 calling from branches to the side of and behind the chameleon, and flew above and around it
179 for several minutes, but did not approach it from the front. Safford (2013c) notes that
180 Souimanga sunbird is aggressive and may relentlessly mob predators, singly or in groups. Our
181 observations show that Souimanga sunbirds recognize large chameleons as potential predators,
182 however we are aware of only one record of a chameleon (*Furcifer oustaleti*) predated birds
183 in Madagascar (Garcia and Vences 2002).

184

185 Snake mobbing by Common newtonia *Newtonia brunneicauda*, Madagascar magpie robin
186 *Copsychus albospecularis*, Madagascar paradise flycatcher *Terpsiphone mutata* and
187 Souimanga sunbird *Nectarinia souimanga*

188 On 20 March 2015 at 1202h at Baie des Sakalavas (E049° 23' 28", S12° 16' 41", Diana
189 Region), LDJ was alerted by the alarm calls of Madagascar magpie robin and Souimanga
190 sunbird to an area of shrubby vegetation within a patch of degraded coastal thicket. On closer
191 approach she found a mixed aggregation including Common newtonia, Madagascar magpie
192 robin, Madagascar paradise flycatcher and Souimanga sunbird, mobbing an adult-sized Tiny

193 night snake *Ithycyphus miniatus* (Lamprophiidae; total length <170 cm, Glaw and Vences
194 2007). The snake was initially moving across the ground before climbing into a bush after
195 several minutes: all four bird species continued to alarm call vociferously from distances
196 between 1 m and 5 m, though none physically approached the snake. The snake continued to
197 hunt for over 30 min during which Madagascar magpie robin and Souimanga sunbird continued
198 to alarm call persistently, with Common newtonia and Madagascar paradise flycatcher also
199 continuing to alarm though more intermittently. During this time the snake caught and
200 consumed a probable House mouse *Mus musculus*, and was closely approached by three human
201 observers, but the birds continued to alarm throughout. Although none of these species are
202 noted as known snake prey items (Safford and Hawkins 2013), our observations suggest that
203 all recognize snakes as potential predators.

204

205 Frugivory in Lafresnaye's vanga *Xenopirostris xenopirostris*

206 On 25 November 2012 at 0631h, LDJ observed a male Lafresnaye's vanga
207 *Xenopirostris xenopirostris* eating the fruit of *Commiphora lamii* (Burseraceae) in degraded
208 coastal spiny thicket south of the village of Anakao (E043° 38' 35", S23° 40' 11", Atsimo
209 Andrefana Region) (Fig. 5). The bird picked the ripe fruit with its bill, but then held it against
210 a branch with its foot in order to remove and eat the fleshy aril before dropping the seed (as
211 described for White-headed vanga *Artamella viridis* eating the red arils of *Commiphora*
212 *guillaumini* fruit, Böhning-Gaese et al. 1995): it was observed feeding on the fruit continuously
213 for about five minutes. Since the seeds were neither destroyed nor swallowed but dropped
214 around the tree, the bird is unlikely to function as either a seed disperser or a seed predator.

215

216 Members of the Vangidae are primarily insectivorous, though the larger species take
217 vertebrates and “a few species consume at least some fruit” (Schulenberg 2013b). Species

218 recorded eating fruit include Madagascar blue vanga, Chabert vanga *Leptopterus chabert*
219 (including red arils of *Commiphora* fruit), Bernier's vanga *Oriola bernieri* and White-headed
220 vanga (Benson et al. 1977, Böhning-Gaese et al. 1995, 1999, Schulenberg 2013a, Schulenberg
221 and Hawkins 2013a): our observation is the first record of frugivory in the genus *Xenopirostris*.
222 The 44 Malagasy species of *Commiphora* are widespread in the country's dry regions (Costel
223 et al 2016; Schatz 2008). The oily, energy-rich arils are consumed by birds including the Lesser
224 vasa parrot *Coracopsis nigra*, Greater vasa parrot *C. vasa*, Common jery and now three species
225 of vanga, as well as a lemur (Verreaux's sifaka *Propithecus verreauxi*), and the ant
226 *Aphaenogaster swammerdami* (Böhning-Gaese et al. 1995, 1999).

227

228 [FIG 5]

229

230 Mobbing of boa by Crested drongo *Dicrurus forficatus*

231 On 29 December 2014 at Anjajavy Lodge (E047° 13' 40", S14° 59' 27", Sofia Region),
232 LDJ observed a Crested drongo mobbing a large (total length <320 cm, Glaw and Vences 2007)
233 Madagascar ground boa *Acrantophis madagascariensis* (Boidae) that was lying motionless
234 against a log. The bird aggressively mobbed the snake in flight, approaching to within
235 approximately 1 m, and emitted a loud, metallic alarm call that we have not previously heard.

236

237 The Crested drongo is a very aggressive bird that frequently mobs raptors and other
238 large birds (Safford 2013b), as well as a captive Ring-tailed lemur *Lemur catta* (van Someren
239 1947). However we are not aware of any records of this species mobbing snakes. The

240 Madagascar ground boa is a predominantly terrestrial ambush predator, and thus unlikely to
241 predate a mid-stratum sally gleaner such as the Crested drongo.

242

243 Entrapment of Madagascar mannikin *Lepidopygia nana* in spider web

244 At 1740h on 17 June 2015, about 15 min after sunset, we witnessed a Madagascar
245 mannikin *Lepidopygia nana* fly into, and become trapped within, the web of a golden orb
246 spider, *Nephila* cf. *inaurata*, in a hotel garden in urban Morondava (E044° 16' 05", S20° 17'
247 59", Menabe Region). The web was suspended between two trees at a height of approx. 3.5 m.
248 The bird struggled frantically to escape and the large, female spider immediately began to
249 approach it, reaching out to touch it with its forelegs. After about 15 sec the bird escaped the
250 web and was able to fly away apparently unharmed.

251

252 Entrapment of birds in spider webs is a relatively rare event, a recent review revealing
253 only 69 reports involving 54 bird species in 24 families: of these, four involved members of
254 the mannikin family, Estrildidae (Brooks 2012). Of those in which the spider was identified,
255 50 % (n=23) were in the genus *Nephila*. Results suggest that birds may survive if they escape

256 the web before being wrapped in silk by the spider (n=8), but otherwise invariably die unless
257 released (Brooks 2012).

258

259 ACKNOWLEDGEMENTS

260 We thank L. Wilmé, N. B. Davies (expert on cuckoo breeding behaviour), C. Meier (expert on
261 migration ecology of Alpine swift) and E. Dunn for discussions and help with the literature,
262 and Rokiman Letsara for identification of the fruit in Figure 5.

263

264 REFERENCES

265

266 Benson, C. W., Colebrook-Robjent, J. F. R. and Williams, A. 1977. Contribution à
267 l'ornithologie de Madagascar. Oiseau et Revue Française d'Ornithologie 47: 41–64, 168–191.

268

269 Böhning-Gaese, K., Gaese, B. H. and Rabemanantsoa, S. B. 1995. Seed dispersal by
270 frugivorous tree visitors in the Malagasy tree species *Commiphora guillaumini*. Ecotropica 1:
271 41–50.

272

273 Böhning-Gaese, K., Gaese, B. H. and Rabemanantsoa, S. B. 1999. Importance of primary and
274 secondary dispersal in the Malagasy tree *Commiphora guillaumini*. Ecology 80: 821–832.

275

276 Brooks, D. M. 2012. Birds caught in spider webs: a synthesis of patterns. The Wilson Journal
277 of Ornithology 124: 345–353.

278

279 Eguchi, K. 1998. The white-breasted mesite: rufous vanga's beater. Working Group on Birds
280 in the Madagascar Region Newsletter 8: 5–6.

281

282 Engels, S., Schneider, N. L., Lefeldt, N., Hein, C. M., Zapka, M., Michalik, A., Elbers, D.,
283 Kittel, A., Hore P. J. and Mouritsen, H. 2014. Anthropogenic electromagnetic noise disrupts
284 magnetic compass orientation in a migratory bird. *Nature* 509: 353–356.

285

286 García, G. and Vences, M. 2002. *Furcifer oustaleti* (Oustalet's Chameleon). *Diet.*
287 *Herpetological Review* 33: 134–135.

288

289 Gardner, C. J. and Jasper, L. D. 2014. A record of vertebrate carnivory by the crested drongo
290 (*Dicrurus forficatus*). *Malagasy Nature* 8: 105–106.

291

292 Gardner, C. J., Jasper, L. D. and Vincke, X. 2011. Sakalava weaver (*Ploceus sakalava*) nesting
293 association with raptors: an alternative hypothesis. *Malagasy Nature* 5: 129–131.

294

295 Glaw, F. and Vences, M. 2007. *A Field Guide to the Amphibians and Reptiles of Madagascar.*
296 *Third Edition.* Vences & Glaw Verlag, Koln.

297

298 Goodman, S. M. 2013a. Verreaux's Coua *Coua verreauxi*. In: *The Birds of Africa. Volume*
299 *VIII: The Malagasy Region.* R. J. Safford and A. F. A. Hawkins (eds.), pp 543–544.
300 Christopher Helm, London.

301

302 Goodman, S. M., Pidgeon, M., Hawkins, A. F. A. and Schulenberg, T.S. 1997. The birds of
303 south-eastern Madagascar. *Fieldiana (Zoology), New Series*, 87: 1–132.

304

305 Gostel, M. R., Philipson, P. B. and Weeks, A. 2016. Phylogenetic reconstruction of the Myrrh
306 genus, *Commiphora* (Burseraceae), reveals multiple radiations in Madagascar and clarifies
307 infrageneric relationships. *Systematic Botany* 41: 67–81.
308

309 Hawkins, A. F. A. 2013. White-breasted mesite, *Mesitornis variegatus*. In: *The Birds of Africa*.
310 Volume VIII: The Malagasy Region. R. J. Safford and A. F. A. Hawkins (eds.), pp 339–341.
311 Christopher Helm, London.
312

313 Hens, P. 1949. Junge kockock (*Cuculus canorus*) doodt een van zijn pleegouders (young
314 cuckoo kills one of its fosterers). *Limosa* 22: 329–330.
315

316 Huguet, P. and Chappuis, C. 2003. Oiseaux de Madagascar, Mayotte, Comoros, Seychelles,
317 Réunion. Maurice. Société d'Etudes Ornithologiques de France, Paris.
318

319 Langrand, O. 1990. *Guide to the Birds of Madagascar*. Yale University Press, New Haven.
320

321 Milon, P., Petter, J. J. and Randrianasolo, G. 1973. Oiseaux. Faune de Madagascar 35.
322 ORSTOM and CNRS, Antananarivo.
323

324 Safford, R. J. 2013a. Alpine Swift, *Tachymarptis melba*. In: *The Birds of Africa*. Volume VIII:
325 The Malagasy Region. R. J. Safford and A. F. A. Hawkins (eds.), pp 599–601. Christopher
326 Helm, London.
327

328 Safford, R. J. 2013b. Crested drongo, *Dicrurus forficatus*. In: The Birds of Africa. Volume
329 VIII: The Malagasy Region. R. J. Safford and A. F. A. Hawkins (eds.), pp 848–850.
330 Christopher Helm, London.
331
332 Safford, R. J. 2013c. Souimanga sunbird, *Nectarinia souimanga*. In: The Birds of Africa.
333 Volume VIII: The Malagasy Region. R. J. Safford and A. F. A. Hawkins (eds.), pp 775–779.
334 Christopher Helm, London.
335
336 Safford, R. J. and Hawkins, A. F. A. 2013. The Birds of Africa. Volume VIII: The Malagasy
337 Region. Christopher Helm, London
338
339 Schatz, G. E. 2001. Generic Tree Flora of Madagascar. Royal Botanic Gardens, Kew and
340 Missouri Botanical Garden, St Louis.
341
342 Schulenberg, T. S. 2013a. Chabert vanga, *Leptopterus chabert*. In: The Birds of Africa.
343 Volume VIII: The Malagasy Region. R. J. Safford and A. F. A. Hawkins (eds.), pp 819–821.
344 Christopher Helm, London.
345
346 Schulenberg, T. S. 2013b. Family Vangidae: Vangas. In: The Birds of Africa. Volume VIII:
347 The Malagasy Region. R. J. Safford and A. F. A. Hawkins (eds.), p 802. Christopher Helm,
348 London.
349
350 Schulenberg, T. S. and Hawkins, A. F. A. 2013a. Bernier’s vanga, *Oriola bernieri*. In: The
351 Birds of Africa. Volume VIII: The Malagasy Region. R. J. Safford and A. F. A. Hawkins
352 (eds.), pp 830–832. Christopher Helm, London.

353

354 Schulenberg, T. S. and Hawkins, A. F. A. 2013b. Hook-billed vanga, *Vanga curvirostris*. In:
355 The Birds of Africa. Volume VIII: The Malagasy Region. R. J. Safford and A. F. A. Hawkins
356 (eds.), pp 823–825. Christopher Helm, London.

357

358 Seddon, N. 2001. Ecology, Communication and Conservation of the Subdesert Mesite,
359 *Monias benschi*. Unpubl. Ph.D. thesis, University of Cambridge, Cambridge.

360

361 Seddon, N. and Tobias, J A. 2013. Subdesert mesite, *Monias benschi*. In: The Birds of Africa.
362 Volume VIII: The Malagasy Region. R. J. Safford and A. F. A. Hawkins (eds.), pp 341–344.
363 Christopher Helm, London.

364

365 Stattersfield, A., Crosby, M., Long, A. and Wege, D. 1998. Global Directory of Endemic
366 Bird Areas. BirdLife International, Cambridge.

367

368 van Sommeren, V. D. 1947. Field notes on some Madagascar birds. *Ibis* 89: 235–267.

369

370

371 FIGURE LEGENDS

372

373 FIG. 1. Green-capped coua *Coua ruficeps olivaceiceps* predating a Madagascar girdled lizard
374 *Trachyloptychus madagascariensis*, Arboretum Antsokay, southwest Madagascar, 6 April
375 2014. Photo: Louise Jasper.



376

377

378 FIG. 2. Verreaux's Coua *Coua verreauxi* using aquatic vegetation (a bed of the fern
379 *Acrostichum aureum*), Onilahy River, 18 April 2013. Photo: Louise Jasper.

380



381

382

383 FIG. 3. Sequence of images showing the temporary capture of a Common jery *Neomixis tenella*
384 host by a fledgling Madagascar cuckoo *Cuculus rochii*, Ranomafana National Park,
385 Madagascar, 30 December 2012. Photos: Louise Jasper



386

387

388 FIG. 4. Flock of Alpine swift *Tachymarptis melba* flying around emitter of telecommunications
389 tower in Belalanda, southwest Madagascar, 28 May 2012. Photo: Louise Jasper.

390



391

392

393 FIG. 5. Male Lafresnaye's vanga *Xenopirostris xenopirostris* eating fruit of *Commiphora lamii*,
394 Anakao, 25 November 2012. Photo: Louise Jasper.



395