*NATURE IN SINGAPORE* 2009 **2:** 31–38
Date of Publication: 8 January 2009


# THE BIOLOGY OF *OTUS LEMPIJI CNEPHAUES* DEIGNAN, THE SUNDA SCOPS-OWL IN SINGAPORE

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## INTRODUCTION

*Otus lempiji* Horsfield, 1821, the Sunda scops-owl, belongs to the order Strigiformes, family Strigidae, subfamily Striginae, and tribe Otini (Marks et al., 1999). The order Strigiformes consist of two families—the Strigidae (typical owls; the larger family) and the Tytonidae (barn and masked owls; the smaller family) (Marks et al., 1999; König & Weick, 2008). According to Marks et al. (1999), this family of predatory birds is plagued with a considerable confusion regarding its constituent species, and even generic limits. This confusion is largely owed to similarities in plumage and morphology, coupled with the lack of basic information on behaviour. In fact, the taxonomy of the Strigidae is in far greater turmoil than that of any other family of non-passerine birds. This problem is especially compounded in the genus *Otus* whose members inhabit tropical forests where fieldwork is extremely difficult. More recent studies are largely based on analyses of vocalisations which have revealed that numbers of species in the genus could be considerably underestimated. The rationale for using vocalisations to "solve" the taxonomic nightmare that is *Otus* is based on the assumption that the calls of nocturnal birds play an important role in recognition between individuals rather than by subtle plumage differences, which cannot be seen at night, and it is these vocalisations that are used to attract a mate, advertise territory, indicate alarm, maintain contact between members of a pair, defend the nest or young, and food begging. This is even more important because strigid vocalisations are claimed to be innate (born with), rather than learned, thus providing valuable clues for species limits and phylogenies (König & Weick, 2008).

The species limits of *Otus* in Asia are especially complex, where many distinct and little-known populations have yielded several taxonomic nightmares. The collared scops-owl group is a case in point. Because of the numerous and loosely used common names for this group of owls, we will use of the zoological names in this article to reduce confusion. In 1940, 18 subspecies of *Otus bakkamoena* (Indian scops-owl) were recognised, and *Otus bakkamoena* was reported to range from India and Pakistan to South East Asia, Japan and the Philippines (Marks et al., 1999). In 1978, *Otus bakkamoena* was now considered to consist of only 13 subspecies with the removal of *Otus mentawi* (Mentawai scops-owl) which was raised to full species status (Marshall, 1978). Further work led to the elevation of four more of the subspecies of Peters (1940) to full species status, so that his original single species now comprised of *Otus mentawi*, *Otus bakkamoena*, *Otus lettia* (collared scops-owl), *Otus lempiji*, *Otus semitorques* (Japanese scops-owl), and lastly *Otus fuliginosus* (Palawan scops-owl), which is further subdivided further into subspecies (Marks et al., 1999). These six species have also since been subdivided into many subspecies. *Otus megalotis* (Philippine scops-owl) was later added to the southeast edge of the range making a total of seven species, which should be regarded as forming a superspecies. Since then, many of species have been added to these seven species.

*Otus lempiji* probably forms a superspecies with the above mentioned taxa and is currently made up of six subspecies (Marks et al., 1999) and their distributions are highlighted in Table 1. *Otus lempiji* is however sometimes treated as a race of *Otus bakkamoena* and conspecific to *Otus lettia*, although each species has distinct vocalisations.

Table 1. *Otus lemiji* subspecies and their natural geographical ranges (Marks et al., 1999).

| Subspecies | Geographical Range |
|---|---|
| *Otus lempiji condorensis* | Southern Peninsula Thailand |
| *Otus lempiji lempiji* | Malay Peninsula (except south), Southern Sumatra, Bangka, Belitung, Java, Bali, North Natuna Island, Borneo (except north) |
| *Otus lempiji cnephaeus* | South Malay Peninsula |
| *Otus lempiji hypnodes* | Northern and central Sumatra |
| *Otus lempiji lemurum* | Northern Borneo |
| *Otus lempiji kangeanus* | Kangean Island |

Fig. 1. *Otus lempiji cnephaeus* adult in the Central Catchment Nature Reserve. (Photograph by: Johnny Wee).

Previously, only two species of scops-owls were recorded from Singapore (Wang & Hails, 2007). These two species are *Otus sunia malayanus* (Oriental scops-owl) and *Otus lempiji lempji* (Sunda scops-owl) (Wang & Hails, 2007). *Otus sunia malayanus* is considered a rare winter visitor, and passage migrant (Wang & Hails, 2007) and is from South China (east Yunnan to Guandong) (Marks et al., 1999). *Otus lempiji lempji*, on the other hand, was listed as a common resident to Singapore (Wang & Hails, 2007), but this was probably erroneous because this subspecies is only found in the Malay Peninsula (only the north), Southern Sumatra, bangka, Belitung, Java, Bali, north Natuna Island and south Borneo (Marks et al., 1999).

The resident subspecies that was named as *Otus lempiji lempji* by Wang & Hails (2007) is likely *Otus lempiji cnephaeus*, which is a subspecies supposedly found only in the southern Malay Peninsula including Singapore, and which is distinctly smaller, and possesses a distinct call (Marks et al., 1999; Wells, 1999). This subspecies has also recently been proposed by König & Weick (2008) to be a distinct species, *Otus cnephaeus* (Singapore scops-owl) occurring between Kuala Lumpur (Peninsular Malaysia) and Singapore, based on its vocalisations, smaller size and subtle differences in the facial disc, ear tufts, and the nuchal collar. As mentioned above, vocalisations of nocturnal or crepuscular species should, in theory, be more important than colouration or plumage as an aid to identification (König & Weick, 2008), especially as a tool in strigid taxonomy, based on the assumption that vocalisations are innate, and cannot be learnt (König & Weick, 2008). This assumption has however drawn great skepticism from the scientific as well as the birding community, who have raised the fact that if other bird species, including owls, can learn multiple calls, why not *Otus* species?

Fig. 2. Juvenile (lacking distinct ear-tuffs) perching on a *Falcataria moluccana* (= *Paraseranthes falcataria* or *Albizia falcataria*; albizia) tree twig opposite the Rail Mall along Upper Bukit Timah Road. (Photograph by: Lee Tiah Kee).

In this paper we will work under the assumption that there is only one resident *Otus* species in Singapore and shall treat it as the subspecies; *Otus lempiji cnephaeus* (Sunda scops-owl) based on Marks et al. (1999), instead of the recently proposed *Otus cnephaeus* (Singapore scops-owl) (König & Weick, 2008). *Otus lempiji cnephaeus* has two colour morphs, the grey-brown morph as well as the rufous morph (Marks et al., 1999). From our observations, *Otus lempiji cnephaeus* has a greyish to light rufous-buff facial disc with a blackish border. Its forehead is buffy-whitish and have eyebrows and long ear-tuffs which are edged black, contrasting sharply with the dark blackish-brown crown. The upperparts are dull brown-grayish, densely marked with dark brown or black blotches and spots with an indistinctive pale buff or sandy nuchal collar. The underparts are buffy grey-brown to cinnamon with dark streaks and thin vermiculations. The tarsus are also fully feathered and their feet and bills are ivory-white to pale yellow (Marks et al., 1999). Based on the assumption that different vocalisations are not substantial enough taxonomic differences, two distinct vocalisations of *Otus lempiji cnephaeus* in Singapore have been heard. The first is a musical interrogative "woouk woouk", with upward inflection and uttered at relatively long intervals of 10–15 seconds, while the second is a resonant "kwookh" at the same pitch, uttered at 14-second intervals and each note without any inflection (König & Weick, 2008; A. F. S. L. Lok, pers. obs.).

*Otus lempiji cnephaeus* has a varied diet, which consists mainly of large insects such as large beetles, Orthoptera, Lepidoptera, and mantids (Marks et al., 1999; Wells, 1999). Small birds such as munias, and nestlings have been reported being eaten together with rodent prey (Marks et al., 1999; Wells, 1999). It also eats small nocturnal reptiles such as geckos, which are particularly abundant in South-east Asia (Marks et al., 1999). In fact, geckos are seemingly the commonest food prey in Singapore (Fig. 3). Hunting is normally done from a perch such as an overhanging tree branch, or house roofs (Marks et al., 1999).

Fig. 3. An adult with a gecko kill. (Photograph by: Lee Tiah Kee).

*Otus lempiji cnephaeus* is generally monogamous with long-term pair-bonds being formed (Marks et al., 1999). Nesting usually takes place in a natural tree-hole or hollow stump-top 3–9 m from the ground (Fig. 4) (Mallick et al., 2007) and devoid of any lining, although nesting has been recorded in dead palm leaves, and abandoned houses (Marks et al., 1999). In Singapore, eggs have been reported from Jan. to Jun. with chicks seen in Apr., and immature birds reported from Apr. through Oct. (Wang & Hails, 2007) in nearby trees close to the nest. Each clutch usually consists of 1–2 eggs but rarely three (Mallick et al., 2007; Wang & Hails, 2007).

All subspecies of *Otus lempiji* are not globally threatened but are listed in CITES Appendix II (Marks et al., 1999). These strigids are considered the commonest owls throughout their range and seem to be attracted to human habitation and cultivated sites which apparently are advantageous for their survival in terms of presenting food prey such as geckos, insects, and rodents (Marks et al., 1999). These owls would therefore benefit from the conversion of forest lands to agricultural areas, hence expanding their range (Marks et al., 1999). In Singapore, *Otus lempiji cnephaeus* individuals have been noticed around condominiums in the Bukit Timah Road area as well as in Housing Development Board (HDB) estates—an adult individual was spotted in Toa Payoh Housing Estate on the 26 Aug.2007 (Anonymous, 2007). In Singapore, *Otus lempiji cnephaeus* individuals are found throughout Singapore Island as well as on Pulau Ubin, and Sentosa (Wang & Hails, 2007).

## PAST AND PRESENT RECORDS

*Otus lempiji cnephaeus* is normally found in lowland secondary forest in both the Bukit Timah Nature Reserve (BTNR) as well as the Central Catchment Nature Reserve (CCNR) (Wee, 2008; A. F. S. L. Lok, pers. obs.; N. T-L. Lim, pers. comm.), well-vegetated parks such as Bukit Batok Nature Park, Kent Ridge Park, Mount Faber Park (Mallick et al., 2007) and Telok Blangah Park, wasteland vegetation areas near Choa Chu Kang, and Old Jurong Road, as well as wooded areas close to human habitation, but strangely, avoids primary forests (Marks et al., 1999).

Nesting information, and records for *Otus lempiji cnephaeus* in Singapore are rare. In late Mar.2007 a nest was located in an old *Pterocarpus indicus* (angsana) tree at Mount Faber Park near The Jewel Box (Mallick et al., 2007). The nest was discovered when pruning works on the tree frightened the incubating bird which suddenly flew off, exposing its nest site (Mallick et al., 2007). The bird was nesting in a shallow cavity formed at the intersection of the main branches and trunk (Mallick et al., 2007). Because of the inaccessibility of the nest, the stages were not documented so as not to further disturb the nesting birds (Mallick et al., 2007). The birds were reported throughout most of Apr.2007, but the nest was finally abandoned at the end of the month, when constant rain caused the nest to flood (Mallick et al., 2007). Horticultural workers later managed to retrieve a single egg from the semi-flooded cavity (Mallick et al., 2007). The

Fig. 4. An adult seen here in a natural tree hole in the Sime Road Forest. (Photograph by: Ivor Lee).

Fig. 5. A pair of juveniles at Hillview Avenue. (Photograph by: Lim Kim Chuah).

Fig. 6. A juvenile begging for food. (Photograph by: Lim Kim Chuah).

Fig. 7. Juvenile being fed a gecko kill by the parent bird at Hillview Avenue. (Photograph by: Lee Tiah Kee).

Fig. 8. A juvenile with a gecko kill at Hillview Avenue. (Photograph by: Lee Tiah Kee).

Fig. 9. A juvenile with its gecko meal. (Photograph by: Lim Kim Chuah).

egg was near-spherical, white, plain, smooth, matte, and measuring 34 × 29 mm (Mallick et al., 2007). A dead embryo was found in the egg, in an advanced stage of development, with traces of early down (Mallick et al., 2007).

In Oct.2008, two young individuals were observed behind a condominium at Hillview Avenue (T. K. Lee & K. C. Lim, pers. obs.), an observation which corresponded with the report of Wang and Hails (2007) of immature owls being observed from Apr. through Oct. The birds were noticed after a noisy commotion started up in a *Falcataria moluccana* (= *Paraseranthes falcataria* or *Albizia falcataria*; albizia) tree. The commotion started at around 2200 hours, with a pair of immature owls observed (Fig. 5). Later a small dark shadow was seen flying into the tree, and after shining the torch at where it landed, an adult was seen perching on a branch with a gecko in its talons (Fig. 3). Upon the arrival of the adult, both the juvenile birds started to beg for food (Fig. 6). One of the juveniles then flew to the branch where the adult was and harassed the adult for the gecko kill (Fig. 7). The adult was then observed flying off, presumably to find another gecko (Fig. 8). The juvenile was then observed consuming the rest of the gecko head first (Fig. 9). The time between feedings and whether both adults were responsible for feeding the immature birds could not be ascertained as prolonged usage of flashlights was avoided, so as not to disturb the birds. This behaviour was noticed for the next few days until the birds were not seen or heard from again. Immature owls have also been recorded from the months of Jul. to Oct., although no other feeding observations are available.

## CONCLUSIONS

Because many diurnal bird species are known to have a variety of calls, and are still considered the same species, or subspecies, it may be premature to classify owls based on different calls alone as suggested by König & Weick (2008). It would therefore be useful to employ other taxonomic characters such as physical plumage as well as to DNA bar-coding together with behavioural and ecological attributes as a holistic approach to elucidating the taxonomy of the genus *Otus*. It would also be helpful for local birders to pay more attention to the vocalisations of any scops-owl they encounter in field as well as its plumage, and to study the behaviour and ecology, so as to better understand these intresting birds.

## ACKNOWLEDGEMENTS

We would like to dedicate this paper to the memory of our dear friend Dr. Remo Koh Rim Poh who shared with us his many birding experiences and whose photography has been an inspiration to us all. We would also like to thank Ivor Lee, and Johnny Wee for providing photographs of this beautiful subspecies, which has managed to elude many of us, as well as the anonymous reviewer for his comments on how to improve this article.

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