DISCOVERY

'Spectacled Flowerpecker': a species new to science discovered in Borneo?

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The island of Borneo is a centre of avifaunal biodiversity and endemism (Myers *et al*. 2000), with over 390 resident breeding species and over 40 land-based endemics (Mann 2008). The lowland rainforests are of particular importance, with over half of all species confined to the lowlands (Lambert & Collar 2002), including 30% of the endemic bird species (Mann 2008). Here we present for the first time observations of a probable new species of flowerpecker from the lowlands of north-eastern Borneo.

Our observations were made from the well-known Borneo Rainforest Lodge (BRL; 5°01′43″N 117°45′5″E), which is located at 180 m asl within unlogged rainforest of the Danum Valley Conservation Area (DVCA), Sabah, Malaysia. This area is dominated by lowland dry dipterocarp forest, with temperature (annual mean: 26.7°C) and rainfall (annual mean: 2,669 mm) typical of the moist tropics (Walsh & Newbery 1999). BRL has a 250 m long canopy-walkway, which affords excellent views of the canopy in this exceptionally tall tropical rainforest.

Plate 1. The *Koompassia excelsa* tree in which the flowerpeckers were observed, Borneo Rainforest Lodge, Danum Valley Conservation Area, Sabah. The arrow indicates the fruiting mistletoe on which the birds fed.

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Whilst visiting the canopy-walkway at 16h00 on 18 June 2009, REW located a fruiting mistletoe epiphyte that was parasitising a large (> 60 m in height) *Koompassia excelsa* tree (Plate 1). The mistletoe was ~ 8 m above an observation platform, which was positioned around the trunk of the tree and ~ 35 m above ground level. From this platform, he obtained good views of several flowerpecker species—Yellow-breasted *Prionochilus maculatus*, Yellow-rumped *P. xanthopygius*, Yellow-vented *Dicaeum chrysorrheum* and Orange-bellied *D. trigonostigma*—that were visiting the epiphyte, usually one individual at a time. He then noted another small flowerpecker in an adjacent tree, which subsequently flew in to feed on the mistletoe fruits.

This flowerpecker showed prominent clean-white arcs above and below the eye, creating a broken eye-ring (Plates 2 and 3). A white throat was bordered by a diffuse dusky malar, which was darker than the cheek, and this merged into solid grey sides that were separated by a white stripe from the throat towards the centre of the underparts. The upperparts were medium-slate grey in coloration, with no additional markings, but there were prominent, pure white pectoral tufts emerging from the carpal joint. The eye, bill and legs were all dark.

REW managed to obtain digital photographs of this individual, and discussions with DPE and RAR that evening, followed by a review of the literature (MacKinnon & Phillipps 1993, Smythies & Davison 1999, Cheke & Mann 2008, Myers 2009, Robson 2009), revealed that these features were inconsistent with any known species from Borneo.

The following afternoon at the same site and time, REW again encountered this species, but subtle buff coloration on the underparts suggested that there were at least two birds visiting the mistletoe, although never at the same time (Plate 4 and 5). Note that the bird in Plates 4 and 5 has a shorter tail than the bird in Plates 2 and 3 indicating that at least two individuals were present. REW also heard two very short, hard flight-notes, similar to those

made by Fire-breasted Flowerpecker *D. igniventris*, when one individual alighted and departed.

On 20 June 2009, RAR observed one individual of this species at ~08h00, and further noted a white line bordering the upper (supraloral) and lower edges of the dark lores, with the upper line continuous with the bold upper white eye-arc. This feature had not previously been seen in the field, despite being visible on some images (Plates 3 and 4).

At 15h50 that afternoon, DPE watched a very well-marked individual for ten minutes. He noted that the bill structure was very similar to that of *D. trigonostigma*, being black, small and slightly downward-curving. This individual had prominent broken eye-rings, pectoral tufts, stripe from throat to central belly, and vent, all clear-white in coloration on an otherwise dark grey plumage (as in Plates 2 and 3). He also heard this bird singing, with a series of ~12 high-pitched *see* notes, rising and then falling in pitch. Very disappointingly, the bird sang for less than 20 seconds, and a recording was not obtained.

After the individual had departed into the canopy, a second bird arrived almost immediately from a different direction and spent 20 minutes in the mistletoe. It was less well marked, with slightly paler grey plumage, less prominent broken eye-

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Plate 2. Presumed male, with a prominent broken white eye-ring, uniform dark grey crown and flanks, white stripe from throat to vent, and dark undertail feathers.

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Plate 4. Presumed female, with shorter tail. This bird reveals that the upperparts, wings and tail are uniform dark grey, with a prominent white pectoral tuft. The lower mandible is dark, indicating that this is most likely an adult.

Plate 3. Presumed male, note black lores with white supraloral markings.

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Plate 5. Presumed female, showing the faint yellowish hue of the throat, central belly and vent.

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rings and pectoral tufts, and less well-defined stripe down the breast, which, in addition to the vent, was marked with a hint of yellow. It had a black bill, suggesting that this was also probably an adult bird. We are therefore confident that there were at least two adult individuals of this flowerpecker species visiting the mistletoe, and it seems likely that the more strikingly marked, singing individual was a male, and that the less well-marked bird with a yellowish tinge to the underparts was a female.

On several subsequent visits to this site between 21 June and 17 August 2009, DPE failed to relocate these birds, despite the presence of some, albeit old, fruits on the mistletoe.

Diagnosis

We have examined many literature sources and consulted with several ornithologists with wide experience of Asian birds. DPE has subsequently made comparisons of the photographs (>40, including Plates 2–5) with all specimens of the Dicaeidae (>2,500 individuals) in the Natural History Museum at Tring, UK, the American Museum of Natural History, USA, and the Smithsonian Institution, USA. Based on this research and consultation, we believe that this is a species new to science.

Flowerpeckers are a group of roughly 45 species, placed in their own family: the Dicaeidae (Cheke & Mann 2008). The small size and short, rounded tail of the observed species are typical of flowerpeckers, whilst the structure of the tiny bill, the pectoral tufts, the feeding behaviour and the vocalisations are also consistent with a number of species of flowerpecker. We have considered other families, chiefly the Zosteropidae (white-eyes); especially the somewhat similar Pygmy White-eye *Oculocincta squamifrons*, but this would involve two or more leucistic individuals and pectoral tufts are not known to occur in this family, and the Nectariniidae (sunbirds), whose face patterns in Africa are somewhat reminiscent of this species, but whose bills are typically longer and thinner. Therefore, whilst we cannot absolutely rule out these possibilities, we are persuaded that this species is a flowerpecker.

Juvenile plumages of flowerpeckers are often poorly represented in the literature. However, nothing in our field observations or from further examination of the photographs suggests that the birds were juveniles, with the black lower mandible, the crisp plumage (including pectoral tufts), and the song heard by DPE pointing instead toward maturity. Indeed, juvenile flowerpeckers are typically nondescript, and acquire prominent markings only as birds moult into adult plumage. Furthermore, thanks to much field experience and the searches of museum specimens, DPE is familiar with the juvenile plumage of all 12 species of flowerpecker known in Borneo, none of which matches this bird.

Finally, we have considered all described species of flowerpecker, with particular attention to those known from Borneo. The combination of a broken white eye-ring with white supraloral markings is unique among flowerpeckers. Furthermore, we can find no species that combines extensive plumbeous or slate-grey coloration above and below that lacks *any* bright colours (although there remains a possibility that these birds could be leucistic, but that does not explain the broken eye-ring), with contrasting white pectoral tufts, and with a white throat that continues down the midline, creating a vested appearance. Because of its unique white, broken eye-ring, we propose the common name 'Spectacled Flowerpecker' for this species. Given the lack of a type specimen, we are unable to assign the Spectacled Flowerpecker a scientific name. However, we suggest that, from the delicate bill structure of the bird, it is from the genus *Dicaeum*, although, without in-hand examination, we are unable to assess the length of the tenth primary, which is a near-diagnostic character separating *Dicaeum* from *Prionochilus*; it is short in *Dicaeum* (Cheke & Mann 2001).

We publish this account here in the belief that the best way to obtain other records of this species from the field and eventually a specimen, either as a mislabelled individual in a collection or one taken on a future research project, is by enlisting the help of ornithologists and birdwatchers living in and visiting Borneo. While this species presumably occurs in low densities, its presence in the extensive DVCA suggests a population of sufficient size that scientific collecting will not put it at further risk of extinction. If someone is in a position to obtain material, we add the (perhaps gratuitous) advice to preserve the tongue, which has considerable variation in structure within *Dicaeum* (Cheke & Mann 2001). We invite anyone who does locate a specimen to contact us so that we might describe this species together. In turn, formal description will aid the ultimate goal: conservation of this species and large tracts of its habitat, which is under threat from clearance for oil palm agriculture (Koh & Wilcove 2008). Please send all records and other information to DPE.

Spectacled Flowerpecker: a canopy specialist?

All observations of Spectacled Flowerpecker were made at ≥ 35 m from ground level in the subcanopy and canopy of large emergent trees. DPE has been conducting ornithological studies in the unlogged forests of the DVCA and the surrounding selectively logged forests of the Ulu Segama-Malua Forest Reserve (USMFR) each year from 2006 to 2009

between the months of April and October. He has intensively investigated the understorey avifauna using standardised sampling techniques: mist-netting (> 20,000 twelve-metre mist-net hours: Edwards *et al*. 2009) and point count censuses (> 200 hours: unpublished data). With this level of effort, combined with > 1,000 hours of opportunistic observations, we feel it surprising that DPE has failed to locate this species if it frequented the understorey or lower canopy. Whilst it is always difficult to infer the absence of a species, it seems likely that Spectacled Flowerpecker is a canopy specialist, enabling it to have evaded detection till now. Since no known species of flowerpecker is confined to the canopy, although they often occur there, such specialism towards a canopy life-style would represent a unique behaviour for Spectacled Flowerpecker (C. F. Mann, pers. comm.).

Nevertheless, it is still highly surprising that such a striking bird could go unnoticed in such a well-watched location as BRL. We believe that this can be primarily explained by a comparative lack of unit effort by ornithologists in studying the avifauna of rainforest canopies compared to that of rainforest understoreys. Given that the only food plant of Spectacled Flowerpecker discovered to date is mistletoe, which resides high in the canopy, any reliance on such ephemeral epiphytic fruits is likely to make this species, and others like it, highly mobile. In the 300,000 ha DVCA-USMFR there is only one fixed canopy-tower and one 250 m-long fixed canopy-walkway (Plate 1). All other canopy-based research in the area must rely on rope access techniques.

Finally we suggest that in order to gain a better appreciation/understanding of the diversity of canopy-dwelling vertebrates, the number and spatial separation of census points within the canopy must be dramatically increased, as must the amount of time spent on observations at each location. Given the massive recent increase in estimates of the species richness and invertebrate biomass within the canopy (Lawton *et al*. 1998, Elwood & Foster 2004), it seems plausible that such a broad-scale canopy access programme would yield more avian discoveries in the future.

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