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# OBSERVATIONS ON BREEDING AND MOULTING OF THE GREY-EYED BULBUL, *IOLE PROPINQUA*, IN THAILAND

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***ABSTRACT.* –** I describe for the first time observations on the nest, breeding and moult of the Grey-eyed Bulbul, *Iola propinqua*, a common species in evergreen forests of central Thailand. In 2007, two active nests were found and monitored at Khao Yai National Park. Only females built the nest and incubated eggs while the male assisted the female to provision nestlings and defend the nest. The overall nesting season lasted from mid-January to at least early May. Adults underwent a typical complete post-breeding moult with primary moult taking ca. 126 days from the end of May until early October. Juveniles underwent a complete moult of similar duration shortly after leaving the nest following which they were indistinguishable in the field from adults. There was little or no overlap in the breeding and moulting cycles.

***KEYWORDS*. –** Breeding, grey-eyed bulbul, *Iole propinqua*, moult, nest.

## INTRODUCTION

The life history of many tropical birds is poorly known and this is particularly true within South-east Asia (Sodhi, 2006). With the continuing declines in forest cover and forest quality (FAO, 2007) it is essential that the basic ecology of species is understood for long-term management of bird communities. To provide more details of the ecology of forest birds in Thailand a long-term study has been conducted in and around the 30 ha. (0.3 km$^2$) Mo-singto permanent forest plot, Khao Yai National Park (KYNP), Nakhon Nayok Province, (14°26'N 101°22'E) since 2002. The plot is situated in mature seasonally-wet evergreen forest at 723–817 m elevation (Brockelman, 1998). The average annual rainfall is 2,326 mm, most of which falls between May and October (Kitamura et al. 2002).

The Grey-eyed Bulbul, *Iole propinqua*, (hereafter GBU) ranges from South-west China through Myanmar, much of Indochina and Thailand. At KYNP, it is a common resident found mainly in the mid- to upper story of forest and forest edge. Elsewhere in its range, it may also inhabit secondary growth, up to an elevation of 1,525 m (Robson, 2000). They are highly frugivorous and were the most frequently observed species at fruiting trees during a frugivory study on the Mo-singto plot (Sankamethawee, in prep.). Intensive surveys of the study area using distance sampling during 2002–2006 found GBU to be one of the most abundant species, with densities of approximately one individual per hectare (Gale et al., in litt.). Despite its abundance, and implementation of intensive nest searches for all bird species during the same period, no nests were seen until two active nests were found in 2007. Here I describe these nests and their contents and present details of the moult cycle of GBU none of which have been previously documented.

## METHODS

Nests of all species in and around the study area were actively searched for and monitored following the guidelines of Martin & Guepel (1993) with precautions to reduce the possibility of leading predators to the nest as recommended by Robinson et al. (2000). The GBU were caught using adapted mist nets; short 2–4 m four shelf nets or 6 m two shelf nets were positioned along streams during the afternoon when birds came to drink and bathe, often in amongst dense tangles of overhanging vegetation and woody climbers. The GBU were occasionally susceptible to wing strain and apparent haemorrhaging so handling time was minimized and the birds released immediately upon showing signs of stress. Birds were fitted with one numbered aluminium ring and two plastic colour rings in unique combinations to allow individual recognition in the field. A copy of all banding and biometric data collected was deposited at the Wildlife Research Division, Department of National Parks, Wildlife, and Plant Conservation, Bangkok.

I adopted the frequently used method of measuring primary moult visually (Humphrey & Parkes, 1959). Each feather

was assigned a score of 0 (old feathers) through to 5 (fully grown new feathers). Thus, a bulbul with 10 primaries yet to start moulting has a moult score of 0 while one that has finished has a score of 50 (only right wing measurements were used but both wings were checked to make sure the moult was normal rather than accidental). As most passerines have a moult score that increases linearly with time (Ginn & Melville, 1983) this method gives a good indication of the progress of moult although it tends to slightly over estimate the total duration (Oschadleus & Underhill, 2006). In this analysis, birds with a moult score of 0 or 50 were only included if they had started body moult or were still growing their innermost secondary, indicating that primary moult was about to begin or had recently finished (Fogden, 1972). The same scoring system was used for the 6 secondaries, three tertials and all twelve rectrices giving total scores of 30, 15 and 60 respectively.

## RESULTS

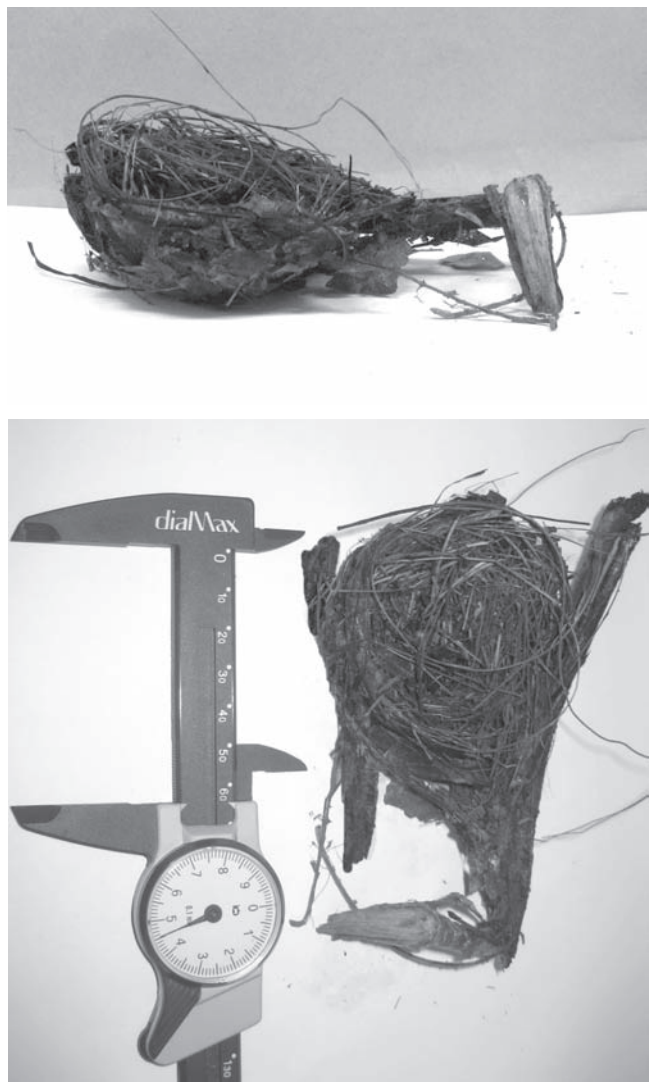
Two GBU nests found during 2007 were the first to be described for this species. Both were in *Dipterocarpus gracilis* Blume (Dipterocarpaceae) trees. The first nest was found nearly complete on 15 Mar. when an adult was seen to make three visits within twenty minutes in order to add nest lining. On 19 Mar. the adult was seen incubating and continued to do so until at least 31 Mar. but by 2 Apr. the nest had been destroyed, probably depredated. The nest was ca. 10 m above the ground, built at the fork of a thin branch about 0.5 m from the trunk of the tree. It was shielded from above by leaves of a woody climber which encompassed the main tree. The nest tree was situated at the edge of a gap in the forest, about 20 m in diameter, caused by a tree fall.

The second nest was found in a 9.5 m tree on 25 Apr. by following an adult bird back to its nest. The nest tree was at the edge of a small gap less than 10 m across. Examination of the nest contents on 27 Apr., using a combination of ladder, pole and mirror, showed it to contain three eggs. The female was sitting on the nest on 29 Apr., 3 and 5 May. On 8 May both adults were seen bringing small invertebrate prey items to the nest and the heads of at least two nestlings were visible. During these feeding observations an adult Moustached Barbet *Megalaima incognita* landed on the nest tree and both bulbuls, alarm-calling, rapidly flew at it causing it to fly off. Although the female was seen brooding on 10 May, during one hour of observation on 12 May no adults were seen in the area and the nest was considered to have failed. On 17 May, the nest was collected. It contained one decomposed nestling which had been fed on by Diptera larvae which had pupated within the nest structure. Some primary feathers of the nestling had just emerged from their sheaths suggesting it was 7–8 days old when it died.

The collected nest was a neat cup attached with spiders' web between two thin (7 mm diameter), almost parallel, branches that came out from the main stem such that the rim of the nest was level with these branches. It was 6 cm from the stem and ca. 50 cm from the top of the tree below a thick layer of large apical leaves. The nest measured 65 × 63 mm across with a total depth of 43 mm (the internal cup was too disturbed to measure accurately). The outside of the nest was constructed of leaves held together with spiders' web and horse hair-like fungal hyphae. A distinct nest lining was composed of fine aerial rootlets of woody climbers (Figs. 1, 2).

The eggs, viewed with binoculars from the ground with the aid of a mirror, were off-white (pale fawn or creamish) with small sparsely scattered dark flecks that were more concentrated around the widest part of the egg forming a slight ring effect.

Although these were the only nests found during this study several other observations of breeding activity were recorded. Birds carrying nesting material were recorded in all months from mid-January to late April. All records of GBU carrying nest material were of birds flying upwards and disappearing into the sub-canopy or above suggesting that the two nests found were at the lower end of their height range, which is probably why no other nests were found despite the finding of over 300 nests of Puff-throated Bulbul, *Alophoixus pallidus*,




Figs. 1, 2. The nest of Grey-eyed Bulbul *Iola propinqua*.

during the study period. A few recently fledged birds (short tails, limited flight capabilities and begging behaviour) were observed, with the latest being 8 May 2006. This would indicate that the complete breeding season was from mid-January to early May making it one of the earlier nesting species in the study area (Pierce et al., in prep).

No direct evidence was obtained for the incubation and nestling period. However, similar-sized birds with open cup nests on the Mo-singto plot, including Black-crested Bulbul, *Pycnonotus melanicterus*, and Puff-throated Bulbul, have a total nest period from first egg to fledging of 25–28 days. (Pierce et al., 2004, Pierce et al., in prep.).

The bird building the second nest was known to be a female as it had an obvious brood patch when first caught and ringed in March 2005. Males caught during the breeding season had distinct cloacal protuberances but no brood patch. This indicates that only females incubate which is consistent with other bulbuls including Puff-throated Bulbul in which only the female builds the nest and incubates eggs (Pierce at al., 2007). Further proof of this came from the first GBU nest where the nest-builder was accompanied by a second bird that neither carried nest material nor perched at the nest and was likely therefore to be a mate guarding male.

***Moult.*** **–** Adults had a complete moult at the end of the breeding season. Regression of moult score against date for 44 adult birds measured in 2004 showed an average moult period of 126 days (18 weeks) from late May until early October (Fig. 3). The progression of moult was typical of

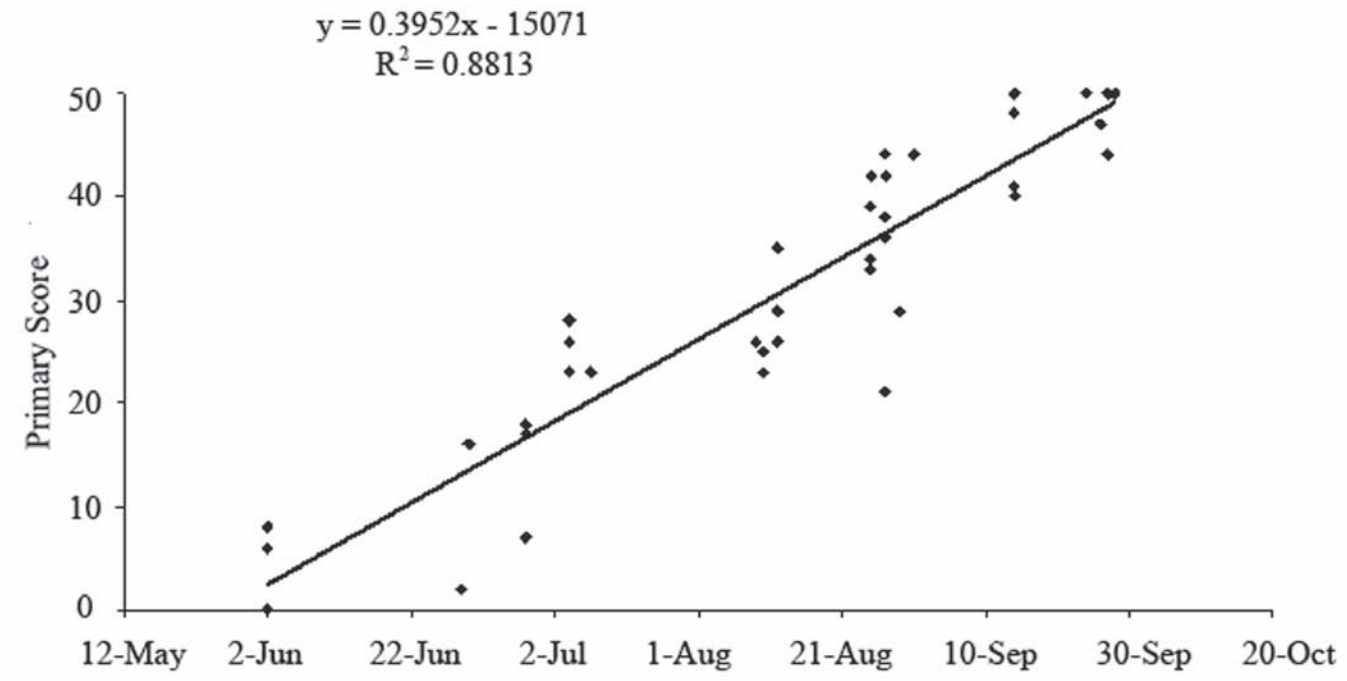



Fig. 3. Primary moult scores by date for adult Grey-eyed Bulbuls at Khao Yai National Park, Thailand in 2004.

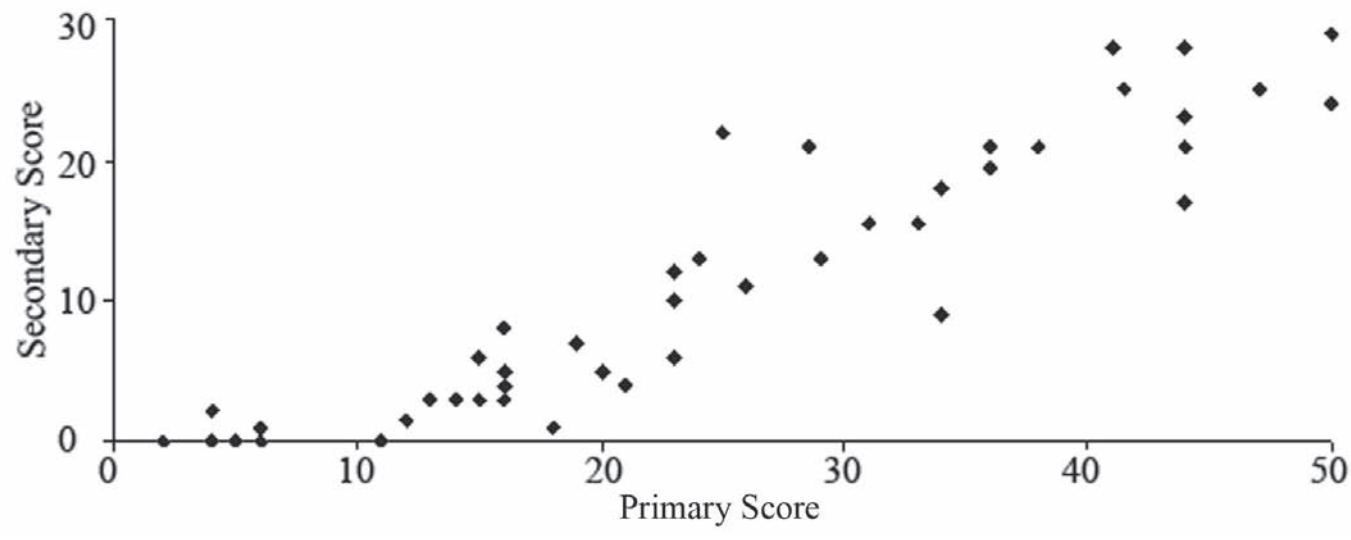



Fig. 4. Primary moult score of Grey-eyed Bulbul plotted against secondary moult score.

most passerines (Ginn & Melville, 1983) with a few head and body feathers being replaced shortly before the onset of regular-descendant primary (P) moult starting with the innermost primary (P1). Between 1–3 primaries were in active moult at any time simultaneously (n = 46, median = 2) and there was no discernable variation the numbers of primaries in moult throughout the whole period of replacement.

Secondary moult started after primary moult had progressed to a score of > 10 beginning with the outermost secondary and continued ascendantly (Fig. 4). The innermost secondary was the last remex to finish growing, shortly after the outer most primary became full grown. Moult of the tertials started with the centremost shortly after the first primary was dropped followed by the outer and finally the inner tertial. All three tertials were fully grown by the time P8 was dropped (Fig. 5).

Rectrices were moulted from the centre outwards. They were replaced more quickly than the primaries (Fig. 6) starting when the primary score was > 10 and finishing by a score ca. 40 with 2–6 feathers on each side moulting simultaneously.

Juvenile GBU also had a complete moult. Ten juveniles in active moult were examined in 2004 and although this was too small a sample to show precise moult periods the data suggested that it was of a similar timing, duration and pattern to that of adults. Undergoing a complete post-juvenile moult is consistent with many tropical passerines (Wells, 2007; Round, 2008), but unlike most temperate passerines which have distinct post-juvenile plumages following a partial moult (Svensson, 1992). Juveniles could be aged by their richer brown colouration but became indistinguishable from

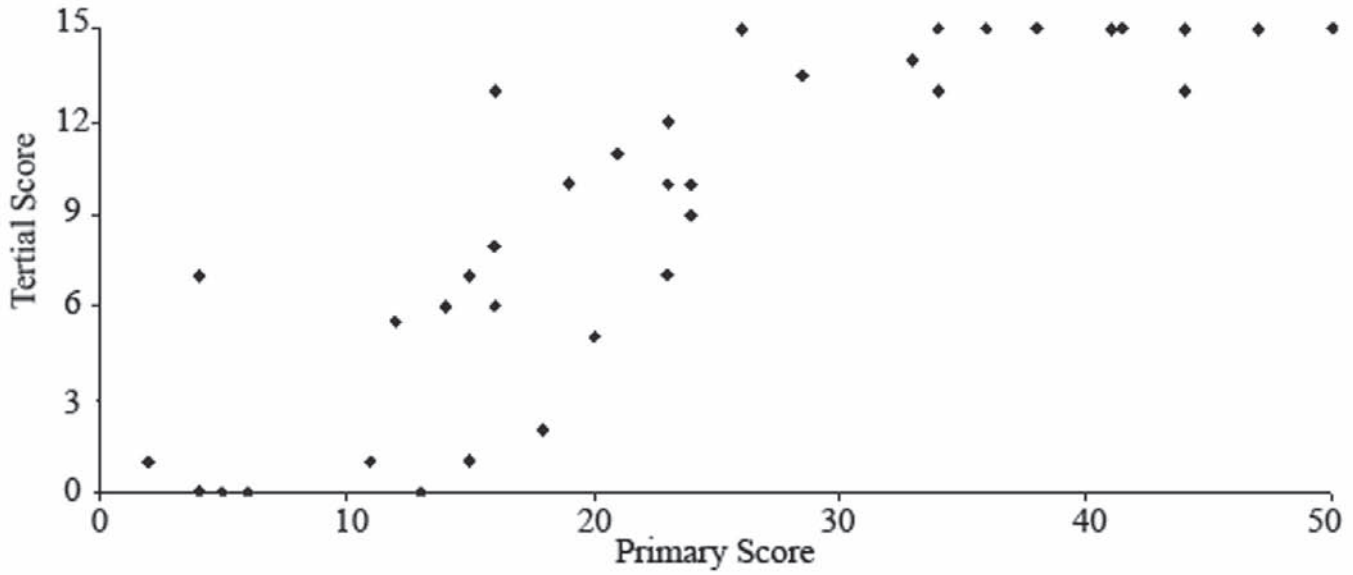



Fig. 5. Primary moult score of Grey-eyed Bulbul plotted against tertial moult score.

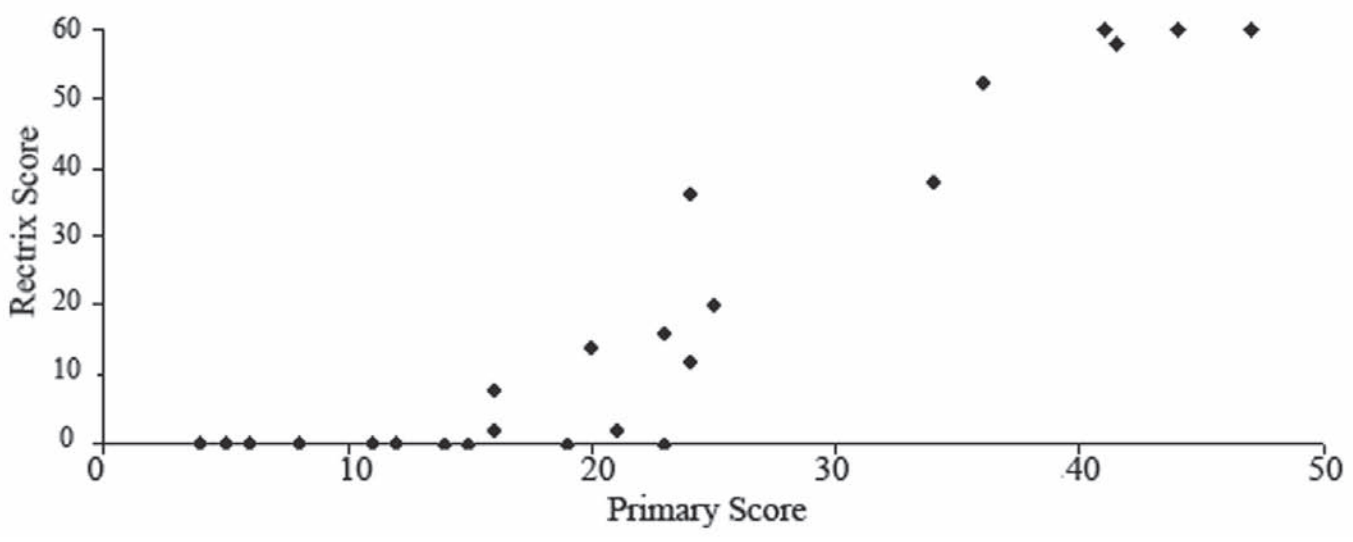



Fig. 6. Primary moult score of Grey-eyed Bulbul plotted against rectrice moult score.

adults after their final old remex (innermost secondary) was dropped. The adult remiges, before replacement, were worn at the tips unlike juveniles' which, although sometimes castellated (chipped) (Sutherland, 2000), had unworn fringes. Bare part colouration warrants further study as there is likely variation in iris or bill colour as noted with other bulbuls (Round, 2008). This may allow aging after the completion of post-juvenile moult. There was no evidence of suspended or partial moult of remiges as I have observed in other bulbuls (Black-crested Bulbul, *Pycnonotus melanicterus*, and Streak-eared Bulbul, *Pynonotus blanfordi*).

The data indicate that in GBU there is little if any overlap in their breeding and moulting cycles as has been found for many other passerines due presumably to the high energetic costs of both activities. Fogden (1972), working in Sarawak, noted that moult rarely overlapped with breeding and this included observations of individuals of more than 20 species that were known to have begun moulting after their young had fledged. Marini & Durães (2001) found that moult of remiges and breeding overlapped in less than 2% of passerines in a south-central Brazil. A few individual passerines at Khao Yai have been observed moulting while still feeding nestlings [Puff-throated Bulbul and Black-naped Monarch, *Hypothymis azurea* (pers. obs.)] but their nestlings would have fledged by the time the majority of feather tracts started to moult. Fogden (1972) suggests that low food availability in November (the lean season) in Sarawak may be the reason for moult being completed before this time. Ongoing investigations of fruit phenology and arthropod availability at Khao Yai, where the climate is more seasonal than Sarawak, may show there is an even more pronounced lean season which in turn may affect breeding and moult seasonality.

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