Overview

Scops-owls (Genus: *Otus*) from the family True Owls (Strigidae) are small owls (16-28cm). Their name ‘scops’ is derived from Greek ἄντα (skopós) which means “watcher”, probably due to their earnest eyes which are proportionally large even for owls.

In Singapore, this species is a resident breeder that is doing well and can be heard in most forest patches at night. It is also the most widespread scops-owl in Singapore as well as other parts of Southeast Asia. Unlike many other avian species which are threatened by the rapid habitat loss caused by urban development in Singapore, this species is still doing well as it hunts mainly insects and geckos which are readily available even in our small and fragmented forest patches.
Biology and Ecology

**Morphology**

The Collared Scops-owl is one of the bigger scops-owl at 20-25cm. This species is polymorphic and exhibits grey, brown and rufous morphs. A study in avian polymorphism suggests that different individuals of the same species might exhibit different colour morphs depending on their habitat and daily activity patterns (for example, red tones are more conspicuous than yellow tones in open habitats but less conspicuous in denser habitats such as forests due to red wavelengths being filtered out in low-light conditions). According to this study, individuals with rufous morphs would be more successful in forest habitats while brown and grey morphs would be more successful in park or edge habitats.
Adults are sexually monomorphic and have pale longish ear-tufts and relatively unmarked underparts which can also have light streaking. Juveniles are a lighter brown and can show extensive horizontal barring on their underparts and upperparts. For both adults and juveniles, the most distinctive feature setting them apart from other scops-owls in the region (ie. Oriental Scops-owl, which can be found in Singapore during migration) are their dark eyes (Oriental Scops-owl has pale coloured yellow eyes).

Vocalisations

As with many other Old World scops-owls (from Europe, Africa, Asia, Australia), this species has only one type of vocalization used for both territorial aggression as well as courtship (New World Megascops from North and South America have separate song types for these two purposes). Males give a single, inflected “woouk” which last for 0.2 seconds and is typically repeated every 10-15 seconds. Females have been observed to occasionally return the call to duet with a higher-pitched “woik”. Individuals from different localities within the distribution range have been observed to produce slightly different vocalisations with varying inflections. As with other owls, being a nocturnal and morphologically cryptic species would suggest that they rely heavily on vocalizations for conspecific communications such as defense of territory and courtship during breeding season. The difference in vocalisation across localities has hence sparked numerous debates over whether Collared Scops-owl is only one species. Individuals from higher latitudes such as Thailand produce an upward-inflected (rising pitch) “woouk”; those from lower latitudes such as Java produce a downward-inflected (decreasing pitch) “woouk”; those from intermediate latitudes where the two vocalisation types meet, such as Singapore and Northern Peninsula Malaysia, produce a non-inflected “woouk” (unchanging pitch). Some believe these differences in vocalisations indicate that Collared Scops-owl actually comprises more than one species, which will be further elaborated in the Taxonomy section below.
Thailand: falling inflection

Singapore: no inflection
Diet

The main staple of scops-owls consists of insects and small animals including geckos, frogs and even small birds. In addition, scops-owls practice intraguild predation – where individuals may hunt and eat conspecifics and/or other species of scops-owls. Successful intraguild predation gives the successful hunter twofold benefits – a full stomach as well as the removal of a competitor within the same ecological niche.

Breeding records

The Collared Scops-owl is a resident breeder (mates and reproduces within their home range, including Singapore) and juveniles have been spotted at Lower Peirce, Mandai Track 7 and Pasir Ris Park. Their breeding season spans January to April, occasionally extending beyond to June. Nestlings are observed up to April, and immatures are observed up to October. Their nests can be found in tree cavities as well as the recesses of dead palm leaves and abandoned houses.

An observational study of 12 nests found that the female usually lays 3-5 eggs each season with 60% hatching success. The incubation period lasts 22-29 days and the nestling period (from hatching until the chicks fledge, or leave, the nest) lasts 18-26 days with a 65% fledging success rate.

Habitat and distribution

The Collared Scops-owl can be found in broadleaf evergreen forests, deciduous forests as well as plantations.
This high adaptability has made them resistant to rapid habitat change caused by anthropogenic development as they are able to feed and roost well even in proximity of inhabited areas such as agricultural areas and urban parks. Their distribution range spans Indochina, Borneo and Indonesia. They are sedentary and do not migrate.

Conservation

IUCN follows the taxonomic treatment of del Hoyo et al. (2018) which splits this species into two: Collared Scops-owl (Otus lettia) and Sunda Scops-owl (Otus lempiji), which under this treatment includes the population in Singapore). Both taxa are accorded Least Concern due to their stable population trends.

Taxonomy & Systematics

Hierarchical classification of Collared Scops-owl:

Kingdom: Animalia

Phylum: Chordata

Class: Aves

Order: Strigiformes

Family: Strigidae
Genus: *Otus* (Pennant, 1769)

Scientific name: *Otus lempiji* (Horsfield, 1821)

**Species description**

Roughly translated from Google Translate, the original description describes the type specimen to have brown and blackish-yellow colours, pale-rufous underparts and ear tufts on the head.

**Type specimen**

The type specimen was collected by Horsfield in 1821 from Java and given the protonym *Strix lempiji*. It is currently kept in the Museum of the Honorable East India Company.

**Phylogeny**

Historically, Old World Scops-owls *Otus* (*O. lempiji* included) and New World Screech-owls *Megascops* were thought to be a monophyletic clade, but vocalisation, behavioural, geographic and mitochondrial DNA (mtDNA) analysis has since shown these two genera to be distinct from each other. [1]
**Otus bakkamoena species complex**

*Otus lempiji* is part of the Indian Scops-owl *O. bakkamoena* complex sensu Marks et al. (1999) consisting of 18 recognised subspecies. The complex was further split into 6 different species, including Indian Scops-owl, Collared Scops-owl, Sunda Scops-owl, amongst other island taxa such as Mentawi Scops-owl.

The table shows the difference in taxonomic treatment by several authorities:

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This species page follows the classification of Eaton et al. (2016) although there are more recent treatments that are incongruent with it. The reason will be expounded on in later paragraphs. It should also be noted that IUCN, as well as the majority of the casual birdwatching scene in Singapore, follows the treatment by Clements et al. (2018) in which the Singapore population is treated as Sunda Scops-owl, *Otus lempiji* (note: according to this split, the epithet *lempiji* now belongs to Sunda Scops-owl as the type specimen for *lempiji* was from Java; post-split Collared Scops-owl would be referred to as *Otus lettia*).

Interestingly, despite Singapore having barely any endemicity, König & Weick proposed that the *Otus* taxa in Singapore is worthy of species level divergence from the rest of the complex. This split was based on *O. bakkamoena cnephaeus* having “very different vocalisation” from the other taxa. Furthermore, its close proximity with *O. b. lettia* was interpreted as these two taxa withstanding the test of sympathy. Biogeographically, however, this is highly unlikely as Singapore is part of the Sunda shelf and would have been connected to peninsular Malaysia and the rest of Sundaland too recently for speciation to have occurred.

Indian, Collared and Sunda Scops-owls are treated as separate species by different authorities due to their distinct vocalisations, suggesting that (as per above Vocalisations section) different vocalisations would act as a reproductive barrier preventing the three taxa to interbreed. However, closer examination seems to reveal that the difference in vocalization between the three taxa are more likely clinal across a geographic gradient rather than truly distinct vocalisations. Sound recordings from higher latitudes (Thailand, China, Taiwan) have falling inflections while those from lower latitudes (Indonesia, Central peninsular Malaysia) have rising inflections. Vocalisations from intermediate localities such as Singapore and North Peninsular Malaysia are not inflected. This seems to show support for Eaton et al.’s (2016) and Robson & Allen’s (2005) treatment of Sunda Scops-owl and Collared Scops-owl as a single species.
Although the recordings from India seem to show a higher degree of vocal differentiation from the rest of Indochina, genetic studies suggest otherwise. Genomic analysis using two nuclear introns and four mitochondrial protein-coding genes revealed very low genetic divergence between the \( O. \text{ bakkamoena} \), \( O. \text{ b. letitia} \) and \( O. \text{ b. lempiji} \), suggesting that there may not be a species level divergence between the three. 

The next step forward in order to gain better resolution on the true extent of divergence between taxa in the \( O. \text{ bakkamoena} \) complex (Indian vs Collared vs Sunda) is for population genomic and/or whole genomic analyses to be carried out for the different localities, allowing us to construct the phylogeny of the different taxa and uncover whether there is true evolutionary distinction or if the difference is merely clinal.

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Last curated on 3 Dec 2018