

ACKNOWLEDGEMENTS

We wish to thank Orlando Berek (Forest Guard, Suai district), Sixto Borges, Manuel Cardosa, and Maria Berek for help in the field and logistical support at Foho Lulik. Funding for the surveys was made possible by the BirdLife International Asia Programme, and we would like to thank Richard Grimmett and Cathy Molnar. Permission to conduct fieldwork was facilitated and given by Cypriana Soares and Estanislau da Silva of the Ministry of Agriculture, Forestry and Fisheries (MAFF, Timor-Leste). Adalberto Ferreira of the Geographical Information Systems unit (MAFF), provided access to aerial photos of the Foho Lulik area which helped pinpoint study sites, and Geoffrey Carr, Charles Darwin University (Darwin, Australia), kindly prepared the map. Thanks are also due to the United Kingdom Parrot Society for supporting purchase of a vehicle which was used to access remote field sites and to Ian Cowie of the Northern Territory Herbarium for providing access to a working list of Timor plants. Sonagrams were kindly prepared by Richard Ranft of the British Library Sound Archive.

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A taxonomic reappraisal of the Black-browed Barbet *Megalaima oorti*

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As commonly treated (e.g. Peters 1948, Cheng 1987, Clements 2000, Short and Horne 2001, 2002, Dickinson 2003), Black-browed Barbet *Megalaima oorti* consists of five widely disjunct subspecies: *M. o. nuchalis* on Taiwan, *M. o. sini* in southern mainland China, *M. o. faber* on

Hainan, *M. o. annamensis* through parts of eastern Indochina (Cambodia, Laos, Vietnam), and *M. o. oorti* in Peninsular Malaysia and Sumatra (see Fig. 1; note that Robson [2000] also lists nominate *oorti* for extreme southern Thailand). In terms of plumage morphology,

these five taxa fall into three distinct groups, (1) *nuchalis* as a standalone, (2) *sini* and *faber*, and (3) *annamensis* and *oorti*. Wolters (1975–1982), who confined *Megalaima* to a single species and placed the birds considered here in the genus *Cyanops*, elected to treat these groups as three species, *M. nuchalis*, *M. faber* and *M. oorti*. Lewthwaite (1996) evidently concurred with this judgement, but his information was overlooked by Short and Horne (2002) who, in retaining all taxa in the single species *M. oorti*, noted:

Very well-marked races *sini* and *faber* could prove specifically distinct; *nuchalis* also sometimes thought possibly to be a distinct species, but tends to bridge the gap between these two races and nominate *oorti* and *annamensis*; thus, all are considered better treated as races of present species.

Lewthwaite (1996), however, had made the point that important vocal differences supported the separation of the taxa into three species:

When recent recordings of birds singing in Guangxi, Guangdong, Taiwan and South Annam... were compared with published recordings from Malaysia..., the songs of *sini* and *nuchalis* were found to differ from each other and from those of *annamensis* and *oorti*, which in turn resembled each other.

Moreover, on the basis of a rapid assessment of museum specimens, Collar (2004), who also overlooked Lewthwaite (1996), pointed out that *nuchalis* is certainly not geographically intermediate between the southern Chinese *faber* group and the South-East Asian *oorti* group (Taiwan is a north-easterly outlier of the complex and over 10° further east than the latitudinally similar *sini*: see Fig. 1), and much less morphologically intermediate than at first glance. While *nuchalis* shares a full red breast-patch with the *faber* group, its forecrown coloration is shared with the *oorti* group (in many ways this is the more striking concordance, thereby leap-frogging the geographically intermediate black-crowned Chinese birds); but the latter two groups share a red rear mid-crown while *nuchalis* has a red upper mantle-patch, a feature which further undermines the notion of the latter's intermediacy.

Measurements of taxa in Short and Horne (2001), although helpfully broken down by sex, do not allow full comparisons because certain features are omitted (tail,

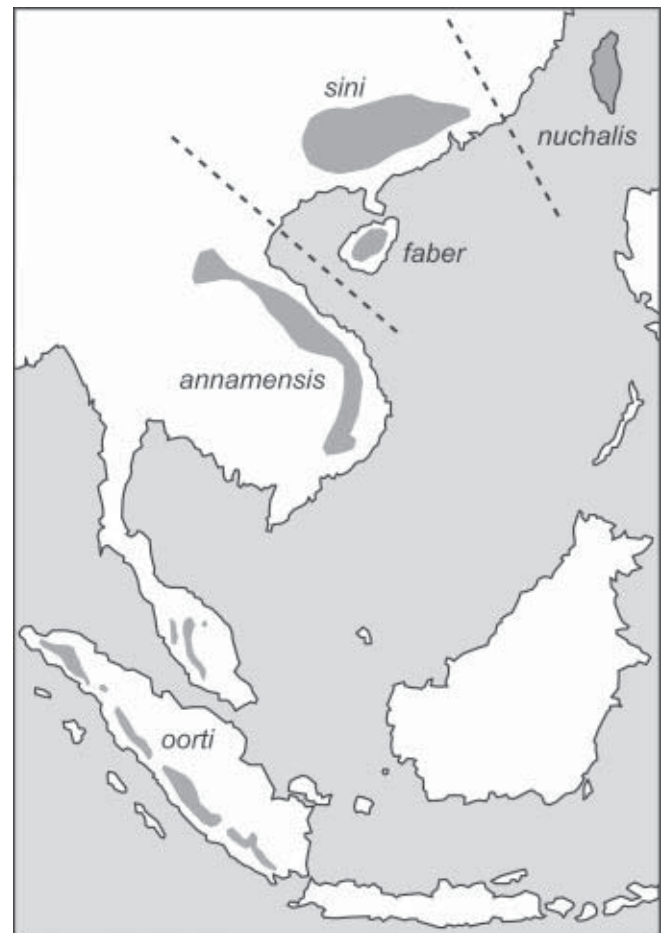


Figure 1. Ranges of the five taxa of Black-browed Barbet *Megalaima oorti*, conflated from maps in Short and Horne (2001, 2002) and adjusted to incorporate new range data for *M. o.* (= *M. faber*) *sini* (see text). Dashed lines indicate new species limits.

bill and tarsus for *annamensis* and *faber*, tail and tarsus for *nuchalis* and *sini*). I therefore measured, using digital calipers, bill, tarsus, wing and tail of all five taxa represented by specimen material in the American Museum of Natural History, New York (AMNH), and Natural History Museum, Tring (BMNH), constructing a matrix of their key plumage patterns (Table 1) and morphometrics

Table 1. Plumage colour matrix for the five taxa in the *Megalaima oorti* complex. The asterisk (*) indicates that the text discusses slight differences on the lower forehead.

Feature	<i>nuchalis</i>	<i>sini</i>	<i>faber</i>	<i>annamensis</i>	<i>oorti</i>
Forehead	narrow black	black*	black*	red	red
Forecrown	pale yellow, shading via whitish to blue	black	broad black	pale yellow	yellow
Hind-crown	pale blue shading to green; blue sides	broad red square; black and blue sides	broad red square; black and blue sides	red central patch; blue sides	red central patch; blue sides
Red loreal spot	large	small	small	adjoins forehead	adjoins forehead
Subocular cheek/moustache	black/black	black/black	black/black	blue/black	blue/black
Ear-coverts and lower malar	pale (turquoise) blue	violet-blue	blue	turquoise	turquoise
Throat and upper malar	pale orange-ochre (mustard yellow)	pale orange-ochre (mustard yellow)	pale orange-ochre (mustard yellow)	pale yellow	pale orange-ochre (mustard yellow)
Upper breast-band	pale (turquoise) blue	violet-blue, blackish-blue centre	violet blue, blackish-blue centre	turquoise	turquoise
Lower breast-band	narrow red crescent	broad red block	broad red block	blue shading to green, red breast-side patch	blue shading to green, red breast-side patch

Table 2. Morphometrics (in mm) of the five taxa and grouped taxa in the *Megalaima oorti* complex. Bill was measured from skull, wing curved. Sample sizes: *oorti* 10 males, 9 females, 1 unsexed; *annamensis* 10 males, 10 females; *faber* 10 males, 8 females, 2 unsexed; *sini* 1 male (bill 26 mm, tarsus 29 mm, wing 111 mm, tail 74 mm); and *nuchalis* 10 males, 10 females. For each pair or group of taxa considered, and for each variable, a one-way ANOVA was done to test for statistically significant differences amongst the taxa and, if found, a Scheffe post-hoc comparison was made to determine where the differences lie; the significance values in Table 3 are for these comparisons.

Taxon/Taxa	Bill		Tarsus		Wing		Tail	
	N	mean \pm SE min-max	N	mean \pm SE min-max	N	mean \pm SE min-max	N	mean \pm SE min-max
<i>M. o. nuchalis</i>	20	24.7 \pm 0.24 22–27	20	26.3 \pm 0.26 23–28	20	98.4 \pm 0.58 91–102	20	73.1 \pm 1.26 63–81
<i>M. o. faber</i>	20	25.5 \pm 0.35 22–27	20	27.0 \pm 0.29 24–29	19	102.6 \pm 0.65 95–106	20	74.1 \pm 0.89 68–81
<i>M. o. annamensis</i>	20	23.5 \pm 0.34 21–26	20	24.6 \pm 0.17 23–26	20	94.3 \pm 0.70 89–99	20	68.9 \pm 0.71 65–76
<i>M. o. oorti</i>	20	22.4 \pm 0.36 20–25	20	23.9 \pm 0.22 22–25	20	90.9 \pm 0.88 85–100	20	73.6 \pm 0.92 67–81
<i>oorti+annamensis</i>	40	22.9 \pm 0.26 20–26	40	24.2 \pm 0.15 22–26	40	92.6 \pm 0.62 85–100	40	71.3 \pm 0.69 65–81
<i>faber+sini</i>	21	25.5 \pm 0.34 22–27	21	27.1 \pm 0.29 24–29	20	103.1 \pm 0.75 95–111	21	74.1 \pm 0.85 68–81
Group 1 (all but <i>nuchalis</i>)	61	23.8 \pm 0.26 20–27	61	25.2 \pm 0.22 22–29	60	96.1 \pm 0.80 85–111	61	72.2 \pm 0.56 65–81
Group 2 (<i>faber+sini+nuchalis</i>)	41	25.1 \pm 0.22 22–27	41	26.7 \pm 0.20 23–29	40	100.7 \pm 0.60 91–111	41	73.6 \pm 0.75 63–81
Group 3 (<i>oorti+annamensis+nuchalis</i>)	60	23.5 \pm 0.22 20–27	60	24.9 \pm 0.18 22–28	60	94.5 \pm 0.58 85–102	60	71.9 \pm 0.62 63–81

Table 3. Statistical significance of different measurements of the taxa in Table 2.

Contrasts between subspecies	Bill	Tarsus	Wing	Tail
<i>annamensis vs faber</i>	0.001	0.001	0.001	0.01
<i>annamensis vs nuchalis</i>	n.s.	0.001	0.01	0.05
<i>annamensis vs oorti</i>	n.s.	n.s.	0.01	0.05
<i>faber vs nuchalis</i>	n.s.	n.s.	0.05	n.s.
<i>faber vs oorti</i>	0.001	0.001	0.001	n.s.
<i>nuchalis vs oorti</i>	0.001	0.001	0.001	n.s.
<i>nuchalis vs Group 1</i>	n.s.	n.s.	n.s.	n.s.
<i>oorti+annamensis vs Group 2</i>	0.001	0.001	0.001	n.s.
<i>faber+sini vs Group 3</i>	n.s.	0.001	0.001	n.s.

(Tables 2 and 3). In order to assess species limits, I deployed a quantitative system—to be published in detail elsewhere (Collar *et al.* in prep., but outlined in Collar 2006)—for grading morphological and vocal differences between allopatric taxa: a major difference scores 3, medium difference 2, minor difference 1, a threshold of 7 is set to allow species status, and no taxon can qualify for this status on minor differences alone, no matter how many. (In this analysis, degree of significance in size difference is not allowed for, and such differences, if counted at all, are considered minor.)

From Tables 1–3 it is clear that *oorti* and *annamensis* separate out (whether considered together or separately) from *faber*, *sini* and *nuchalis* on the basis of their complete red forehead and lores (in the other taxa the lores are black by the eye, red by the bill, the latter making a red spot) (score 2), turquoise (*vs* blue) on upper breast and ear-coverts (2), red spot each side of the upper breast (*vs* red breast-band) (2), and small, blue-boxed red nape-patch (*vs* either large and black-sided or absent) (1), all-yellow crown (2), turquoise (*vs* black) subocular cheek

area (frontal ear-coverts) (1) and significantly smaller size (bill, tarsus and wing) (1). There is the further testimony (Lewthwaite 1996) that their songs, while similar to each other, are different from the three more northerly taxa (a score of 2 here may be unjustly low but at least assumes the difference cannot be minor). A total of 13 indicates that these two taxa are better treated on these multiple, distinctive characters as a single species, although *annamensis* is unique among all taxa under consideration in having a yellowish-green crown and throat (score 2) and in its longer wing and shorter tail it shows a (weakly) significant difference from *oorti* (1), and its bill more extensively grey-horn on the lower mandible than all other taxa (1), all suggesting that there is considerable distance between the two forms in the newly arranged species *M. oorti*.

It is also clear that *nuchalis* separates out from *faber* and *sini* on the basis of its paler, more turquoise-blue upper breast-band and ear-coverts (1), much larger red loreal spot (1), yellowish shading to whitish crown (2), bluish shading to green upper hind-crown (2), diffuse red patch on upper mantle (2), and slightly smaller size (although this is only on average, and only significant for wing length) (no score). In addition, a different song (again, with the disclaimer it may be too low, 2), *vide* Lewthwaite (1996, also P. I. Holt *in litt.* 2006) takes the total to 10 and confers species status on *nuchalis*.

The differences between *faber* and *sini* are small. In his original description, Stresemann (1929) diagnosed *sini* as very similar to *faber* ‘aber Federn des Stirnrandes mit roten Spitzen auf blaugrünem Grunde statt mit blaugrünen Spitze; Ohrdecken und seitlich-rückwärtige Begrenzung des gelben Kehlflecks mehr veilchenfarben, weniger blau’ (‘but the feathers on the edges of the forehead have red tips on a blue-green base, rather than blue-green tips; ear-coverts and lower upperside borders to the yellow throat [=lower malar area] more violet, less blue’). He

gave the wing of the type as 112 mm, which conforms well with the 111 mm of the single specimen in BMNH and suggests that a longer wing may be a further minor point of separation from *faber* (score 1). On the BMNH specimen (1934.6.20.4) the more violet coloration of the ear-coverts and lower malar is just discernible (1), but the red tips to feathers on the lower forehead (area immediately above the bill) are absent (indeed, the dull blue-green feathers on the lower forehead of the five BMNH *faber* are very few and barely noticeable) (0); however, it has a more complete blue lower border to the red hindcrown-patch than appears on any of the five BMNH *faber* (0, since it is not known if this feature is constant in other specimens of *sini*). A score of only 2 therefore separates the two taxa.

Most of the plumage differences used here to establish species limits are evident in the photographs published in Collar (2004). Vocal differences merit further analysis when recordings of all five taxa become available—Lewthwaite (1996) was lacking *faber*—and more detailed analysis of these and other characters may perhaps suggest that *annamensis* has a claim to species rank. Meanwhile I commend the species-level treatment proposed by Wolters (1975–1982). Possible English names for the resulting species might be Taiwan Barbet for *Megalaima nuchalis* and Chinese Barbet (or possibly Black-crowned Barbet) for *M. faber*, with Black-browed Barbet restricted to *M. oorti*, yielding the following arrangement:

- Megalaima nuchalis* TAIWAN BARBET (Gould, 1863)
Taiwan
Megalaima faber CHINESE BARBET
M. f. sini (Stresemann, 1929) S China
M. f. faber (Swinhoe, 1870) Hainan
Megalaima oorti BLACK-BROWED BARBET
M. o. annamensis (Robinson and Kloss, 1919)
Indochina
M. o. oorti (S. Müller, 1835) W Malaysia, Sumatra

Fortunately, all three species are relatively common and widespread. *Megalaima nuchalis* is ‘common... in all types of forest from sea level to 2,800 m’ on Taiwan (Severinghaus and Blackshaw 1976; also Short and Horne 2001). *Megalaima faber sini* was recently speculated to be at risk when it was believed confined to the Yao Shan range in China (Short and Horne 2002), but this overlooked the comment in MacKinnon and Phillipps (2000) of its being a ‘common resident in Guanxi (Yaoshan)’ and, more importantly, the information in Lewthwaite (1996) which extended its range 250 km south-east and 400 km east. Indeed, R. W. Lewthwaite (*in litt.* 2006) notes that *sini* is now known from ‘all parts of Guangxi except the coast, southern Hunan, western, northern and central Guangdong, southern Jiangxi, with a recent record from south-east Guizhou’, although he adds the caveat that it is ‘restricted to areas of mature native forest and is an indicator of forest quality’. *Megalaima f. faber*, although described as rare on Hainan (Cheng 1987, Short and Horne 2001, 2002), proves from recent observations to be common and widespread (Lok *et al.* 2005). *Megalaima oorti annamensis* is ‘fairly common to common’ (Robson 2000), while *M. o. oorti* is ‘common and locally abundant’ in Sumatra (van Marle and Voous

1988; also Short and Horne 2002), and ‘common wherever found’ (typically in forest at 750–1,300 m) in Peninsular Malaysia (Wells 1999). Thus it would appear that all three qualify as Least Concern on the IUCN Red List.

ACKNOWLEDGEMENTS

I am very grateful to the staff at AMNH (Paul Sweet, Shannon Kenney, Peter Capainolo) and BMNH (Robert Prys-Jones, Mark Adams, Katrina Cook) for access to the specimens used in the morphometric analysis, to Ana S. L. Rodrigues and Claire N. Spottiswoode for advice on statistical analysis and preparation of the tables and map, to Yves de Soye, Mike Kilburn, Craig Robson and Paul Holt for various kindnesses, and to two referees—Richard Lewthwaite and Martin Williams—for sensible suggestions and additional data.

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