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Diet composition of Sokoke Scops Owl *Otus ireneae* in Arabuko-Sokoke Forest

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Food and nest site availability are the two principal factors that influence the distribution and abundance of birds (Newton 1998). A scientifically sound understanding about these provides the basis for the practical management and conservation of wild populations. For example, it is vital to know the diet of a critically endangered species if conservation action calls for captive breeding. This paper examines the diet composition of the Sokoke Scops Owl *Otus ireneae*, an endangered species found only at Arabuko-Sokoke Forest in coastal Kenya and the foothills forests of the East Usambara Mountains in Tanzania (Hipkiss *et al.* 1994, Virani 2000). In the Arabuko-Sokoke Forest, the species is mainly confined to the *Cynometra* woodland habitat (Britton & Zimmerman 1979, Kelsey & Langdon 1984, Virani 2000), although there is also a small population in *Brachylaena* woodland to the north of the (C. Jackson pers. comm.). The only data regarding the scops owl's diet (based on stomach contents of an unspecified number of individuals) suggested that invertebrates are an important component of the owl's diet (Ripley & Bond 1971).

Forest owls present a challenge because they are particularly difficult to study due to their nocturnal habits and the nature of the habitat in which they occur. Owls of the genus *Otus* (scops owls) are the largest and most widespread group of owls with at least 21 different species occurring in the Old World (Kemp & Calburn 1987). This group of owls is unique in that the range of prey, habitats and climates in which they have radiated make the evolutionary relationships between species difficult to unravel (Kemp & Calburn 1987).

Five species of the genus *Otus* occur on mainland Africa of which four are endemic: Sokoke Scops Owl *Otus ireneae*, West African Cinnamon Scops Owl *O. icterrorhynchus*, African Scops Owl *O. senegalensis* and White-faced Scops Owl *O. leucotis*. Being strictly nocturnal, *Otus* owls are not amenable to study and relatively little is known about their ecology compared to other owl taxa (Tarboton & Erasmus 1998).

Materials and Methods

Arabuko-Sokoke Forest (3° 20′ S, 39° 55′ E) covers an area of 372 km^2. This study was conducted in a 1 km^2 patch within the 99 km^2 large *Cynometra* woodland in the northern part of the forest. The 1 km^2 patch was selected based on availability of suitable roads and tracks that facilitated the making

of a network of transects in a form of a grid. The *Cynometra* woodland patch was mainly homogenous dominated by an association of *Cynometra webberi*, *Manilkara sulcata* and *Brachylaena huillensis*. Numbers of the latter two trees have been indiscriminately logged over the last few decades and therefore occur in much lower densities than *Cynometra.* Other common tree species within the focal study site included *Memecylon* sp, *Combretum schumannii*, *Salacia* sp. and *Strychnos* sp. The woodland canopy usually extended up to 15 m where mature trees were present, while the understorey contained small trees, shrubs, lianas, vines and Cycads *Encephalartos hildebrandtii* in dense tangles.

Three pairs of Sokoke Scops Owls were intermittently radio-tracked for a total of 57 days between July and October 1993 to establish ranging behavior and roost sites. The owls were fitted with 1g back-pack transmitters (produced by Hollohill Ltd, USA) sewn into cotton fabric with a weak link that enabled the transmitter to fall off when the link frayed. The owls' locations were marked before dusk and after dawn to obtain roost site fixes. In addition, eight locations were obtained for each owl per pair throughout the night to establish ranging behaviour (Virani 1995). For all three pairs, the ground under active roosts was cleared so that pellets could be collected. Pellets were collected immediately after dusk when the owls left their roosts to forage. After collection, pellets (and half pellets) were placed in a plastic bag, labelled and refrigerated for further analysis. Nearly two-thirds of the pellets collected had either disintegrated due to damp forest conditions, or were partially consumed by ants soon after regurgitation. All collected pellets, both complete and fragmented, where soaked in water before identification of prey contents under a 3X magnification dissecting microscope. Where possible, prey fragments were identified to order level while unidentified fragments such as feathers (most likely from the owls' facial disc) and chitinous material (mainly insect bits) were categorized separately. During radio-tracking sessions on full moon nights, it was possible to briefly observe the owls when they were foraging.

Results and Discussion

Fifty three pellets (17 whole and 36 half or fragmented) were collected from the three pairs of owls under nine different roosts within the study patch. Three complete pellets were collected from pair 1, four from pair 2 and ten from pair 3. Pellets were compact, round to slightly elongated masses of undigested material, usually dark when fresh. On average, a complete pellet measured 9.96 mm in length (n = 17, range 7.84 – 13.2 mm), 7.85 mm in width (range 6.68 – 9.82 mm), and weighed 0.08 g (dry weight) (range 0.04 – 0.11 g). About 30 % of the pellets were made up of plant and soft material. The plant material probably originated from consumption of herbivorous prey, while the soft material was unidentifiable.

Table 1 lists all prey items found in the pellets, identified from heads,

elytra, legs, thoraces and mandibles. Over 99 % of the prey items in the pellets consisted of insects. Of these, 91 % were from the order Coleoptera, 1.8 % from Orthoptera, 0.003 % from Hymenoptera and the remaining 6.3 % consisted of unidentified masses of chitinous material. The small size of the owl (between 48 and 51 g) probably makes it difficult for it to hunt small rodents. Similarly, diet studies from pellets analysed of the critically endangered Seychelles Scops Owl *Otus insularis* showed that the species fed exclusively on invertebrates, although Coleopterans made up only 14 % (Currie *et al.* 2003).

Table 1. Distribution of prey items found in 53 Sokoke Scops Owl pellets collected between July and December 1993 in the Arabuko-Sokoke Forest

Order	Family	Sub-family	Number	Percentage
Coleoptera	Scarabaeidae (Chafers)	Melolonthinae/Rutelinae	313	78.3
	Lucanidae (Stag Beetles)	Species 1	47	11.8
		Species 2	5	1.3
Orthoptera (Cricket)			7	1.8
Hymenoptera	Formicidae (ants)		1	0.003
Small feathers			2	0.005
Unidentified chitinous material			25	6.3

Owl foraging behaviour was difficult to observe due to the dense structure of the *Cynometra* woodland. On two occasions, a Sokoke Scops Owl was seen to pounce at potential prey objects within the dense foliage, and return to the same perch to devour them. This is consistent with studies of the Seychelles Scops Owl that show significant foraging from foliage and on tree trunks (Currie *et al.* 2003).

From stomach analysis contents of the Sokoke Scops Owl, Ripley & Bond (1971) found medium sized insects mainly belonging to the order Orthoptera and Phasmida. This is in contrast to the findings of this study where the owls mostly fed on Coleopterans. However, it implies that the Sokoke Scops Owl possibly feeds on a large variety of insects depending on their availability, and its restricted distribution within the Arabuko-Sokoke Forest is unlikely to be from lack of preferred prey. Related to this unspecialised feeding behaviour, a plausible explanation for the differences in prey composition between this study and that of Ripley & Bond (1971) is that the large number of Coleopteran prey observed in this study maybe as a result of the increase in the number of elephants *Loxodonta africana* in Arabuko-Sokoke forest over the last 20 years (Litoroh 2002). Elephant dung attracts dung beetles and this may have influenced the prey availability and hence composition of the pellets collected.

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