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Factors affecting the response of Seychelles Scops-owl *Otus insularis* to playback of conspecific calls: consequences for monitoring and management

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Summary

The endemic Seychelles Scops-owl *Otus insularis* is a Critically Endangered restricted range species currently only recorded in the upland forest of Mahé, the largest (152 km^2) and highest (903 m) island in the granitic Seychelles. We studied the response of colour-ringed individuals to playback of conspecific calls, to determine factors affecting playback reaction, to monitor behaviour and to assess the reliability of current monitoring techniques. Playback of the territorial *waugh* call was conducted at fixed points (*c.* 200 m apart) every month along a total transect length of 8.4 km between April 1999 and May 2001. On the basis of responses and movements of marked individuals we identified 12 territories and noted their boundaries. Mean territory length was 2.92 points (approximately 400 m), equivalent to a conservative estimated territory size of *c.* 12–16 ha. Males were more frequently detected than females/pairs. The probability of detection (males vs. females/pairs) was 0.87 vs. 0.50 on territory; 0.65 vs. 0.26 at fixed points within territories; and 0.58 vs. 0.22 at fixed points along the transect. There was some significant seasonal variation in detection rates at fixed points within territories for both males and pairs, and in general there was a low probability of detecting individuals around June-August and a high probability of detection around April and, to a lesser degree, October. Response times and owl-recorder distances were not influenced by moon phase or time of playback. This study provides the first baseline data on individual responses to the systematic repeated use of playback in Seychelles Scops-owl. We discuss the implications for current monitoring and its application to other similar *Otus* species.

Introduction

Seychelles Scops-owl *Otus insularis* (Tristram 1880) is currently known only from upland mist forests above *c.* 200 m asl on the island of Mahé in the Seychelles archipelago, western Indian Ocean (Collar and Stuart 1985). The mountainous terrain that the Seychelles Scops-owl occupies, together with its secretive and nocturnal habits, has made it difficult to study. It was thought extinct earlier this century (e.g. Greenway 1958), rediscovered in 1960 (Loustau-Lalanne 1961), and is currently classified as Critically Endangered (BirdLife International 2000) with a minimum population estimate of 80–90 pairs (Rocamora 1997, Watson 2000). The first nest to be found was discovered in May 1999 (Fanchette *et al.* 2000).

Individual responses to the playback of conspecific calls have been used as the principal means of studying this species and monitoring its population (e.g. Rocamora 1997, Watson 2000). However, no data exist on seasonal variation in response to playback. Such variation has potentially important consequences for monitoring, as responses to calls in other species of owl may be influenced by factors such as breeding status, moon phase and type of call used (see Fuller and Mosher 1981, Smith 1987). Furthermore, although Seychelles Scops-owls produce distinctive calls that may allow for individual recognition (Watson 1980, Rocamora 1997), the reliability of using vocalizations to identify individuals has yet to be tested, and research to date has been conducted on non-marked or unidentified birds.

In this paper, we examine factors affecting the response of marked individuals and pairs occupying known home ranges to the systematic repeated use of playback over a 26–month period, and discuss the implications of our findings for the monitoring regime currently employed for Seychelles Scops-owl (Rocamora 1997).

Methods

Study species

Seychelles Scops-owl is a small, cryptically coloured brown owl *c.* 20 cm in length (Sinclair and Langrand 1998), with small ear tufts and unfeathered tarsi and feet. Both sexes produce a characteristic, rhythmically repeated *waugh* territorial call (Tristram 1880, Watson 1980, 2000, Rocamora 1997). The species responds to playback of conspecific calls by calling to and/or approaching the source of playback (Watson 1980, Rocamora 1997).

Study area

The study was conducted along two transects within the known distribution of the species: Casse Dent-Mare aux Cochons-Danzil (T1) and Trois Frères-Le Niol (T2) in the Morne Seychellois National Park, Mahé, Seychelles (*c.* 4° S 55° E; see Figure 1) from April 1999 to May 2001. Vegetation in the study area comprised mature secondary forest, primarily *Cinnamomum verum* and *Paraserianthes falcataria*, interspersed with *Pterocarpus indicus* and *Sandoricum koetjape*, with remnants of primary forest dominated by endemic and native species at higher altitudes (e.g. *Dillenia ferruginea*, *Northia hornei*, various *Pandanus* species, and endemic palms, in particular *Phoenicophorium borsigianum*, *Nephrosperma vanhoutteanum* and *Verschaffeltia splendida*).

Climate

In the granitic Seychelles, temperature and humidity vary little through the year, but rainfall is seasonal, with a peak in December/January, during the north-west monsoon (which lasts approximately from November to April). The driest months are those dominated by south-east monsoon winds: June–August (Walsh 1984).

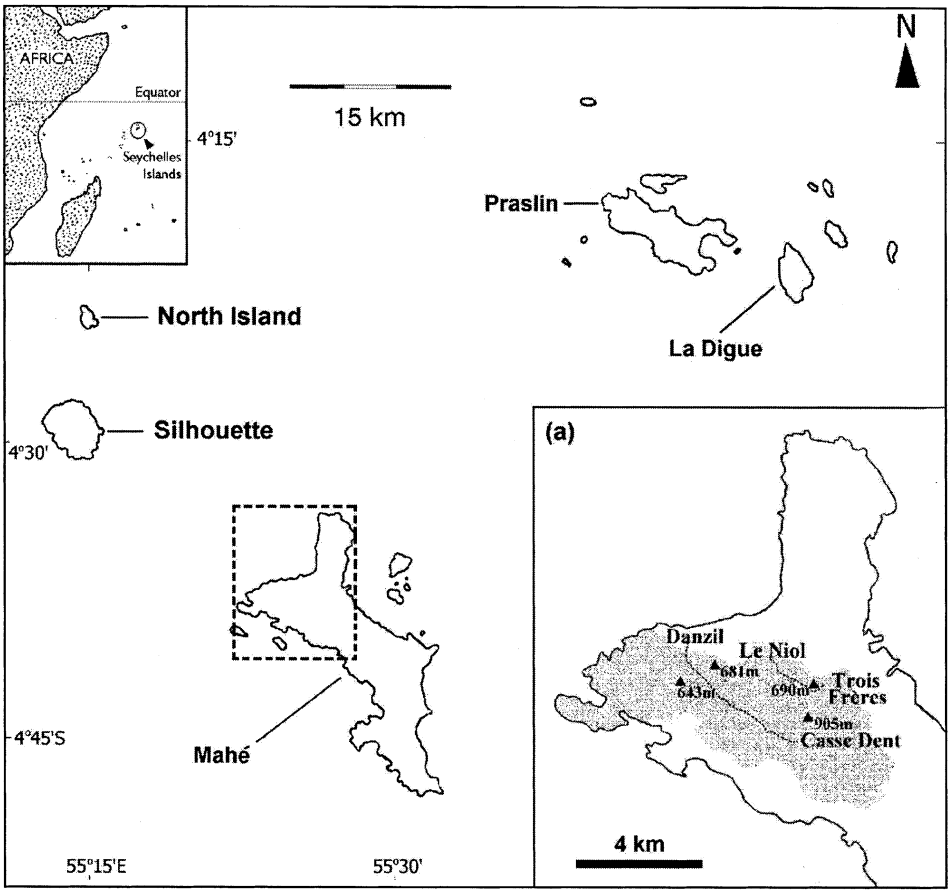

Figure 1. Map of inner Seychelles. Inset (a) shows the marked area on Mahé, and highlights the Morne Seychellois National Park (shaded area) and the two study transects: Casse Dent–Danzil (T1) and Trois Frères-Le Niol (T2).

Playback methods

Both transects followed existing forest tracks (after Fuller and Mosher 1981). T1 was 5.9 km long (30 points) and T2 was 2.5 km long (13 points). Mean elevation above sea level (m asl) ± SE of fixed sampling points was 411.0 ± 15.6 for T1 (n = 30, range = 140–480 m) and for T2, 492.3 ± 46.0 (n = 13, range = 250–710 m). A 5 km section of T1 had previously been used for monitoring by the Seychelles Government Ministry of Environment and Transport (MoET; Rocamora 1997).

Playback trials were conducted for a maximum of 10 minutes, ceasing four minutes after the initial auditory contact, at fixed points *c.* 200 m apart, once a month along both transects, between 18h00 and 23h20 local time. We used a one-minute constant loop tape that consisted of 55 seconds of the *waugh* territorial call with five seconds silence to facilitate the detection of responses. Observers typically sat away from the recorder so responses obtained during playback could also be detected. This recording was originally made at a distance of *c.* 5 m from the subject, identified as male (see below), using a directional microphone (Sennheiser MKH 70) and a Sony Professional Walkman tape-recorder. Pilot trials indicated that if an individual had not responded to playback within 10 minutes it was unlikely to do so over a longer period of time. Tape volume was kept constant and was sufficient to be heard by the human ear at least 100 m from the tape-recorder. The same model of tape-recorder and the same recording were used during playback in April 1999–September 2000. A different recorder with similar output was used in October 2000–May 2001.

The following information was recorded: (i) response time, i.e. the time from the start of playback to the first audible response (to the nearest minute); (ii) owl–recorder distance (estimated to the nearest metre) every minute thereafter for four minutes of playback; and (iii) the number and sex of birds detected. Playback ceased five minutes after the initial auditory contact. When both members of the pair were present (determined if both sexes were heard to call together, normally characterized by the pair duetting), owl–recorder distance was estimated to the individual that first responded to the tape using the *waugh* call. Playback was not conducted in heavy rain or very windy conditions.

Current monitoring techniques

Current playback monitoring techniques used by the MoET are conducted between 18h45 and 20h45, mid-July to mid-October at fixed points *c.* 300–400 m apart, using a tape of a pair duetting. The tape is played for three minutes followed by one minute of silence to listen for returned calls. This is repeated four times in a different perpendicular direction with the tape being stopped when a response is obtained. Objectives of MoET's monitoring are twofold: to census the population and to obtain measures of breeding success by noting presence of fledglings, which produce a characteristic *whsst* call (Watson 1980, 2000). For more details see Rocamora (1997).

Identification of individuals and territories

At the outset of the study no birds were colour ringed. However, between June and August 1999, 10 adults from nine territories were trapped using mist-nets and ringed with unique colour ring combinations; 12 adults (from 11 territories) had been colour ringed by February 2000. Nine of the 11 colour-ringed territorial males (sexed by analysis of blood; see Currie *et al*. 2002) were still present on their territories by May 2001. Individuals were identified by their colour rings, when possible, after their response to playback had been measured. Colour ring combinations could be read by flashlight using 8×42 binoculars. Prior to ringing, territory boundaries were identified on the basis of movements of marked individuals after ringing, and for a few unringed individuals by distinct auditory differences in their call.

Analyses

Data were analysed using SPSS (Norusis 1992). For each territory in each month we calculated a mean owl–recorder distance and response time. In addition, we calculated playback time, i.e. the time that the majority of observations were made on a given territory to the nearest hour (18–23h), and the nearest phase of the moon (1–4; 1, full moon; 2, first quarter; 3, last quarter; 4, new moon). Dates for new and full moon were provided by Seychelles Meteorological Services. In addition to noting the presence/absence of individuals on territory (based on vocalizations in response to playback) and at all fixed points along both transects, we calculated the likelihood of detecting an individual/pair within a territory in each month (within territory detection). This was based on the number of points at which an individual or pair were detected in a given month divided by the maximum range of points that had been attributed to a specific territory during the study. Two territories shared a point and this was factored into this calculation.

Repeated measures analyses of variances (ANOVA) were used to compare monthly measures of owl–recorder distances and response times, and the within-territory detection rates of males and pairs (and therefore the presence of females), as data were of repeated observations of the same individuals/territories in successive months. Distance and time data were log transformed, whereas proportions were arcsine transformed. Playback time and moon phase were entered as varying covariates in the repeated measures ANOVA. Interactions between factors in these ANOVA were not significant unless otherwise stated. Bonferroni-corrected univariate tests using difference contrasts, in which the effect of each category of the predictor variable/factor except the first was compared to the mean effect of previous categories, were used for post-hoc within-subject comparisons. Statistical tests follow Siegel and Castellan (1988) and Sokal and Rohlf (1981). Results are reported as mean ± standard errors (SE).

Results

Responses to playback

When a response to playback was first obtained, it was almost always the *waugh* call, delivered by one bird, which was usually a male. If the other member of the pair was present or approached in response to playback and/or the calls of its mate, the pair usually started to duet. These duets included a variety of distinct vocalizations including frog- and duck-like ''quacking'' calls, and gurgling ''arguing'' calls, which both frequently increased in intensity and sometimes climaxed with the pair copulating, indicated by a high pitched trill (see also Watson 1980, 2000, Rocamora 1997).

Although females can call like males (R. Fanchette and D. C. pers. obs.), there was no clear evidence that they responded to playback in the absence of the male, and when it was possible to identify calling individuals, it was always the male that was identified. The mean percentage of territories per month in which colour-ringed individuals responded to playback and were subsequently identified was 54% ± 5.6; range 17–100% (data from October 1999 to May 2001).

Detection of individuals

On the basis of movements of colour-ringed and unringed individuals, 14 territories were identified along the two transects: T1 passed through 10 territories and T2 through four territories. Twelve of these territories were identified as core territories (i.e. the transect passed through a significant area of the territory), whereas two were identified as peripheral territories. The latter, both on T1, were excluded from subsequent analyses as individuals occupying these territories were rarely detected during the sampling.

Territories occurred across a range of altitudes (140–710 m asl). Their boundaries along each transect remained stable during the study, and on average territories consisted of 2.92 ± 0.42 points (range 1–6). This is a distance of *c.* 400 m, (inter-point distance was *c.* 200 m), which equates to a territory size of *c.* 12–16 ha (assuming either a circular or square territory, respectively).

Each of the 12 core territories was occupied by one pair of owls. On territories, individual males were detected more frequently than pairs (Figure 2a), and females were not detected in the absence of the male. Mean detection rate (proportion of core territories in which individuals were detected) per month was 0.87 ± 0.02 for males and 0.49 ± 0.03 for pairs (Kolmogorov–Smirnov test, $D_{max} = 0.81$, $P < 0.01$). Similarly, across all 43 points on both transects there were marked sex differences in the likelihood of detecting, with males being more likely to be detected than pairs at the fixed points. The mean proportion of points at which individuals were detected was 0.57 ± 0.02 for males (range = 0.40–0.76) and 0.23 ± 0.03 for pairs (range = 0.09–0.44); Kolmogorov-Smirnov test, $D_{max} = 0.92$, $P < 0.01$; Figure 2b).

Within-territory detection rates for males were significantly higher than for pairs (repeated measures ANOVA, males/pairs vs. likelihood of detection, between-subject effect, $F_{1,18} = 22.79$, $P < 0.001$). There was significant monthly variation in within-territory detection rates (repeated measures ANOVA, within-subject effect, $F_{25,450} = 2.56$, $P < 0.001$; Figure 2c), but no significant difference in monthly within-territory detection rates of both males and pairs (repeated measures ANOVA, sex–month interaction, $F_{25,450} = 1.04$, $P = 0.42$). There was no significant effect of playback time or moon phase on within-territory detection rates of either males or pairs (repeated measures ANOVA, all tests n.s.).

Mean response times and owl–recorder distances did not vary significantly with month, playback time or moon phase. The mean response time (minutes) per month was 3.64 ± 0.12 ($n = 26$) and mean owl–recorder distance (m) per month was 19.98 ± 1.36 ($n = 26$).

Discussion

Playback of conspecific calls has been the principal method of studying and monitoring Seychelles Scops-owl. However, this study is the first to assess the effectiveness and reliability of playback as a standard monitoring method. Our methods and results may also be useful for studies on other similar owl species.

Detection using playback

Monthly detection rates on territories *per se*, at points on transects, and at points within territories were significantly higher for males than pairs. There was also significant seasonal variation in the number of fixed points at which males and pairs were detected within territories. In general, peaks in detection occurred in

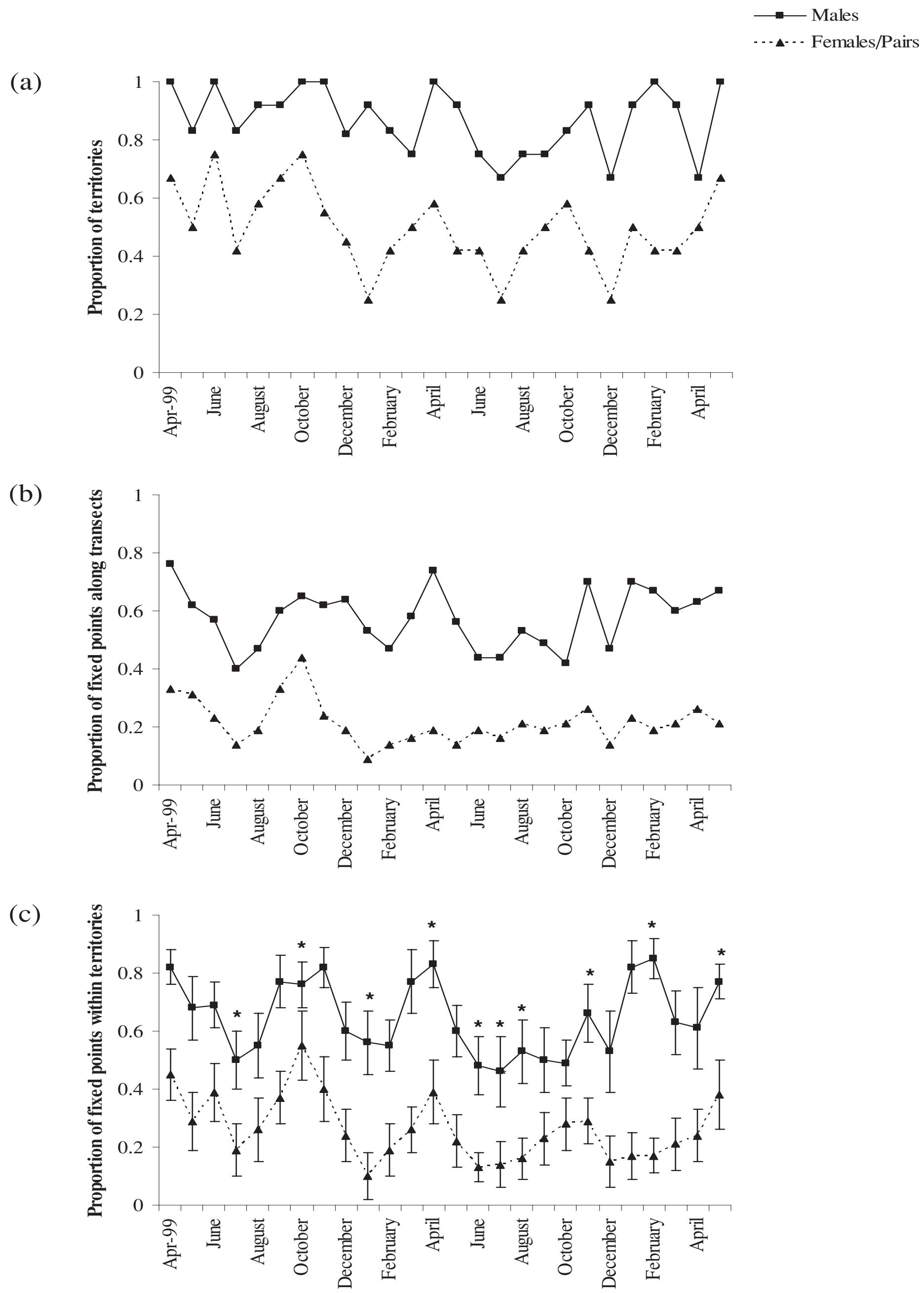

Figure 2. (a) Monthly proportion of focal territories (n = 12) on which males and females/pairs of Seychelles Scops-owl were detected (April 1999–May 2001); (b) monthly proportion of fixed sample points along both transects (n = 43) at which a response was detected; and (c) mean monthly within-territory detection rates (± SE) of males and pairs. Within-territory detection rates of males and pairs in months marked with an asterisk differ significantly from the mean of previous categories at the 5% level.

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April and (to a lesser extent) October, while lower rates of detection occurred during the intervening months, particularly June–August. The peaks in detection coincided with transition months between the wet and dry seasons, which are characterized by calm and fair weather (Walsh 1984). Although good weather may facilitate an increased intensity of response to playback, these peaks in detection did not appear to be an artefact of conditions. Sampling was conducted during fair conditions and increases in territoriality appeared to coincide with breeding activities (Currie 2002). There was no suggestion that moon phase or time of playback significantly affected responses to playback. Importantly, there was no evidence that individuals habituated to playback during the period of study.

Implications for monitoring

Monitoring programmes for conservation management of threatened species require clear objectives and demonstrable robust methods. The two objectives of current monitoring are: (i) census and (ii) measure of breeding success (Rocamora 1997). Major problems of designing a monitoring regime for the scops-owl stem from a deficiency of data on basic ecology such as time of breeding. Prior to this study, such problems were further compounded by a lack of baseline data on factors affecting responses to playback.

Effective population monitoring on a restricted-range and cryptic bird species requires some means of identifying, or at least discriminating between, individuals and/or territories. Seychelles Scops-owl territories are documented as having a radius of 200–300 m (Rocamora 1997, Watson 2000). Results presented in this study, based on movements of colour-ringed individuals, are similar to these observations; mean territory length was on average *c.* 400 m. In the absence of individual recognition, either by (a) colour-ringing, which is time consuming, or by (b) calls, the use of which has still to be tested (see Peake and McGregor in Currie 2002), an inter-point playback distance of *c.* 400 m or more is likely to reduce the likelihood of counting individuals from the same territory twice, an important consideration. However, care should be taken with this method as there was considerable variation in perceived maximum territory length (between one and six points; *c.* 0.2–1.2 km), which was apparently influenced to a large extent by topography. For example one pair was only ever detected at one point located at the base of a valley running perpendicular to the transect, whereas in two territories individuals were detected across five and six points respectively, both ran along the transect.

The timing of current monitoring (mid July–mid October) is based to a large extent on incomplete observations of spontaneous vocalizations from one territory (Rocamora 1997). Data from this study indicate that using playback in some of these months may result in an underestimate of the number of territories.

Although there were few seasonal changes in the detectability of territories (see Figure 2a), it is important to note that there was a higher likelihood of detecting individuals on territory in the current study as fixed points were *c.* 200 m apart (mean territory length was 2.92 points) compared to previous monitoring where points were *c.* 400 m apart. Using this larger inter-point distance, double counting individuals is less likely (see above), but there is an increased risk of not detecting individuals if sampling is conducted at a time when there is a reduced response to playback.

There is some evidence that Seychelles Scops-owl territories are constantly occupied over time. Watson (2000) found eight out of 10 sites remained occupied over a 20 year period. However, six contacts (territories) were detected during MoET's survey of a transect that overlapped T1 in 1996 (Rocamora 1997), while this study detected 10 territories along the same transect three years later, albeit using more intensive methods. A large inter-point sampling distance (*c.* 457 m; transect length = 6.4 km, number of points = 14, Rocamora 1997), combined with the sampling period including months with a low likelihood of detecting individuals within territory (specifically July and August) are likely to be factors accounting for this 40% difference in territory density between the two studies. Should this difference be reflected across other transects it could result in significant inaccuracies in any population estimate.

Seychelles Scops-owl appears to have a protracted breeding season (Watson 1980, 2000, Currie 2002) and there is a low likelihood of detecting the single fledgling during one or a few monthly territory visits every year. Infrequent monitoring will, at best, probably provide anecdotal observations on breeding success.

The most significant difference between playback methodologies used in our study and MoET monitoring is that we used a male's *waugh* call during playback as opposed to a duet tape. We used a male call for two reasons. Firstly, we wanted to quantify a response to playback against a constant intensity of calls (duets frequently increase in intensity over time), and secondly because in other *Otus* species territory defence in response to a conspecific intruder is frequently performed by both sexes (e.g. Galeotti *et al*. 1997).

It has been assumed that use of a duet tape would be more likely to detect pairs (Rocamora 1997). In fact, we found no evidence that pairs were more likely to be detected using a duet tape. Males were still detected significantly more than females when playback with a duet tape was conducted at the mid-point of the 12 study territories once a month (June–November 2000). Mean within-territory detection rate was 0.79 ± 0.07 (SE) for males and 0.23 ± 0.08 (SE) for females (Wilcoxon pair sign, $z = -2.91$, $P < 0.05$). This is consistent with observations at 59 sites (presumed territories) identified by MoET in 1996–1997 at which pairs were detected only at 20 (34%) using a duet tape (Rocamora 1997).

Very occasionally mature fledglings on study territories were observed responding to playback with an adult-like call and even duetting with one of their putative parents. However, in general, an auditory response to playback of conspecific calls was a reliable indicator of a territorial male or pair, and it was probably not important whether a pair or a solitary individual is detected to ascertain the presence of a territory.

Proposed modifications to existing monitoring regime

In light of quantified responses to the systematic use of playback over 26 months we make the following recommendations for monitoring within the existing framework.

Since there was a high probability (67–100%) of detecting males on territory

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all year round (see also Rocamora 1997), playback conducted at fixed points *c.* 300 m apart during one visit per transect is likely to be sufficient to determine presence or absence of the species. However, the timing of playback appears to be important and we recommend playback be conducted around April (due to the consistently high detection rates in 1999–2001), or alternatively bi-annually around April and October. It may not be necessary to conduct the monitoring on an annual basis; longer intervals of time, for example every three to five years, may suffice.

Although spontaneous calls are frequently heard soon after dusk and again before dawn (Rocamora 1997, Watson 2000), playback time in our study had no significant effect on detection rates. We therefore propose a less restrictive sampling regime than current monitoring in which playback can be used throughout the early part of the night (18–23h00). This would allow each existing transect ($n = 7$, length 2–12 km) to be monitored over several nights depending on transect length. Transects could then be sampled over a one month period instead of four.

Monitoring is currently conducted along roads and tracks, which is certainly the easiest way of monitoring the species. Until recently there were no baseline data on distribution of the scops-owl on Mahé (Currie 2002), and transects used by MoET were within its known distribution. Although this allows monitoring of the persistence of territories and the opportunity for quantifying adult survival, it does not take into consideration range reduction and/or expansion, which may be more important indicators of population change than the presence or absence of territories within the owl's known range

Implications for studies of other Otus species

Of the 68 currently recognized *Otus* species (del Hoyo *et al*. 1999), 23 are documented as having restricted ranges, the majority of which are island endemics: 11 are globally threatened, and six of these are restricted to upland forests (BirdLife International 2000). Playback is a potentially important tool for monitoring populations of these threatened species. It provides useful information on presence or absence, population size, breeding success and survivorship, particularly for those species inhabiting forest, montane or otherwise inaccessible environments that make intensive study difficult. Nonetheless, this study indicated that playback may provide potentially ambiguous information unless it has been systematically used to provide a ''species baseline'' for data interpretation prior to applying its use for monitoring purposes.

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References

BirdLife International (2000) *Threatened birds of the world.* Barcelona and Cambridge, U.K.: Lynx Edicions and BirdLife International.

Collar, N. J. and Stuart, S. N. (1985) *Threatened birds of Africa and related islands.* Cambridge, U.K.: ICBP and IUCN.

Currie, D. (2002) *The ecology of the Seychelles (Bare-legged) Scops Owl* Otus insularis: *consequences for conservation and management.* Victoria, Mahé: BirdLife Seychelles.

Currie, D., Mateman, K., Lessells, C. and Fanchette, R. (2002) Sexual size dimorphism in the critically endangered Seychelles Scops Owl *Otus insularis*. *Ringing Migr.* 21: 1–3.

Fanchette, R., Hoareau, C., Currie, D., Parr, S. J. and Shah, N. J. (2000) First nest record for the Seychelles (bare-legged) Scops owl *Otus insularis*. *Ibis* 142: 485–486.

Fuller, M. R. and Mosher, J.A. (1981) Methods of detecting and counting raptors. *Stud. Avian Biol.* 6: 235–246.

Galeotti, P., Sacchi, R. and Perani, E. (1997) Co-operative defence and intra-sexual aggression in scops owls (*Otus scops*): responses to playback of male and female calls. *J. Raptor Res.* 31: 353–357.

Greenway, J. C. (1958) *Extinct and vanishing birds of the world.* New York: American Commitee for International Wildlife Protection.

del Hoyo, J., Elliot, A., Sargatal, J. eds (1999). *Handbook of the birds of the world*, 5. *Barn-owls to hummingbirds.* Barcelona, Lynx Edicions.

Loustau-Lalanne, P. (1961) Land-birds endemic to the granitic group of the Seychelles Islands. *J. Seychelles Soc.* 1: 22–31.

Norusis (1992) SPSS for Windows, Advanced Statistics, Release 6.1. Chicago, IL.

Peake, T. and McGregor, P. (2001) Report on the feasibility of using vocal individuality to monitor Seychelles scops owls. In D. Currie, ed. *The ecology of the Seychelles (Bare-legged) Scops* Owl Otus insularis: *consequences for conservation and management.* Victoria, Mahé: BirdLife Seychelles.

Rocamora, G. (1997) *Rare and threatened species, sites, and habitat monitoring programme in Seychelles.* Project G1 EMPS. Divison of Environment/BirdLife International.

Siegel, S. and Castellan, N. J. (1988) *Non-parametric statistics for the behavioural sciences.* New York: McGraw-Hill.

Sinclair, I. and Langrand, O. (1998) *Birds of the Indian Ocean.* Cape Town: Struik Publishers Ltd.

Smith, D. (1987) Owl census techniques. Pp. 304–307 in R. W. Nero, R. J. Clark, R. J. Knapton and R. H. Hamne, eds. *Biology and conservation of northern forest owls.* Symposium Proceedings. Winnepeg, Manitoba. Fort Collins, CO: US Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station (Gen. Techn. Rep. RM-142).

Sokal, R. R. and Rohlf, F. J. (1981) *Biometry.* Second edition. San Francisco: W. H. Freeman.

Tristram, H. B. (1880) Description of a new genus and species of owl from the Seychelles islands. *Ibis* 4: 456–459.

Walsh, R. P. D. (1984) Climate of the Seychelles. Pp. 39–62 in D. R. Stoddart, ed. *Biogeography and ecology of the Seychelles Islands.* The Hague/Boston/Lancaster: Dr W. Junk (Monographiae Biologicae 55).

Watson, J. (1980) The case of the vanishing owl. *Wildlife* 22: 38–39.

Watson, J. (2000) How many Seychelles Scops Owls are there? Proceedings of the 5th World Conference on Birds of Prey, Berlin, London, Paris.

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