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SHORT COMMUNICATION

Gape patches in Oriental Cuckoo *Cuculus saturatus* nestlings

ORNITHOLOGICAL SCIENCE

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In areas where more than one brood parasitic *Cuculus* species occurs, identification of their eggs and nestlings is a problem for ornithologists (Payne 1997). The situation is complex in Japan where four *Cuculus* species, the Common Cuckoo *C. canorus*, the Oriental Cuckoo *C. saturatus*, the Little Cuckoo *C. poliocephalus*, and the Horsfield's Hawk Cuckoo *C. fugax* breed largely sympatrically. Although they differ in major host species and usually lay eggs more or less mimetic to their hosts', different cuckoos have occasionally been found to use the same host species, and host usage may change with time (Brooke & Davies 1987; Nakamura 1990; Higuchi 1998).

The Oriental Cuckoo is an example of such a complex situation. In most parts of Japan, Oriental Cuckoos normally lay buff-coloured eggs into *Phylloscopus* Warblers' nests, while Little Cuckoos parasitize the Bush Warbler *Cettia diphone* and lay mimetic reddish eggs. In central Hokkaido (northernmost main island of Japan), however, where the Little Cuckoo is absent, Oriental Cuckoos have been reported to parasitize Bush Warblers and lay reddish eggs (Higuchi & Sato 1984). In this case, "mystery" nestlings were taken from Bush Warbler nests in Hokkaido and reared by hand to a size at which they could be identified.

We were able to observe an Oriental Cuckoo nestling and found that it had prominent black gape patches. In this paper we describe the gape patches and discuss their reliability for species identification of *Cuculus* nestlings in Japan.

MATERIALS

On 19 May 2000, we found a nest of the Eastern Crowned Leaf Warbler *Phylloscopus coronatus* in a deciduous forest on Mt. Tsukuba (877 m, 36°13′N, 140°06′E), central Japan, containing five small white eggs and one larger buff egg. Although the buff-coloured egg had many brown spots overall, these were concentrated, forming a broad band between the obtuse end and the broadest part of the egg (Fig. 1), characters common in Oriental Cuckoo eggs from central Japan (Kiyosu 1978). The egg size (21.3×14.0 mm) was also within the range of the Oriental Cuckoo (19.1–21.5×13.7–15.2 mm, Kiyosu 1978).

At 1600 on 26 May, we found that a nestling occupied the nest, and three white eggs and a small dead nestling were found outside of the nest. The nestling in the nest could not have been more than 3 days and 7 hours old at this time, as it had not yet hatched when we checked the eggs in the nest at 0900 on 23 May. On 8 June, after we measured and ringed the nestling, it left the nest and moved into a bush several meters away from the nest. The nestling was not observed after that.

All four Japanese *Cuculus* species occur on Mt. Tsukuba. While Oriental and Little Cuckoos are common summer visitors, Common and Horsfield's Hawk Cuckoos are rare and were not observed in 2000. The nestling's plumages on head, back, scapulars and breast were slaty-black, these feathers faintly fringed with white, and much darker than in the Common Cuckoo (Higuchi & Sato 1984). The belly and flanks were dark blackish brown with obscure white bands, not white with blackish bands as in Little Cuckoo nestlings (Higuchi & Payne 1986) nor white with fine streaks as in Horsfield's Hawk Cuckoo nestlings (e.g. Nakamura & Nakamura 1995, p 110; Kiyosu 1978, p 40; Yoshino 1999, pp 61–63). The nestling's tarsus length reached 21.2 mm and exceeded the range found in adult Little Cuckoos (16–19 mm, Kiyosu 1978). We therefore concluded that

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the nestling was an Oriental Cuckoo, which is consistent with what was indicated by the host species and the egg morphology.

RESULTS

The nestling had remarkable blackish gape patches when it was first observed (Fig. 2a) and it kept them until leaving the nest (Fig. 2b, 2c). Two triangular patches on the palate adjoin the cutting edges of the upper mandible (Fig. 2b). Another pair of patches on the inside of the lower mandible was smaller and more rounded (Fig. 2c).

We also found similar gape patches in a photograph of a fledgling from a northern population of the Oriental Cuckoo (Fig. 3). The bird was taken from a Bush Warbler nest in central Hokkaido, and reared by hand (Higuchi & Sato 1984, for detail). Thus, the gape patches were present in two birds from different Japanese "gentes", one parasitizing *Phylloscopus* Warblers with buff-coloured eggs and the other one parasitizing Bush Warblers with reddish eggs.

There are few published photographs of Oriental Cuckoo nestlings or fledglings in Japan. A naked nestling that occupied the nest of the Bull-headed Shrike *Lanius bucephalus* (Nakamura & Nakamura 1995, p 110, no information for location), unfortunately closed its bill and did not show its gape. A photograph of a fledgling being fed by an Eastern Crowned Leaf Warbler at the foot of Mt. Fuji, central Japan (Kiyosu 1966, p 122), was taken from the side and so that the gape is not visible. For areas outside Japan, a photograph of a nestling being fed by *Phylloscopus tenellipes* in the Russian Far East (Payne 1997, p 536) showed apparent gape patches as in the Japanese birds. A nestling being fed by an Eastern Crowned Leaf Warbler in Ussuriland (Knystautas 1993, plate 43; Campbell & Lack 1985, p 68, apparently the same nestling) is of a bird with its head turned away and hardly showing the gape. In a photograph taken in Malaysia (Becking 1975), a fledgling *C. saturatus lepidus* fed by a Chestnut-crowned Warbler *Seicercus castaniceps* seems to have gape patches, but it is too dark to allow further comments.

We could find only few descriptions of the Oriental Cuckoo's gape. Payne (1997, p 555) noted that "Nestling naked at hatching, orange gape, black gape flanges" in Horsfield's Cuckoo (*Cuculus horsfieldi*, which he recognized as a species distinct from other races of Oriental Cuckoo based on differences in song and morphological traits). Payne (1997) may refer to the black gape patches we have described here, although the gape flanges were mostly orange in the birds that we examined.

DISCUSSION

The Oriental Cuckoo has four subspecies, *C. s. horsfieldi*, *C. s. saturatus*, *C. s. lepidus* and *C. s. insulindae* (Becking 1975; Wells & Becking 1975; Cramp 1985) and all three birds recorded as showing gape patches belonged to *C. s. horsfieldi*, which is the northernmost breeder of the four and is wholly migratory. Our results, therefore, suggest that Oriental Cuckoo nestlings and fledglings, at least within the subspecies *C. s. horsfieldi*, have black gape patches, independent of egg types and region. Presence of gape patches, thus, should be a key character to identify young Oriental Cuckoos because they seem to be unique to this species. The Common cuckoo has not been described as having gape patches, despite the species having been the subject of extensive studies in Europe and Japan, including of the gape area and colour of nestlings (e.g., Kilner et al. 1999; Noble et al. 1999). Two Little Cuckoo nestlings that we found on Mt. Tsukuba in 2000 both lacked gape patches (Fig. 4), as did those in various published photographs (e.g., Nakamura & Nakamura 1995, p 109; Yoshino 1999, p 56). Horsfield's Hawk Cuckoo nestlings, unlike other Japanese *Cuculus* species, have yellow gapes without black patches (Kiyosu 1978, p 40; Yoshino 1999, p 61). Therefore, if one finds a naked *Cuculus* nestling with gape patches in Japan, it is most likely to be an Oriental Cuckoo. This is a very useful identification feature because nest predation is often so frequent that the nestlings disappear before other morphological characteristics become visible. Taking and rearing nestlings by hand, as well as blood sampling requires governmental permission. In most cases when *Cuculus* eggs or nestlings are found unintentionally, it would be impossible to obtain the necessary permission before they fledge.

It should be noted that even a nestling without gape patches might be an Oriental Cuckoo. The gape patches appeared within about three days from hatching, but we do not know exactly when. Therefore, very small Oriental Cuckoo nestlings, possibly during the first or second day, may not have gape patches. Gape patches in such small nestlings, as well as those in other subspecies of this species, need further investigation.

Fig. 1. An egg of Oriental Cuckoo (the largest one) and five eggs of its host, an Eastern Crowned Leaf Warbler. 19 May 2000 on Mt. Tsukuba, Central Japan.

Fig. 2c. The same Oriental Cuckoo nestling as in Fig. 2b, showing a pair of patches on the inside of the lower mandible. 8 June 2000.

Fig. 2a. An Oriental Cuckoo nestling hatched from the egg in Fig. 1. It was two or three days old and had prominent gape patches at this age. 26 May 2000.

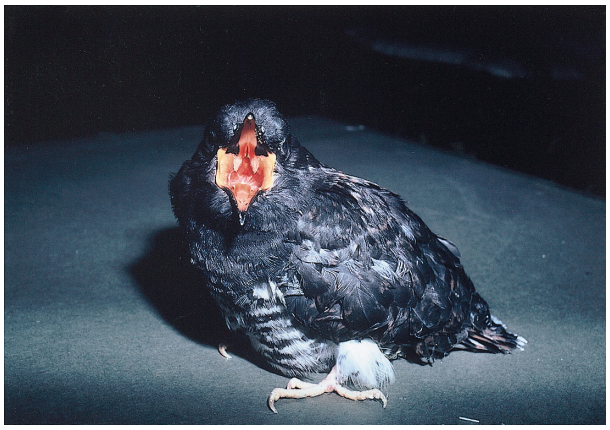

Fig. 3. A 30-days-old Oriental Cuckoo fledgling taken from a Bush Warbler nest in central Hokkaido and reared by hand.

Fig. 2b. The Oriental Cuckoo nestling hatched from the egg in Fig. 1 at 15 or 16 days of age, showing a pair of patches on palate. 8 June 2000.

Fig. 4. A Little Cuckoo nestling at about 14 days of age, showing it's gape. It had parasitized a Bush Warbler nest on Mt. Tsukuba. 1 August 2000.

It is not clear whether the gape patches in young Oriental Cuckoos have any adaptive functions. It seems unlikely that the patches mimic corresponding patches in their host species because, as far as we know, none of the host species of the Oriental Cuckoo has such gape patches (e.g., Harrison 1975). Viduine birds which are parasitic on estrildine finches mimic mouth parts of their host's nestlings, as each estrildine host will feed only young with the distinctive mouth parts of its own species (Lack 1968; Nicolai 1974). Host parents of *Cuculus* cuckoos, unlike estrildine finches that rear parasite nestlings alongside their own, generally have difficulties discriminating young cuckoos from their own offspring because the newly hatched cuckoos usually eject all host eggs and nestlings to occupy the nest alone (Payne 1997). Davies and Brooke (1989) found no evidence of chick discrimination in experiments with four major host species of the Common Cuckoo.

Gaping in cuckoos may affect the behaviour of host parents and of predators. Kilner et al. (1999) described how the gape area of Common Cuckoo nestlings shown to host parents, in combination with begging call rate, determined host provisioning rates. Therefore, the gape patches in Oriental cuckoo nestlings may serve to influence parental behaviour, although gape colour had no effect on provisioning rates in three major host species of Common Cuckoos in Britain (Noble et al. 1999). Noble et al. (1999) suggested that the vivid gape colours of Common Cuckoo nestlings might have an aposematic function, as older cuckoo nestlings have a threat display that involves gaping at intruders. The Oriental Cuckoo nestling also threatened observers by gaping and the distinct pattern of the gape patches might provide additional benefits when threatening and attempting to deter certain predators.

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