

Brazza's Martin *Phedina brazzae*: new information on range and vocalisations

Michael SL Mills* and Callan Cohen

DST/NRF Centre of Excellence at the Percy FitzPatrick Institute, University of Cape Town, Rondebosch 7701, South Africa;
Birding Africa, 21 Newlands Road, Claremont 7708, Cape Town, South Africa

* Corresponding author, e-mail: michael@birdingafrica.com

Brazza's Martin *Phedina brazzae* is classified by BirdLife International as Data Deficient, and so improving data on population size, distribution and threats is a priority for its proper conservation evaluation. We recorded Brazza's Martin, previously known only from the Congo Basin, in the central highlands of Angola and near Salonga National Park in the Democratic Republic of Congo, with range extensions of 750km southwards and 175km northwards, respectively. This results in a four-fold increase in the known range size of this species. Because it appears to utilise open habitats, is suspected to be tolerant of some human-induced alteration of habitat, and because there is no evidence that Brazza's Martin is declining, we recommend that this species be listed as Least Concern. Furthermore we describe, for the first time, the vocalisations of this species, which are more similar to those of Banded Martin *Riparia cincta* than to its presumed sister species, Mascarene Martin *P. borbonica*.

Introduction

Brazza's Martin *Phedina brazzae* (Hirundinidae) is classified as Data Deficient by BirdLife International (2006c), as there is 'inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its range and/or population status' (BirdLife International 2000). Improving information on its distribution, population size and threats is hence a conservation priority.

Until now, Brazza's Martin was considered to be confined to the Congo Basin, occurring from Djambala in the central Republic of Congo, south-east to Kipanga in the south-central Democratic Republic of Congo (DRC) via north-eastern Angola (Chapin 1953, Turner and Rose 1989, Keith *et al.* 1992; Figure 1). In Angola, it was known from five specimens from Dundo (Dean 2000) and one from Camisombo (Traylor 1963) in the northern part of Lunda Norte province. Three specimens are housed in the Museu do Dundo, Dundo, Angola, one in the Smithsonian Institution, one in the collection of the Instituto de Investigação Científica de Angola (currently housed by the Instituto de Ciências da Educação) in Lubango (MSLM pers. obs., Specimen 27793; see www.birdsangola.org/downloads/ostrich06-2fig3a.jpg), and one in the American Museum of Natural History (Traylor 1963). In the DRC, Brazza's Martin is known to occur in a narrow band from Bolobo and Nganchu (type locality) on the Congo River, south-east to Bakwanga and Kimpanga (Chapin 1953).

Little is known about the threats this species faces, although it is 'almost undoubtedly subject to human predation' (BirdLife International 2006c). It is gregarious and breeds solitarily or in small, loose colonies in sand banks along rivers, from July–October (Chapin 1953). All records east of 20°E appear to be from the breeding season and it is thought that this species may be an intra-tropical migrant, although this is unproven (BirdLife International 2006c). Its voice is undescribed (Keith *et al.* 1992, Turner 2004).

Because Brazza's Martin and Mascarene Martin *P. borbonica* are morphologically similar (brown above, white, streaked brown below, almost square tail without white, oval nostrils: Mayr and Bond 1943), these species are typically placed in the same genus (Turner and Rose 1989, Keith *et al.* 1992, Dickinson 2003, Turner 2004). However, Brazza's Martin burrows into river banks to create its nests (Keith *et al.* 1992), whereas Mascarene Martin creates a cup-shaped nest, constructed of sticks, and placed on a building or cliff or in a cave. Due to these differences in nesting habits, Brazza's Martin has also been placed in its own genus — *Phedinopsis* — by Wolters (1971); Brooke (1972) concurred with this. Recently, Sheldon *et al.* (2005) conducted a gene-based investigation of interspecific relationships between hirundines and found that Brazza's Martin, Mascarene Martin, and Banded Martin *Riparia cincta* form a well-supported monophyletic group (thus rendering the genus *Riparia* paraphyletic). However, resolution within this clade was too poor to distinguish sister relationships, partly because of the difficulty of extracting nuclear DNA data from the old specimens of Brazza's Martin. Sheldon *et al.* (2005) also showed that divergence in the cytochrome B (cytb) gene between the two *Phedina* species was very high for congeneric species (14.6%; mean for congeneric swallows is 8% and mean divergence between genera is around 10%), suggesting a long history of divergence in this clade. Non-molecular characters are conflicting: Brazza's Martin is more similar morphologically to Mascarene Martin, but more similar in nesting habits to Banded Martin. Vocal evidence has never been examined.

In this paper, we present new distributional information for Brazza's Martin and discuss the relevance of this to its Extent of Occurrence and conservation status. We also describe its vocalisations for the first time and briefly discuss how vocal evidence may affect its taxonomic status.

Methods

We plotted all localities where Brazza's Martin had been recorded previously (Chapin 1953, Traylor 1963, Keith *et al.* 1992, Dean 2000, BirdLife International 2006c) on a map, using MapSource (Garmin Ltd 1995–2004). We joined these points to estimate its Extent of Occurrence, as defined by the IUCN (BirdLife International 2000), to the nearest 1 000km², and repeated the analysis with new distributional information presented here.

Observations of Brazza's Martin were made by MSLM on two separate days (18 and 31 August 2005) at three separate localities in the Cassongue area of west-central Angola (11°51'S, 15°03'E), well south of its known range. At least five birds were seen in total, including one pair in perched display. The song was recorded using a Sony Minidisc recorder (model: MZ-RH910; PCM recording format) and Sennheiser unidirectional microphone (model: MKE 300). In addition to this, CC observed the Brazza's Martin near the edge of Salonga National Park in the central DRC (02°33'S, 20°12'E) on 4 January 2006, north of the known range.

A total of 5min 26sec of sound recordings was made in Angola. Vocalisations were analysed using Goldwave (Goldwave Inc. 2005) and Raven Lite (Cornell Laboratory of Ornithology 2003) software. The time between song-phrases was measured as the time interval between the ends of consecutive song-phrases, to the nearest 0.1sec. To measure song-phrase duration (also to the nearest 0.1sec) the call was inspected at a quarter of the frequency (11 025 Hz), in order to accurately identify the start and end of each song-phrase. Due to background noise, the exact beginning and end of some song-phrases could not be identified; these were excluded from the analysis.

Songs of the Banded (Gibbon 1991, Chappuis 2000) and Mascarene Martin (Gibbon 1991, Huguët and Chappuis 2003) were inspected aurally for similarity to those of Brazza's Martin. Slower playback rates and sonograms were used to compare structure and composition of songs.

Results and discussion

The Extent of Occurrence of Brazza's Martin estimated from previously-known localities is c. 164 000km² (Figure 1). New distribution data presented here vastly increase the known range and show that this species is not a Congo-basin endemic. Our records represent southerly and northerly range extensions of c. 750km and c. 175km respectively. These result in an increase in estimated range of c. 451 000km² and 143 000km², more than a four-fold increase, to 758 000km². We recognise that the method used for calculating Extent of Occurrence (BirdLife International 2000) — defined as 'the area contained within the shortest continuous imaginary boundary which can be drawn to encompass all the known, inferred, or projected, sites of present occurrence of a taxon, excluding cases of vagrancy' (available at http://www.iucnredlist.org/info/categories_criteria2001#definitions) — may produce an overestimate of range size if distribution is not continuous between localities. However, this is the method employed

consistently across all species, and hence is the most comparable method available.

Brazza's Martin almost certainly breeds in the Angolan highlands, as birds were both found displaying (presumably a pre-breeding display) on the breeding grounds, and were found only in the vicinity of suitable breeding habitats, i.e. rivers with sand banks (see below).

All Angolan birds were observed along wide, grassy drainage lines running through *Brachystegia* woodland. Drainage lines at all three localities had vertical sand banks varying in height from c. 1m to 4–5m. Birds were sought along other drainage lines in the region, but were never observed where sand banks, which constitute the majority of drainage lines were absent.

Brazza's Martin was seen at two adjacent sites near the edge of the southern sector of Salonga National Park in the DRC (see photograph of the birds at www.birdsangola.org/downloads/ostrich06-2fig4.jpg). While the vast majority of the area is covered in a mosaic of lowland tropical moist forest types (Demey and Louette 2001), large open savanna patches (dominated by *Hymenocardia acida*) are also present (for a habitat photograph see www.birdsangola.org/downloads/ostrich06-2fig5.jpg). Both observations were made in these savanna patches close to the edge of the forest. The first observation was of 2–3 individuals present in a mixed foraging flock of hirundines (mainly composed of Barn Swallow *Hirundo rustica*). The second observation was in an adjacent savanna patch, where 20–30 birds were observed in a monospecific flock in the late afternoon, gathering to roost in a few small *H. acida* bushes.

It appears that Brazza's Martin is tolerant of a wide range of habitats, including savanna patches adjacent to forest and grassy drainage lines in *Brachystegia* woodland, and hence is unlikely to be affected by habitat conversion, as long as breeding sites are not lost.

In Angola, one individual was observed singing for c. 10min, perched approximately 100m from a small river. During this time it was perched c. 1m above the ground, on a dry grass stalk, in an area that had been recently burned. The singing bird, presumed to be a male, sat facing a second bird, presumably a female, about 30cm away. Each time the bird sang, it leant its body towards the second bird, stretching its head forward. This caused the tail and wings, in the folded position, to be raised, relative to the body.

During the 5min 26sec of sound recordings made, the bird sang 83 song-phrases. The average interval between each song-phrase was 4.8sec (range = 2.6–7.7sec, n = 73 phrases from one individual) and the duration of each song-phrase was on average 2.4sec (range = 1.7–3.7sec, n = 64 phrases from one individual). Most song-phrases started with a series of single chips, between which the time interval decreased with time (Figure 2, Block 1), and ended with a more complex buzz (Block 2), sometimes followed by a series of clicks (Block 3). The loudness of the call increased through the sequence, and markedly so towards the end, although the clicks were rather soft.

The song structure was distinctly similar to that of Banded Martin, and quite unlike that of Mascarene Martin. Although the comparison is in no way quantitative, the

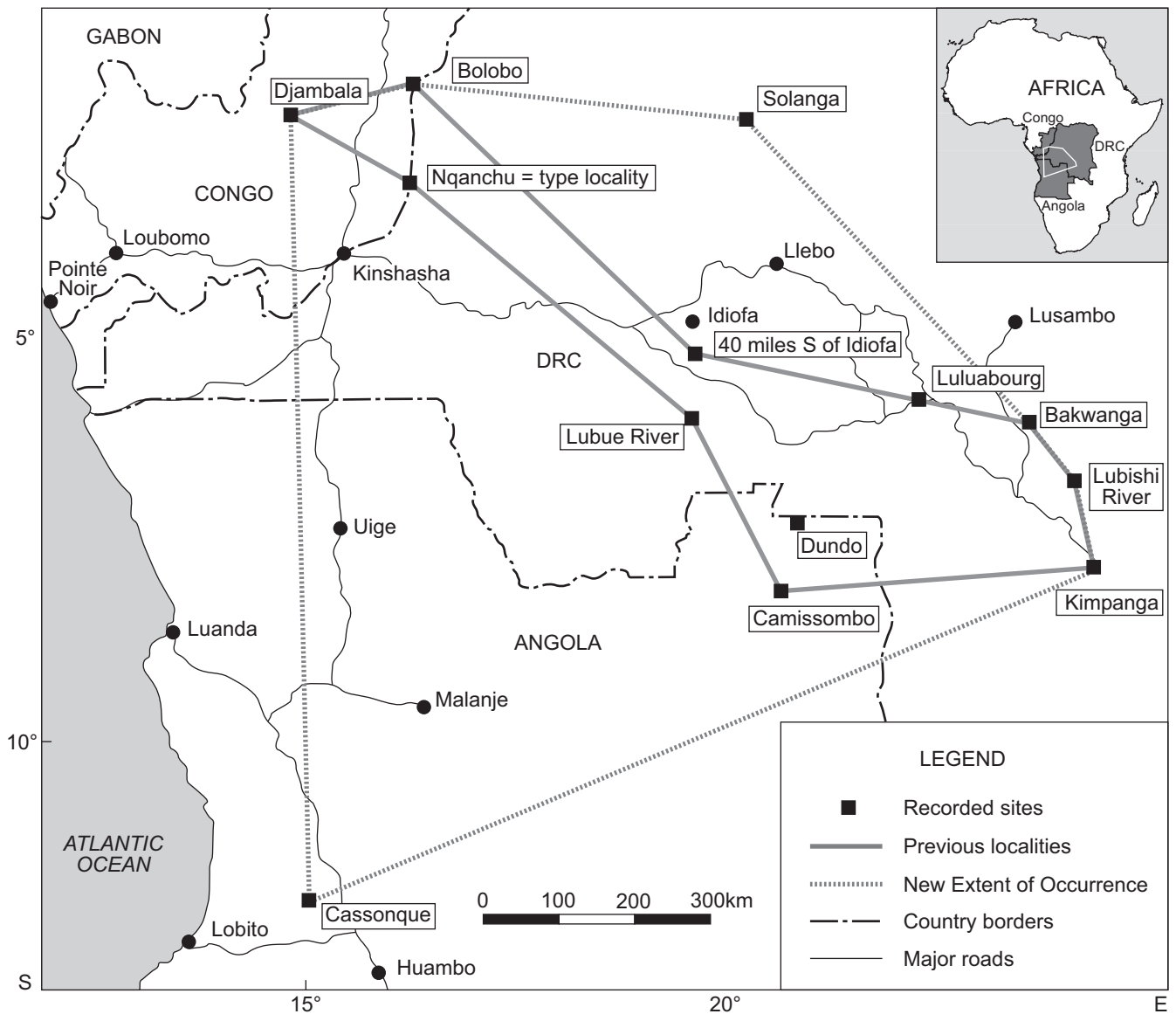


Figure 1: The distribution of Brazza's Martin indicating previous localities and the New Extent of Occurrence. Boxed locality names indicate sites from which Brazza's Martin has been recorded

differences and similarities are marked. Both the Banded and Brazza's Martin songs consist of a series of notes increasing in frequency, regularity, complexity and loudness, repeated at fairly regular intervals. Vocal similarities add a set of characters to support the hypothesis that Brazza's Martin is sister to Banded Martin.

Lack of ornithological work within its range, rather than rarity, is the likely reason for the paucity of information on Brazza's Martin. These data, although based on only a few observations, show that Brazza's Martin is much more widespread than previously thought. Furthermore, it appears not to be dependent on forest habitat and can presumably exist in human-altered landscapes where trees have been removed. The only African hirundines that are threatened are Blue Swallow *Hirundo atrocaerulea* (Vulnerable; BirdLife International 2006a) and White-tailed

Swallow *H. megaensis* (Vulnerable; BirdLife International 2006b), largely because of a combination of destruction and degradation of habitat and small ranges. Swallows are not often preyed upon by humans, and certainly no African swallow is threatened by this type of exploitation. Some colonial, hole-nesting species such as bee-eaters and African River Martin *Pseudochelidon eurystomina* are dug out by humans as food (Chapin 1953) and, although unproven, this may be the case for Brazza's Martin (F Dowsett-Lemaire pers. comm.). Because Brazza's Martin nests in relatively small colonies with dispersed nests, and in more solid substrate than African River Martin or Rosy Bee-eater *Merops malimbicus*, we would expect that it is less rewarding to dig out colonies as a food source. Thus, while Brazza's Martin may not be numerous and may suffer human predation locally, it is relatively widespread and

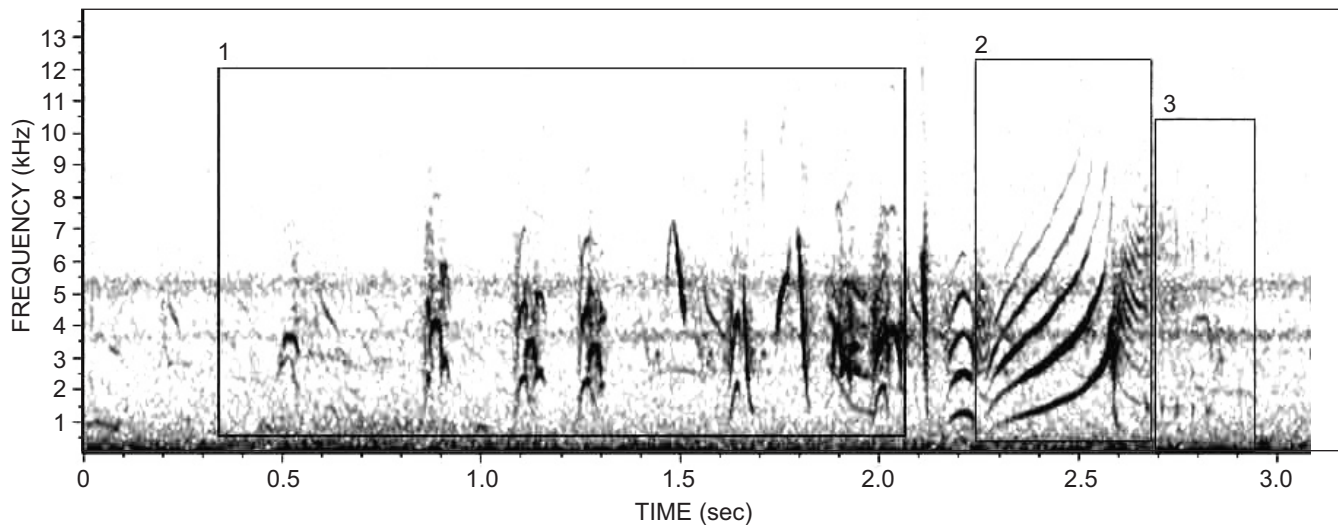


Figure 2: A sonogram of a Brazza's Martin display song. Three sections of call are identified: 1 = a series of single chips, between which the time interval decreases with time, followed by 2; 2 = a more complex buzz, which sometimes ends in 3; 3 = a series of soft clicks, seen as faint vertical lines

there is no reason to believe that its populations are declining. We recommend that it be listed as Least Concern.

Acknowledgements — MSLM would like to thank Conservation International, and Gus, Margie and Sybil Mills for supporting his visit to Angola. CC would like to thank the Max Planck Institute for facilitating his visit to the Salonga site and Cindy Elliot for subsidising his travel costs to the area. Vladimir Russo and the staff responsible for maintaining the bird skin collection at Lubango are thanked, for arranging access to the collection. Thanks are due to Alain Fossé for assisting with obtaining sounds of the Mascarene Martin. Françoise Dowsett-Lemaire confirmed the identity of the dominant tree species at the Salonga site and commented on human predation. Useful comments from Ron Demey and Lincoln Fishpool helped to improve this manuscript.

References

- BirdLife International** 2000. *Threatened Birds of the World*. Lynx Edicions and BirdLife International, Barcelona and Cambridge, UK
- BirdLife International** 2006a. *Species factsheet: *Hirundo atrocaerulea**. Available at <http://www.birdlife.org> [date of access 20 June 2006]
- BirdLife International** 2006b. *Species factsheet: *Hirundo megalensis**. Available at <http://www.birdlife.org> [date of access 20 June 2006]
- BirdLife International** 2006c. *Species factsheet: *Phedina brazzae**. Available at <http://www.birdlife.org> [date of access 20 June 2006]
- Brooke RK** 1972. Generic limits in old-world Apodidae and Hirundinidae. *Bulletin of the British Ornithologists' Club* 92: 53–57
- Chapin JP** 1953. The birds of the Belgian Congo. *Bulletin of the American Museum of Natural History* 75A: 742–743
- Chappuis C** 2000. *African bird sounds: birds of North, West and Central Africa*. Société Études Ornithologiques de France, Paris
- Cornell Laboratory of Ornithology** 2003–2005. *Raven Lite*. Bioacoustics Research Program, Cornell Laboratory of Ornithology
- Dean WRJ** 2000. *The Birds of Angola*. BOU checklist series: 18. British Ornithologists Union
- Demey R and Louette M** 2001. *Democratic Republic of Congo*. In: Fishpool LDC and Evans MI (eds) *Important Bird Areas in Africa and Associated Islands. Priority Sites for Conservation*. Pisces Publications and BirdLife International, Newbury and Cambridge
- Dickinson EC** (ed) 2003. *The Howard and Moore Complete Checklist of the Birds of the World*. Christopher Helm, London
- Garmin Ltd** 1995–2004. *MapSource, Version 6.0*. Garmin. Available at www.garmin.com
- Gibbon G** 1991. *Southern African Bird Sounds*. SA Birding, Durban, South Africa
- Goldwave Inc.** 2005. *Goldwave*. Available at www.goldwave.com
- Horne JFM** 1987. *Vocalisations of the endemic land-birds of the Mascarene Islands*. In: Diamond AW (ed) *Studies of Mascarene Island Birds*. pp 101–150 Cambridge University Press, Cambridge, UK
- Huguet P and Chappuis C** 2003. *Bird sounds of Madagascar, Mayotte, Comores, Seychelles, Réunion and Mauritius*. SEOF. Available at www.mnhn.fr/assoc/seof/accueil.htm
- Keith S, Urban EK and Fry CH** 1992. *The Birds of Africa, Vol. 6*. Academic Press, London
- Mayr E and Bond J** 1943. Notes on the generic classification of swallows, Hirundinidae. *Ibis* 85: 334–341
- Roberts A** 1929. Review of the nomenclature of South African birds. *Annals of the Transvaal Museum* 8: 187–272
- Sheldon FH, Whittingham LA, Moylec RG, Slikas B and Winkler DW** 2005. Phylogeny of swallows (Aves: Hirundinidae) estimated from nuclear and mitochondrial DNA sequences. *Molecular Phylogenetics and Evolution* 35: 254–270
- Traylor MA** 1963. Check-list of Angolan birds. *Publicações Culturais da Companhia de Diamantes de Angola* 61: 1–250
- Turner AK** 2004. *Family Hirundinidae (swallows and martins)*. In: del Hoyo J, Elliott A and Christie DA (eds) *Handbook of the Birds of the World*. Vol. 9. pp 602–685. Lynx Edicions, Barcelona
- Turner A and Rose C** 1989. *Swallows and martins of the World*. Christopher Helm, London
- Wolters HE** 1971. Probleme der Gattungsabrenzung in der Ornithologie. *Bonner Zoologische Beiträge* 22: 210–219