A new species of Strix owl from Oman

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For the past decade, the authors have been recording owls for a new book by The Sound Approach about Western Palearctic (WP) owls. In the process, they have become well informed about variations in sounds of owl taxa in the WP, including those in the Arabian Peninsula (for 'new' WP boundaries, see, Martins & Hirschfeld 1994, 1998, Roselaar 2006, Gantlett 2008). As a consequence, they were quickly aware of the significance of unknown owl sounds registered in northern Oman in 2013, which appeared to concern an undescribed taxon in the genus Strix.

Course of events

March 2013
In late March 2013, Magnus Robb, together with René Pop, spent seven nights studying Pallid Scops Owls Otus brucei at Al Jabal Al Akhdar, the central part of the Al Hajar mountains, northern Oman. They heard the first pair of Pallid Scops in a flat-bottomed wadi containing a few scattered trees, situated among high cliffs and steep mountain slopes from c. 500 m above sea level, and this was where they concentrated all subsequent efforts. Most nights, at least one set of sound recording equipment was in continuous use, usually positioned up a tree where the pair had previously been active. MR would leave it for up to 6 h at a time. It took until 24 March before MR came anything close to a ‘direct hit’, with two male Pallid Scops hooting from different trees on either side of the tree containing the microphones. After they fell quiet, he decided to move in. Putting on the headphones, he became aware of a different owl-like sound at much greater distance. Its four notes had the rhythm of the start of Richard Wagner’s famous wedding march Treulich geführt (Here comes the bride) from the opera Lohengrin. MR started recording the mystery sound immediately. This
Hooting sounded very much like an owl but not like any that MR had heard before. The mystery owl in fact sounded like nothing that was already known to breed in the Arabian Peninsula or the WP. The compound structure of its hooting suggested a Strix owl but one with a voice even deeper than Ural Owl S uralensis. As MR continued to listen, he became aware of a second individual hooting in a similar compound rhythm much further away, on the other side of the stereo image. Soon, two other kinds of vocalisations could be heard: rhythmic bursts of almost identical lower-pitched hoots from one side of the wadi and a single upward-inflected, nasal-sounding call from the other. The former strongly recalled a similar vocalisation of male Ural, while the latter recalled the typical ‘contact’ or ‘begging calls’ of various Strix owls. The next night, nothing more was heard from the mystery owl and so RP and MR then followed their plan of spending a night in another area. However, they returned to spend the first part of their last night again in the wadi. MR left one set of equipment recording in the same tree as before and took another set with him to an area 750 m to the north. Every now and then, he imitated the ‘compound hooting’ heard previously, in the hope of a response. RP stayed and listened from the car, not far from the first set of equipment. Just when MR was returning, he heard the ‘pulsed hooting’ again, at closer range than before. He started recording at the base of the cliff where the sound was coming from. Over the next half hour, MR made good recordings of compound hooting, pulsed hooting and a series of upward-inflected contact calls, all just like a Strix owl but not any species he knew. By now, RP was also hearing it from the car c 100 m away. Despite using both of their powerful torches, it proved impossible to see any bird on the cliff. Eventually they had to go to the airport in the early hours of the morning, with the owl still hooting on the cliff.

April 2013
Seeing and photographing the mystery owl now became a Sound Approach priority. A month later, on 23-30 April 2013, MR was back, this time with Arnoud van den Berg. For several nights, they listened and recorded at the original location and up to 1 km to the north. No Strix owl called in this part of the wadi during the entire April visit. On the fifth night, 28/29 April, AvdB and MR decided to try playback at new locations heading south. Just 2 km down the road, there came a reply. AvdB, who was listening and recording through headphones,
heard it immediately but not MR, who was listening with the unaided ear. After some frantic hand signals from AvdB, MR heard it too and realised that the faint hooting was coming from the top of a peak c 250 m to the south-east. The bird was giving both compound and pulsed hooting but in a deeper and gruffer voice than before, suggesting that it was a different individual, possibly of the opposite sex. They drove slightly closer and, after further playback, it descended to a spot c 40 m above the road. By torchlight, they could see a plain-looking owl perched on a large rock. It had the shape of a Strix owl, lacking ear-tufts and appearing slightly smaller-headed than a Tawny Owl S aluco. As it was facing them, only its face and underparts could be seen, which looked rather featureless except for the presence of a dark breast band, and AvdB noted obvious longitudinal stripes. It was only two nights later, on 30 April/1 May, that the new individual was located again. On this occasion, it called less than 500 m south of where it had been seen and heard on 28 April. Once again, it gave both types of hooting in a deeper, gruffer voice than MR had heard at the original March site. This night, the owl proved impossible to see on the cliff face.

May 2013
From 17 to 31 May 2013, AvdB and Cecilia Bosman went for a fortnight to the Strix wadi to obtain photographic documentation and more sound-recordings. Expectations were low, as there had already been a reduction in vocal activity from March to April, and temperatures had risen sharply, ranging from 30°C up to even 44°C at night. Remarkably though, Pallid Scops Owls were more vocal than they had been in March–April, hooting in many corners of the wadi and even up the slopes for hours each night. In this context, it was less of a surprise to find that the Strix owls were vocal as well. At the site discovered on 26/28 April, hooting could be heard on many nights from the evening of 19 May onwards, with two individuals hooting simultaneously during the early hours of 21 May. Efforts to hear Strix owls again at the site of the original discovery in March were unsuccessful until the evening of 21 May, when one responded to playback. Later that night, at a third location with a steep cliff, halfway between the two known sites 2.2 km apart measured along the wadi road, another individual responded to playback, while the birds at the April site were vocal shortly afterwards as well. This meant that there were at least three territories, each 1.1 km apart. It should be noted that the birds always remained high up the cliffs, so far that their vocalisations were hardly ever audible to the naked ear, only with the aid of microphones and headphones. By 23 May, all efforts to lure the Strix owls down from the very steep cliffs, involving both playback and human imitations, had remained unsuccessful. So, there was no other option but to clamber up to the base of the cliffs. High on the slope below the cliffs of the original March site, under bright moonlight in the early hours of 24 May, a bit of playback of the April song did the trick. Eye-shine revealed one bird perched up on the cliff. Later, this or another bird descended low enough to perch on a dead tree stump where AvdB captured the first photograph. During the rest of that night, several close encounters took place along the base of the cliff but torchlight seemed to startle the owl and it never stayed long enough at one spot for more photographs. Two nights later, on 25/26 May, AvdB and CB heard for the first time loud alarm calls in overhead flight. When one bird landed in low vegetation between rocks at 15 m distance and then jumped up onto a rock to perch for a few minutes, it became apparent that torchlight was no longer a reason to fly off, and many 10 s of photographs could be obtained, also of the bird in flight. During the entire night of 27/28 May, long sequences of hooting and various calls of two individuals were recorded at the same spot. Playback no longer had the same effect and no bird came close. This month’s last recording concerned a bird alarm calling in flight during the early hours of 30 May.

July 2013
During Ramadan in 2013, AvdB and CB visited the Strix area twice, on 10-12 July and 22-25 July. Temperatures were high, most birds had fallen silent and not a single Pallid Scops Owl could be heard. During the night of 11/12 July, after many fruitless attempts to hear the Strix owls at the known sites, the ones at the March site finally called and hooted an hour before dawn. During the night of 22/23 July, a playback response came from the April site only, albeit from a huge distance, with hooting barely audible even by use of microphones and headphones. During the night of 23/24 July, one bird was seen twice in bright moonlight high up at the March site, first just before and then after midnight, when it came close enough on the cliffs for more photographs and sound-recordings to be obtained. Based on sound and plumage, this concerned the same individual as the one photographed two months earlier; its plumage looked more tattered though, possibly in moult.
Material and methods

Photographs
AvdB used a Nikon 500 mm/5.6 lens, D800 camera and SB-800 flash to photograph the owls. All photographs were taken and stored in Nikon’s raw image format, Nikon Electronic Format (NEF), which offers the highest possible image quality with minimally processed data. The purpose of raw image formats is to save, with a minimum loss of information, data obtained from the camera sensor, and the conditions surrounding the capturing of the image. By definition, a raw file (ie, a digital negative) is not directly usable as an image but it has all of the information needed to create an image in a viewable format through a process of converting it into, eg, JPEG or TIFF formats. By storing images as raw (NEF) files, the unaltered information of the captured image is preserved, original colours can be retrieved, and manipulation is made even harder than it would be with analog photographs (cf McKay 2013).

In ‘Results’, we present a detailed description of the Strix owl holotype, based on all available photographs. In ‘Diagnosis: morphology’, we discuss the morphological comparison with owl genera other than Strix, the separation from other Strix owls and, more specifically, the morphological differences from Hume’s Owl S butleri.

Sounds
The Strix owl of the Al Hajar mountains has a repertoire of rather understated, low-pitched sounds, and might have remained undiscovered for much longer were it not for the use of high quality sound recording equipment. On several occasions, even when expecting a response after the use of playback, we could not hear it at a distance of 300 m, unless we listened to an amplified signal through headphones. For this, we used pairs of omni-directional Sennheiser MKH-20 condenser microphones in a Crown SASS (Stereo Ambient Sampling System) casing. This gives a binaural listening experience, as if the listener’s head were positioned exactly where the microphones are, with the difference that the signal can be amplified at will. On the night of the second encounter in March, a Telinga ProV stereo parabolic microphone had to be used, because the SASS with Sennheisers was not at hand. The recorder on all occasions was a Sound Devices 722, and the headphones were semi-open Beyerdynamic DT-990.

We used Raven Pro 1.5 to analyse our recordings and to make sonagrams for publication. When analysing sonagrams, it is necessary to take measurements from the centre of the sonagram trace rather than its outer limits, since the thickness of the line varies with the settings used. On zoomed-in sonagrams, we measured frequency by putting the selection tool in the vertical centre of the trace at the desired point in time. Similarly, we measured duration between the horizontal centres of two traces, which were typically the faint, near-vertical ‘limbs’ with which a vocalisation starts and ends. In the onomatopoetic descriptions of sounds, capital letters are used to indicate accented or louder syllables, where marked contrasts in accent are present.

We made a total of 137 sound recordings of the Strix owl: 15 in March 2013 (MR); 10 in April 2013 (AvdB and MR); 91 in May 2013 (AvdB); and 21 in July 2013 (AvdB). These were recorded within 5 km of one another and most relate to five individuals in three territories. Two owls from a fourth territory are very faintly audible in recordings from the very first night but their hooting is insufficiently clear in sonagrams, so only a contact call of one of them, ie, a sixth individual, has been included in the analysis.

The vocal analysis is divided as follows. In ‘Results’, we describe the four vocalisations. In ‘Diagnosis: vocalisations’, we present sections devoted to individual and presum ed sexual variation as well as phenology and compare the vocalisations with the only other Strix owl of the Arabian Pensinsula, Hume’s Owl, which we believe to be the closest relative of the new owl. Then, we compare with other Strix owls up to 3500 km distant. We demonstrate not only the distinctiveness of the sounds of the new owl but also the existence of clear vocal homologies between members of the genus Strix. Finally, we discuss provisional vocal sexing based on comparison with other Strix species.

Results

Proposed new species
Vocalisations and plumage characteristics demonstrate that the owls sound-recorded and photographed in the Al Hajar mountains represent a new species, which we propose to name:

Strix omanensis sp nov
Omani Owl

Holotype
The holotype concerns the individual shown in plate 374, which is a presumed adult male, photographed by Arnoud B van den Berg at Al Jabal Al Akhdar, Al Hajar mountains, Al Batinah, Oman.
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(type locality 23°18′N, 57°41′E; see plate 372-273), on 24 May 2013. The same individual was photographed two days later at the same locality (plate 375-380) and again two months later (plate 381). Sonagrams of its vocalisations are shown in figure 1. Besides a minimum of 35 recordings from the holotype, another 52 made at the same location showed characters of the same individual by pitch, timbre and length of compound hooting as well as the rate of delivery of the notes of pulsed hooting.

The original raw image format (NEF) photographs and the original sound recordings from which the sonagrams were made have been deposited at the Macaulay Library, Cornell Laboratory of Ornithology, Ithaca, New York, USA (sound recordings with accession number ML163395-163399). Mp3 versions of the corresponding recordings can be listened to at www.dutchbirding.nl and/or www.soundapproach.co.uk.

The holotype was last observed on 23 July 2013, and is presumed to be still alive at the time of writing. Based on comparison of recordings, we believe that it concerns the first individual to be noticed when the species was discovered on 24 March 2013.

Search for a museum specimen
We did a search for specimens of Omani Owl in zoological museums. On 14 July 2013, AvdB and CB were allowed to check the collection and freezers of the National History Museum at Muscat, Oman, where no Strix specimens appeared to be present. No specimen was present at the Natural History Museum, Tring, England, or to the best of our knowledge anywhere else (Weick 2006, cf Ornis database www.ornisnet.org). We considered the possibility that there could be museum specimens of Hume’s Owl that were in fact Omani. However, Goodman & Sabry (1984) checked virtually all museum specimens of Hume’s for their paper on the first record for Egypt and the African continent. They did not mention the features of Omani in any of the specimens of Hume’s they studied and described, although they noted in the specimens of Hume’s that ‘the ground colour of the body feathers shows considerable variation, from chocolate-brown [in central Saudi Arabia] to rufous-red in the type specimen’. Importantly, it appears that the museum specimens originate from areas where the occurrence of Hume’s has been confirmed by photographs and sound-recordings. The only exception con-
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375-377 Omani Owl / Omaanse Uil Strix omanensis, Al Jabal Al Akhdar, Al Hajar mountains, Al Batinah, Oman, 26 May 2013 (Arnoud B van den Berg/The Sound Approach). Same individual as holotype in plate 374.
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378-379 Omani Owl / Omaanse Uil Strix omanensis, Al Jabal Al Akhdar, Al Hajar mountains, Al Batinah, Oman, 26 May 2013 (Arnoud B van den Berg/The Sound Approach). Same individual as holotype in plate 374.
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concerns the type specimen at the Natural History Museum, Tring (see below).

Hume's Owl type specimen
According to Hume (1878), the type specimen of Hume's Owl was given to him by E A Butler, who 'procured it for me through one of his friends, Mr. Nash, I believe from Omara [sic], on the Mekran Coast.' Ormara, the correct spelling, is in southwestern Pakistan (often referred to as southern Iran). This eastern location raises the question whether it in fact could have concerned an Omani Owl. If it did, the scientific name now used for Hume's would become the scientific name of Omani while another scientific name would have to be chosen for Hume's.

Therefore, in June 2013, AvdB and CB examined and photographed the three specimens of Hume’s Owl in the Natural History Museum at Tring, which include the ‘rufous-red’ holotype. The other two are a female from Wadi Qelt, Judaean desert, ‘Palestine’, on 28 March 1938, and a male from Mahd Dhahab, 400 km north-north-east of Jeddah, Saudi Arabia, on 16 August 1950. The latter was collected by Mr Adams (Meinertzhagen 1954, cf Garfield 2007). The state of the specimens does not allow much study of feather details of the head (see plate 382-384). However, all three show horizontal bars on the underparts, a feature not shown in Omani Owl, and just a few short longitudinal lines. The three specimens of Hume’s in Tring differ from each other in colour (the one from ‘Palestine’ being palest and the one from Jeddah darkest) and markings (the type specimen showing a few short longitudinal dark lines on the underparts). The differences in ground colour of the body feathers between the three specimens illustrate the considerable variation in Hume’s described by Goodman & Sabry (1984).

Goodman & Sabry (1984) highlighted the vagueness of Allan Octavian Hume’s type locality. This, combined with the lack of later records, led them to believe that the assumed locality was incorrect, and that the type specimen was collected elsewhere. This idea is corroborated by the lack of records in recent years; Scott & Adhami (2006) and Roselaar & Aliabadian (2009) do not mention
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382-383 Hume’s Owls / Palestijnse Bosuilene Strix butleri, Natural History Museum, Tring, England, 20 June 2013 (Arnoud B van den Berg/The Sound Approach; © Natural History Museum, Tring). Left to right: female collected at Wadi Qelt, Judaeans’ desert, ‘Palestine’, on 28 March 1938; male collected at Mahd ahd Dhahab, Al Madina, Hejaz region, 400 km north-north-east of Jeddah, Saudi Arabia, on 16 August 1950; type specimen, collected at Ormara, Makran, Balochistan, Pakistan (locality uncertain) on unspecified date.
any record for Iran, and Rasmussen & Anderton (2005) do not for Pakistan (contra, eg, the map in Hüe & Etchécopar 1970).

**Description of holotype: morphology**

The description is based on photographs made by AvdB on 24 and 26 May and 22-23 July 2013.

**STRUCTURE** Medium-sized owl with rounded head lacking ear-tufts, with facial disc and obvious rim, and large eye. Leg long. Tail short. Wing projecting slightly beyond tail.

**HEAD** Facial disc grey, darkest grey above eye, forming distinct dusky ‘brows’, paler between eyes, around bill and on chin. Rim shaped like outline of apple sliced vertically through core, blackish on inside and whitish on outside, with dark streak broadly edged white coming down on forehead almost until between eyes. Crown, nape, collar and throat buff-brown with small blackish spade-shaped bars on back of head and blackish streaks on throat.

**UPPERPARTS** Mantle, scapulars, back, rump and upper-tail-coverts dark grey-brown with buff and whitish spots.

**UNDERPARTS** Breast buffish white with short longitudinal stripes. Whitish belly not demarcated from breast but paler with longer thin blackish longitudinal (vertical) stripes. Flank pale as belly with few slightly thicker and longer longitudinal blackish stripes. Abdomen, undertail-coverts and thigh greyish white.

**WING** Remiges greyish brown with pale bars. On underside, remiges mostly dark brown, with broad dark brown bars and narrow pale brown bars and top. Alula dark brown-grey. Greater coverts brown, three outer ones with large white spot near top. Median coverts brown, two outer ones with white spot near top. Lesser and marginal coverts brown. Greater, median and lesser primary coverts dark blackish-grey. On underside, remiges whitish at base and greyish at top, from inside to outside of wing dark bars becoming wider, rendering outer primaries largely dark; inner primaries white at base with dark bars becoming broader towards top and broad dark top, and secondaries white with narrow dark bars and broad dark top. Greater, median, lesser and marginal underwing-coverts greyish white. Greater under primary coverts blackish brown, median under primary coverts white, and lesser under primary coverts greyish white.

**TAIL** Rectrices whitish with white base on underside and with two broad blackish bars caudally, equal in width to white in between and on top, and two vague narrow dark bars distally.
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BARE PARTS  Pupil black, iris orange-yellow surrounded by black; eyelid black. Bill pale green-grey. Tibia, tarsus and toes feathered whitish, somewhat greyish on front of tibia, possibly because of wear. Claws pale greyish.

Description of holotype: vocalisations
We identified four types of vocalisations. These include two ‘song types’ that we describe as compound hooting and pulsed hooting, as well as an alarm call and a contact call. Compound hooting has a fixed rhythm of notes and spaces between them. Pulsed hooting consists of bursts of virtually identical notes. Various authors have studied vocalisations of Strix owls before but most studies have been of a single species, and the names chosen for the various vocalisations are often appropriate only for that species, due to peculiarities of the sounds or associated behaviours. We have attempted to choose more neutral names that work for a variety of species, if not all. To facilitate comparisons, table 1 indicates names used by other authors.

The following description is based on 35 recordings of the holotype, which AvdB obtained while taking photographs on the nights of 23/24 May, 25/26 May and 22/23 July.

Compound hooting
This is the louder of the two types of hooting (see figure 1A), and can be written as $\text{HU}...........\text{HWA}....\text{ha-HA}$. It can be heard in three parts, and there are usually just four notes. The first two parts consist of a single note each while the third part consists of two notes, the last one being the longer of the two. The first, second and fourth notes are approximately equidistant from one another while the third forms an ‘upbeat’ to the fourth. The first note is lower, the second rises slightly in pitch and the final two stay at or close to this higher pitch.

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<td>Glutz von Blotzheim &amp; Bauer 1980</td>
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<td>Svensson et al 2009</td>
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<td>$S_{\text{butleri}}$</td>
<td>Cramp 1985</td>
<td>advertising call</td>
<td>$\text{hu-hu-hu-hu-hu-hu}$</td>
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<td></td>
<td>König et al 2008</td>
<td>song</td>
<td>booming bu notes</td>
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<td></td>
<td>Svensson et al 2009</td>
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<td>defensive call</td>
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<td>$S_{\text{occidentalis}}$</td>
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<td>Reviergesang (male), Revier (female)</td>
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<td></td>
<td>Scherzinger 1980</td>
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<td></td>
<td>Svensson et al 2009</td>
<td>song</td>
<td>alternative song</td>
<td>alarm</td>
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The entire vocalisation stays below 400 Hz. A common variant (eg, figure 2) has an additional, short and slightly lower-pitched note or occasionally two, after the last accented one, giving HU........HWA...ha-HA-ha(ha). More rarely, there may be a short and barely audible low note just after the first one, giving HU-hu........HWA....ha-HA. Measurements of compound hooting in the holotype and four other individuals can be consulted in table 2. The holotype gave compound hooting during all three encounters when it was photographed.

Pulsed hooting
This type of hooting shows a subtle rise and fall in both frequency and intensity along the duration of the strophe, which approximates to: hu-hu-hu-hu-hu-hu-hu-hu-hu-hu (see figure 1B). Occasionally, the first note is extended a little and comes to resemble the first note of compound hooting. Within each burst or strophe, the spacing of the notes is regular. The intensity and pitch are both slightly lower than in compound hooting. Measurements of pulsed hooting in the holotype and three other individuals are shown in table 3. The holotype gave pulsed hooting during all three encounters when it was photographed.

On several occasions, the holotype and other individuals gave variants intermediate between compound and pulsed hooting. Such ‘intermedi-
ate’ strophes occurred occasionally in bouts of pulsed hooting and did not follow a set pattern. Certain features hinted at compound hooting, such as the introduction of some longer gaps, reduction of the number of notes and suggestion of a similar three-part structure. However, there were some important differences. In ‘intermediate’ hooting, the first part became a short series of pulsed notes, the second part often included a short note after the main one, and the third part lacked an upbeat. Such a strophe could be written `Hu-hu-hu-hu-hu.....HWA-ha... HA-ha`.

### Alarm call
This is a rapid series of fairly nasal-sounding barks, each with predominantly rising intonation (see figure 1C). The rate of delivery of the barks is slightly slower, the delivery is less regular and the pitch is higher than in pulsed hooting. The nasal timbre is produced by the higher harmonics, which are more prominent than in pulsed hooting: `nyek-nyek-nyek-nyek-nyek...`. The holotype gave alarm calls during photographic encounters on 26 May and 23 July 2013.

### Contact call
This is usually a nasal, rising sound (see figure 1D), sounding like `NYEP`. Occasionally the call sounds slightly disyllabic, ending with a brief descent: `NYEPu` or `NYEPU`. The holotype gave contact calls during a photographic encounter on 23 July 2013.

### Diagnosis: morphology

#### Comparison with all owl genera except Strix
The structure of the bird excludes all owls except *Strix* (cf König et al 2008). One of the features not found in barn owls *Tytonidae* is the yellow-orange iris. Hawk owls *Ninox* and related genera (*Uroglaux*, *Sceloglaux*) have very indistinct facial discs and many have a much longer tail. Northern Hawk-Owl *Surnia ulula* also has a much longer tail. The many pygmy owls *Glaucidium*, little owls and related genera (*Xenoglaux*, *Micrathene*, *Atheane* and *Heteroglaux*) and saw-whet owls (*Aegolius*) are much smaller. All scops *Otus* and screech *Megascops* owls are much smaller and nearly all have ear-tufts (*Psiloscoops* is small with ear-tufts as well, *Mimizuku* and *Ptilopsis* are large with ear-tufts, *Pyrroglaux* and *Margarobyas* have unfeathered legs). Ear-ed owls *Asio* (and *Pseudoscops*) have ear-tufts and the few without obvious ear-tufts (including *Nesasio*) have a distinct black mask surrounding the eyes. Owls of the Neotropical *Pulsatrix* have a conspicuous white-spectacled face. All *Bubo* owls are larger and most (also *Jubula*, *Lophostrix* and *Ketupa*) have obvious ear-tufts with the exception of Snowy Owl *B. scandiacus* and *Scotopelia*, which have no obvious ear-tufts and no obvious facial disc either. Five species of (Neotropical) *Ciccaba* have yellow bills and are included in *Strix* by König et al (2008) (see below).

#### Separation from other Strix owls
According to König et al (2008), there are 24 spe-
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FIGURE 1 Omani Owl / Omaanse Uil Strix omanensis (same individual as holotype in plate 374), Al Jabal Al Akhdar, Al Hajar mountains, Al Batinah, Oman (Arnoud B van den Berg/The Sound Approach). Catalogue numbers are Sound Approach/Macaulay Library: A four-note compound hooting with clear timbre, Pallid Scops Owl Otus brucei faintly visible in background, 04:04, 26 May 2013 (130526.AB.040400/ML163398); B pulsed hooting with clear timbre, 00:15, 24 May 2013 (130524.AB.001548/ML163396); C alarm call, 03:15, 26 May 2013 (130526.AB.031500/ML163397); D contact call, 01:55, 23 July 2013 (130723.AB.015536/ML163399)

FIGURE 2 Omani Owl / Omaanse Uil Strix omanensis, five-note compound hooting with hoarse timbre, Al Jabal Al Akhdar, Al Hajar mountains, Al Batinah, Oman, 00:27, 28 April 2013 (Arnoud B van den Berg/The Sound Approach; 130428.AB.002745/Macaulay Library ML163395). Recorded in territory discovered in April 2013. Bands second from bottom and top are subharmonics, contributing to hoarser sound.
A new species of Strix owl from Oman

FIGURE 3 Hume’s Owl / Palestijnse Bosuil Strix butleri, Wadi Al Mughsayl, Dhofar, Oman (Magnus S Robb/The Sound Approach): A compound hooting of two presumed males, near (left) and far (right), 21:13, 15 April 2010 (100415.MR.211332); B pulsed hooting of male (2.5 sec onwards, following compound hoot); two series, first consisting of four notes and second largely obscured. In background, contact calls of female, 21:46, 17 April 2010 (100417.MR.214650); C alarm call at nest, 00:16, 18 April 2010 (100418.MR.001602); D contact calls of pair. Male gives two higher-pitched calls, 00:16, 18 April 2010 (100418.MR.001602)

FIGURE 4 Hume’s Owl / Palestijnse Bosuil Strix butleri, compound hooting, Petra, Jordan, 23:30, 4 May 2004 (Magnus S Robb/The Sound Approach; 04.016.MR.12903)
A new species of Strix owl from Oman

385-386 Hume's Owl / Palestijnse Bosuil Strix butleri, Judaean desert, Israel, 6 February 2013 (Emin Yılgırtçuoğlu). Note plain facial disc and horizontal bars on underparts in plate 385-388.
387 Hume’s Owl / Palestijnse Bosuil Strix butleri, Wadi Turabi (c 1800 m above sea level), Ta’if, Saudi Arabia, 17 March 1994 (Michel Gunther/Biosphoto).

388 Hume’s Owl / Palestijnse Bosuil Strix butleri, Sana’a, Yemen, 26 January 2009 (János Oláh).
A new species of Strix owl from Oman

389 Hume’s Owl / Palestijnse Bosuil *Strix butleri*, Judaean desert, Israel, 23 November 2010
   *(Barak Granit/birding tours)*

390 Hume’s Owl / Palestijnse Bosuil *Strix butleri*, Judaean desert, Israel, 1 December 2010
   *(Barak Granit/birding tours)*
A new species of Strix owl from Oman

Dickinson & Remsen (2013) list (only) 14 Strix species as, in contrast with König et al (2008), they do not include four species of Ciccaba in Strix, while treating a fifth as a subspecies of Mottled Owl (C virgata squamulata); moreover, they treat S (a) davidii as conspecific with S uralensis, S (a) nivicolum with S aluco, and S (l) newarensis, S (l) niasensis and S (l) bartelsi with S leptogrammica (Brown Wood Owl). Most of the 24 Strix species recognized by König et al (2008) have dark eyes and the four with orange or yellow eyes include the Neotropical Rufous-banded Owl C (or S) albitarsis and Black-banded Owl C (or S) huhula, which both have a yellow bill among other differences. In the Palearctic region, only Great Grey Owl S nebulosa (which is larger) and Hume’s Owl (which is paler) have pale yellow to yellow and yellow-orange to orangey eyes, respectively.

**Morphological differences from Hume’s Owl**
Hume’s Owl is the only other Strix species occurring in the Arabian Peninsula and, based upon its morphology, with a similar structure and orangey eyes, it may also be considered Omani Owl’s closest relative. Generally, Omani differs from Hume’s by its darker appearance. It should be noted however that there is variation in Hume’s with one photographed in Yemen (cf Ertel 2011) being darker with a greyer facial disc than most in the north of their range (cf Aronson 1979, Wrånes 1998). The facial disc of Omani is darker and bicoloured, with conspicuous dark-grey most prominent above and aside the eyes, on the upper side of the facial disc (‘dusky-browed’), instead of a uniform white or greyish disc as in Hume’s. The upperparts are dark brown, while in Hume’s the upperparts basically vary from pale buffish grey-brown to dark rufous brown. The whitish underparts of Omani show no bars but have conspicuous long black longitudinal (vertical) stripes, while the yellowish to buff underparts of Hume’s show faint markings consisting of small dark bars.

**TABLE 4** Morphological differences between Omani Owl *Strix omanensis* (n=2) and Hume’s Owl *S butleri* (n= c 20, from Israel/Jordan, central and western Saudi Arabia, northern Yemen and southern Oman)

<table>
<thead>
<tr>
<th>Omani Owl</th>
<th>Hume’s Owl</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Facial disc</strong></td>
<td>bicoloured, with dark grey above and aside eye (‘dusky-browed’) and pale grey from just above eye downward</td>
</tr>
<tr>
<td><strong>Upperside</strong></td>
<td>very dark ‘cold’ greyish brown; pale spots vaguely bordered</td>
</tr>
<tr>
<td><strong>Underparts</strong></td>
<td>buffish white, gradually becoming white from lower breast downward; long vertical black lines but no horizontal bars</td>
</tr>
<tr>
<td><strong>Remiges (wing)</strong></td>
<td>dark bands becoming wider and pale bands dusker from inside to outside, resulting in broad dark trailing edge and wingtips</td>
</tr>
<tr>
<td><strong>Rectrices (tail), underside</strong></td>
<td>outer two dark tail bands broad, inner (two) ones thin and vague, with greyish top of inner rectrices, resulting in dark appearance</td>
</tr>
</tbody>
</table>

391 Hume’s Owl / Palestijnse Bosuil *Strix butleri*, Wadi Al Mughsayl, Dhofar, Oman, 23 October 2006 (Nick Moran). Note plain facial disc and contrasting dark bands on upperwing.
connected to inconspicuous short dark longitudinal streaks. The remiges show less white on the upperside than in Hume’s and less conspicuous blackish bands. On the underside, the rectrices show two broad dark bands in Omani and thin ones distally while the outer two tail bands of Hume’s are not so broad with the two more distal ones being only a little thinner. Obviously, any variation in morphology of Omani is unknown as just one individual has been studied extensively with only one or perhaps two other ones briefly seen.

For a summary of the morphological differences between Omani Owl and Hume’s Owl, see table 4-5.

**Diagnosis: vocalisations**

**Individual variation in vocalisations**

In *compound hooting*, the mean modular frequency (resonating longest and dominating our perception of pitch) of the first part for the five individuals in table 2 was 332 Hz, rising to a mean maximum frequency in the remainder of the call of 357 Hz. The mean duration of all strophes for these five individuals was 3.04 sec (3.03 sec for four-note strophes) and the repetition rate was 3.9 strophes/min (max 5.5/min). A three-note ending was present in 11.7% and a four-note ending in 1.4% of 349 strophes analysed by us. A short and sometimes barely audible low note just after the first one was present in 5.7% of strophes. Seven-note hoots with all three extra notes sounded like HU-hu.......HWA...ha-HA-ha-ha. We recorded only three examples of seven-note hoots so far, and those had a mean duration of 3.58 sec.

In *pulsed hooting*, the mean number of notes per strophe for the four individuals in table 3 was 12.6, with the means for four individuals varying between 10.4 and 15. The mean rate of delivery of the notes was highly consistent across individuals at around 3.5/sec. Strophes descended gradually from means of 296 Hz to 339 Hz (maximum frequency per note) before ascending again. The extremes were 237 Hz and 388 Hz, respectively.

*Alarm calls* were given in series of one to 19 individual barks. The rate of delivery of the barks reached a maximum of 3 barks/sec. The mean range of maximum frequencies per series lay between 406 and 447 Hz (range 303-488 Hz). We recorded alarm calls only in the territory of the holotype, where they could be heard often. In most cases only a single series was given, the owl then progressing to either kind of hooting. On a few occasions after playback, they were repeated up to a maximum of 10 times in a row, at rates of up to 7.2 series/minute.

*Contact calls* had mean modular frequency rising from 410 at the start to 565 Hz at the highest point (range 293-723 Hz). Mean duration of the call was 0.3 sec (range 0.2-0.48 sec). Calls were repeated at up to 16/min, and we recorded sequences of up to 22 calls.

A lower-pitched call with rising pitch (mean 234 Hz at start to 361 Hz at highest point) and slightly shorter duration (mean 0.22 sec) was heard on only one occasion, when it was uttered four times in flight. It sounded rather similar to the second note of a compound hoot.

**Dimorphism in vocalisations**

Dimorphism in hooting was apparent between assumed pair members in two territories (in the third, we heard a single individual). In both territories, two individuals could occasionally be heard hooting from a similar distance and direction. The most easily heard difference between the pair members concerned the timbre of both kinds of hooting. One member of each pair had a clear timbre (see figure 1A-B), while the other had a more muffled, hoarse timbre (see figure 2). The individual in the third territory had a clear timbre. In one pair’s territory, we heard almost exclusively the clear-voiced individual; in the other pair’s territory, we recorded both birds many times in May, although mostly one at a time.

In *compound hooting*, the three individuals with clear timbre reached higher maximum frequency than those with hoarse timbre (see table 2). There was also a greater difference in pitch between the first note and the remainder of the strophe in the clear-sounding birds; compound hoots of hoarse birds were at a more level pitch. In pulsed hooting also, birds with clear timbre reached a higher average maximum frequency than the only hoarse bird we heard producing this sound (see table 3). Dimorphism is also suggested by the number of notes in pulsed hooting (largest in the hoarse individual), and the speed of their delivery (fastest in the hoarse individual).

No dimorphism has so far been detected in alarm calls or contact calls.

**Phenology of vocalisations**

During all encounters with Omani Owl, we heard both compound hooting and pulsed hooting. Compound hooting was heard from all five of the well-documented individuals and pulsed hooting
from all but one. In general, one kind of hooting flowed directly into the other, sometimes by way of one or more ‘intermediate’ hoots. Both types of hooting were used in all months that we visited the area, although it was only in May that the owls hooted frequently. The use of playback (mostly of compound hooting) in April and May could have influenced the balance of the two types during those months. As far as we could ascertain, neither type was ever given in flight.

We heard alarm calls and contact calls less frequently, and only from one or two individuals. Alarm calls were recorded only in May and July. In most cases, alarm calling was the first reaction to playback, and only a single series was given, the owl then usually progressing to either kind of hooting. Alarm calls were frequently given in flight, also when no playback was involved. Contact calls were recorded in March, May and July, only in the territory of the holotype and once, on 24 March, from a member of a neighbouring pair that we did not hear subsequently.

**Vocal differences from Hume’s Owl**

RP and MR visited southern Oman in April 2010, spending two nights recording a pair of Hume’s Owl with young in the nest, as well as at least four other individuals in the same wadi. On 19 July 2013, AvdB and CB visited the same Hume’s site for another night, during which they recorded at
least two individuals. In addition, we analysed recordings by MR for The Sound Approach of a single individual from Petra, Jordan (May 2004), and recordings in publications and sound archives, eg, from Ein Gedi, Israel (Mild 1990); Riyadh, Saudi Arabia (Macaulay Library ML 2100); and Petra, Jordan (Xeno-canto 46066).

Hume's Owl uses the compound type of hooting almost exclusively. It hoots a diagnostic three-part rhythm that is virtually identical in all locations sampled (see figure 5). This starts with a loud first hoot, followed by two groups of two shorter hoots at the same or a slightly lower pitch (see figure 3A and 4). Within each of these groups, the notes are typically joined together (ie, second to third, then fourth to fifth note). The second and fifth notes are usually accented (being slightly longer than the third and fourth), giving something like: HUUU........HUhu..huHUhuHU. The mean strope duration is 1.58 sec and the strophes are repeated at up to 9.6/min but more often at around half that rate. Note that exceptionally, some individuals give an extra, quiet note at the end, giving HUUU........HUhu..huHUhu or HUUU........HUhu..HUbuhu. We only heard an extra note from one, possibly two individuals in Oman.

Compound hooting of Omani Owl differs structurally from Hume's Owl in the number of notes: overwhelmingly four in the former and five in the latter. In the few Omani strophes that have five or more notes, the rhythm, duration and pitch are very different from Hume's. For instance, the three accented notes in Omani are more or less equidistant, whereas in Hume's the distance between the second and final accented notes (second and fifth note of the strophe) is much shorter than that between the first and second. In Oman, the second part of the compound hoot never contains more than one note whereas in Hume's there are always two. The mean total duration is much longer in Omani, almost twice that of Hume's.

In pitch, Omani Owl sounds much lower than Hume's, with no overlap in frequency measurements. This difference in pitch is very striking, with Hume's being in the range of a Eurasian Collared Dove Streptopelia decaocto or higher, while Omani hoots at a pitch similar to a male nominate Long-eared Owl A otus otus (ie, lower than Common Wood Pigeon Columba palumbus). There are no indications of geographical variation in Hume's, with birds from Israel, Jordan and Saudi Arabia falling within the range of variation recorded in southern Oman (see table 2 and figure 5). In the recordings analysed, mean modular frequency of the first part of the compound hoot was 331 Hz in Omani and 781 Hz in Hume's. Mean maximum frequency for the second and third parts of the compound hoot was 357 Hz in Omani and 760 Hz in Hume's. In fact, the highest maximum frequency that we have recorded in Omani compound hooting is 399 Hz, which is 89 Hz below the lowest maximum frequency we have recorded in compound hooting of Hume's. Note that the maximum of 399 Hz in Omani was not included in table 2, because, although it came from the individual sounding like the holotype in territory 1, it was not in one of the recordings from a night when photographs were taken.

We did not knowingly record any compound hooting of a female Hume's Owl. According to Yoav Perlman and James Smith (pers comm), the female version is deeper voiced and slightly muffled. In the recordings available to us, the modular frequency of compound hooting in Hume's lay between 488 and 1087 Hz. Even if this only refers to males, it is considerably higher pitched than in either sex of Omani, pairs of which we have recorded hooting together several times.

Published and online recordings of Hume's Owl contain nothing other than compound hooting. However, other calls have been described in the literature. According to Svensson et al (2009), 'A pumping `do-do-do-do-do-do', rising slightly in pitch at the end, appears to serve as a defensive call'. Jennings (1977) was probably referring to the same call when he wrote: 'The only other note I have heard it make is an excited and agitated `Hu-Hu-Hu-Hu-Hu-Hu-Hu-Hu'. These descriptions suggest pulsed hooting but neither mentions song-like repetition of this sound, as in pulsed hooting of Omani Owl.

We have recorded three brief utterances of pulsed hooting in Hume's Owl, given by the male during food-passes to the female near the nest. In two cases, the first note was higher pitched than the rest and resembled the first note of a compound hoot. With maximum frequency per note in the range of 329 to 528 Hz, the pitch was higher than pulsed hooting in Omani Owl (see table 3). The rate of delivery of the individual hoots was faster at 4.4/sec, while the number of hoots per strophe varied from 3 to 20. Two instances involved multiple strophes but only a short first one followed by a longer strophe, almost without a break (eg, figure 3B). Jonathan Meyrav from Israel, when we asked him about this sound, gave a near-perfect rendition and confirmed that in his experience, it is only ever given in bouts of one or two strophes,
usually directly following a compound hoot. In summary, pulsed hooting of Hume’s differs from that of Omani in being higher pitched and faster but mainly in being used only occasionally and in short bouts, whereas in Omani it is used in long bouts, as often as, if not more often than compound hooting. We obtained two recordings of alarm calls of Hume’s (see figure 3C), which were similar to those of Omani but higher pitched and delivered more quickly. The modular frequency reached 1 kHz and the rate of delivery reached 3.8/sec. Strophes were of irregular duration (1-6 barks) as were the intervals between them. At least one series was given by a female, after MR made an unexpected movement.

The adult female Hume’s Owl in our recordings of a pair gave contact calls more often than any other vocalisation, with the pitch rising by around 200-300 Hz over a duration of just under 0.5 sec. Contact calls of the female typically lay between 800 and 1200 Hz, with lower and upper extremes of 650 and 1340 Hz. The few male contact calls we recorded were towards the upper end of the female’s range, at 950-1310 Hz. On two occasions when both sexes called together, the male was higher pitched than the female (see figure 3D). Compared with Omani Owl, contact calls of Hume’s were considerably higher pitched as well as being slightly longer and more whistled or less nasal in timbre.

For a summary of vocal differences between Omani Owl and Hume’s Owl, see table 5.

**Vocalisations of other Strix owls up to 3500 km from Oman**

In the course of our work on WP owls, we have made over 550 recordings of Strix owls, mainly Palearctic species but also, eg, Brown Wood Owl and Northern Barred Owl *S. varia*. AvdB also recorded several additional species in the past, including African Wood Owl *S. woodfordii*. We have been able to fill gaps in our knowledge by consulting published CDs (Chappuis 2000, Jännes 2002, Gibbon 2003, Chappuis et al. 2008) and various online resources, in particular the Macaulay Library (www.macaulaylibrary.org) and Xeno-canto (www.xeno-canto.org). We also referred to recordings from the Borror Library of Bioacoustics (blb.biosci.ohio-state.edu) and the private collection of Hannu Jännes.

In the following comparison of sounds of Omani Owl and other Strix owls breeding within c. 3500 km of the type locality, we have used the same names for equivalent sounds to simplify comparisons across a range of species. Although we believe these to be homologous vocal signals conveying related messages, they should not be assumed to correspond to exactly the same behaviours. Signals derived from the same ancestral version may be put to subtly or radically different uses, depending largely on the ecology of the descendent species.

**Ural Owl**

Some 3500 km separate Omani Owl from the nearest population of Ural Owl in the boreal forests of Russia (del Hoyo et al. 1999). In both types of hooting, Omani shows clear similarities with male Ural, which is rather surprising for a smaller-sized owl of Arabian cliffs and treeless mountain slopes. One strong resemblance is the extensive use of both kinds of hooting. As in most other Strix owls, compound hooting of Ural is divided into three sections (see figure 6A). The first is usually a single note, although it can sometimes be two. The second follows after a long gap and usually consists of two or three notes linked together as a single modulated sound. The third usually has three notes that are also incompletely separated from one another: an upbeat, an accented note and a quieter, lower-pitched final note. The pitch is low in both species but even lower in Omani. In Ural, the modular frequency is around 350-400 Hz in males and marginally higher in females. Omani differs most strikingly in the much shorter gap between the first and second sections, and the second section having just a single (barely modulated) note. In addition, the overall duration and the gaps between strophes are shorter in Omani.

Pulsed hooting of Ural Owl (see figure 7A) sounds remarkably similar in pitch and rhythm to that of Omani Owl. However, Ural surges more noticeably in volume and pitch towards the middle of the strophe, and also usually has longer gaps between strophes. A more important difference is that there is much greater sexual dimorphism in both types of hooting in Ural, whereas pair members of Omani sound only subtly different from one another. We heard this apparently low level of sexual dimorphism in Omani in pairs from two different territories.

Alarm calls of Ural Owl (see figure 8A) also show a certain similarity to those of Omani Owl. Barks of Ural are given in groups of one to four, mostly two or three, whereas those of Omani can be given in much longer series, in which the delivery becomes faster with duration.

The contact call of Ural Owl is given only by females (see figure 9A) and is subject to their very coarse vocal timbre. As such, it sounds very differ-
A new species of Strix owl from Oman

FIGURE 6 Compound hooting of Strix owls: A Ural Owl / Oeraluil S uralensis, compound hooting of male, Vällen, Harg, Uppland, Sweden, 23:00, 1 April 2006 (Magnus S Robb/The Sound Approach; 06.004.MR.14030); B Tawny Owl / Bosuil S aluco biddulphi, compound hooting of male, Dunga Gali, North-West Frontier, Pakistan, 04:00, 27 April 1978 (Sheldon Severinghaus; Macaulay Library ML179419); C Tawny Owl / Bosuil S aluco sylvatica, compound hooting of a male, Rocha da Pena, Algarve, Portugal, 21:40, 19 March 2009 (Magnus S Robb/The Sound Approach; 090319, MR.214026); D Brown Wood Owl / Bruine Bosuil S leptogrammica, compound hooting, Pasoh Forest Reserve, Negeri Sembila, Malaysia, 20 February 1982 (Ben King; Macaulay Library ML41807); E Himalayan Owl / Kleine Himalayabosuil S nivicolum, two-note hoot, 8 km south of Machapuchare, Gandaki, Nepal, 19 May 1982 (Ben King; Macaulay Library ML41955); F Mottled Wood Owl / Indische Bosuil Strix ocellata, compound hooting of pair Bandhavgarh, Madhya Pradesh, India, February 2010 (Hannu Jännes). Second of four series belongs to second bird; G African Wood Owl / Afrikaanse Bosuil S woodfordi, compound hooting of male followed by female, Caprivi Strip, Divundo, Namibia, 02:00, 19 March 1999 (Arnoud B van den Berg/The Sound Approach; 99.002.AB.11129)
ent from the contact call of Omani Owl, despite similarities in shape and probably also in behavioural context.

**Tawny Owl**

While most listeners will hear very little resemblance between Omani Owl and Tawny Owl, comparing their sounds proved to be instructive. The basic form of compound hooting can be found in the easternmost taxon *S. biddulphi* from northern Pakistan (see figure 6B). Its compound hooting lacks any of the florid modulation typical of European and North African birds. Hooting of *biddulphi* consists of four notes: a long first one followed by a long pause, a short second one followed by a short pause and a third that is similar to the second, linked and forming an upbeat to a fourth that is similar to but longer than the first. Hooting of other subspecies such as *S. sylvatica* (see figure 6C) has the same basic structure but this is partly obscured by modulations, making the number of ‘notes’ more difficult to count. Compound hooting of Omani is much lower-pitched and, at c 3 sec, it has duration less than half of that of most Tawny (e.g., 7.5 sec in the recording from Pakistan). In Omani, the proportions are also very different, with the first, second and fourth notes more or less equidistant, whereas in Tawny the gap between first and second hoots is many times longer than that between the second and fourth. Comparing Omani with the desert form *S. sanctinicolai*, which breeds as close to the type location of Omani as ancient Persepolis, Fars, Iran, a distance of c 875 km (Khaleghizadeh 2011), was not possible as no recordings were available.
A new species of Strix owl from Oman

Pulsed hooting of Tawny Owl is the ‘bubbling’ call that occasionally causes confusion with similar-sounding vocalisations of Northern Hawk-Owl and Boreal Owl *A. sylvestriformis*. We recorded this call type for the subspecies *S. a. aluco* (see figure 7B), *S. a. sylvestriformis* and *S. a. mauritanica* but know of no recordings of pulsed hooting in eastern subspecies such as *S. a. sanctinicolai* or *S. a. biddulphi*. Although much less familiar than compound hooting, this is a frequently used vocalisation, sometimes given in long bouts containing many strophes. Pulsed hooting of Tawny is very different from that of Omani Owl. It is much faster, with many more hoots per strophe and is also much higher pitched.

The alarm call of Tawny Owl (see figure 8B) is usually given in groups of two to four, sometimes more, and is both higher pitched and sharper sounding than that of Omani Owl. The contact call of Tawny is the well-known *kuvitt* with which the female answers the male’s compound hooting. The female uses it as a begging call and both sexes also use it in a range of circumstances (see figure 9B). It is much higher pitched and less nasal sounding than the contact call of Omani and also differs in that it first descends slightly before rising in pitch.

**Brown Wood Owl**

The nearest population of Brown Wood Owl oc-
A new species of Strix owl from Oman

A new species of Strix owl from Oman, 301 km away, on the western coast of India (del Hoyo et al. 1999). Its main song type can be identified as a form of compound hooting: a brief collection of three to seven short notes, with around four apparently being most typical (Macaulay Library, The Sound Approach, Xeno-canto). Often, it starts with a single note followed by a long gap (see figure 6D), the same as in many other Strix. However, this note may be omitted altogether. The remaining notes vary geographically in rhythm and number, but in all recordings analysed they appear to accelerate towards the end, another typical Strix feature. Compound hooting of Brown Wood differs markedly from that of Omani Owl, most obviously in its very compressed duration (up to 1.54 sec). Male and female often duet, and differ markedly in pitch, but we found no information about which sex had the higher-pitched voice. All but three of the 33 recordings available contained only compound hooting. The other three concerned sounds very different from Omani and other Palearctic Strix owls, and we will not consider them further.

Himalayan Owl

The nearest population of Himalayan Owl Strix nivicolum occurs c 2000 km away (König et al. 2008). Only one vocalisation is well known (see figure
6E), and it is the main reason why this taxon was recently split from Tawny Owl. According to König et al (2008), the song of the male ‘comprises two, sometimes three, clear hoots in rapid succession; at c. 0.05 second intervals…’, ie, with a gap of this duration between them. ‘…Similar in pitch to vocalisations of doves (c.0.55kHz)... Phrase duration up to c.0.3 seconds; phrases are repeated at intervals of several seconds’. Recordings available online (Borror Library of Bioacoustics, Macaulay Library, Xeno-canto), all of which concern two-note hoots, support this description. Whether this is a form of compound hooting or not, Omani Owl differs in having a minimum of four notes when it hoots. A distant recording of Himalayan from Bhutan contains a call that is similar in pitch and nasal quality to contact calls of Omani but has a much shorter duration. It can also be heard in a recording from India where it is repeated at regular intervals in a song-like manner, effectively cancelling any similarity to Omani.

**Mottled Wood Owl**

The nearest population of Mottled Wood Owl *Strix ocellata* occurs c 1400 km away, in Gujarat, India (del Hoyo et al 1999). Mottled Wood has two song-types, one of which can be identified as an even more compressed form of compound hooting (see figure 6F). Like that of Brown Wood Owl, it accelerates towards the end but in the four examples available to us (Hannu Jännes unpubl recording; Xeno-canto), it only contains four notes and lasts a mere 0.44-0.72 sec. Clearly, there is no risk of confusion between it and compound hooting of Omani Owl.

The same can be said for the other song type, possibly related to pulsed hooting. This is a rising wail followed without a break by a descending nasal whinny, the whole repeated at a rate of up to 33/min (Hannu Jännes unpubl recording; Macaulay Library). Given regularly on emerging from the daytime roost, it can sometimes be heard in duet with the female’s shorter, lower-pitched and less tremulous version (Ali & Ripley 1969, König et al 2008).
A new species of Strix owl from Oman

A call type present in three recordings (Macaulay Library, Xeno-canto) is a level hoot lasting c 0.3 sec, with which male and female duet at different pitches. This may be an equivalent to the contact call of Omani Owl although it lacks any inflection. Other calls described in König et al (2008), a ‘metallic hoot’ and a ‘harsh screech similar to that of Common Barn Owl’, suggest no similarity to anything we have heard from Omani.

African Wood Owl

The nearest population of African Wood Owl occurs in Ethiopia, just over 2000 km away (del Hoyo et al 1999). AvdB made recordings during a trip to Namibia in March 1999, and many recordings were available to us in publications and online collections (Chapuis 2000, Gibbon 2003; AVoCet Avian Vocalizations Center, Macaulay Library, Xeno-canto; www.plexusowls.com). Compound hooting of most populations of African Wood consists of seven notes (see figure 6G), although there is a population in the Democratic Republic of Congo (DRC) with six-note hoots (Marcot 2007). The structure is again divided into three sections, which have two, three and two notes respectively. The first notes of the first and second parts are markedly higher pitched and more accented than the other notes. Exceptions to this rule include compound hoots of the DRC population, and those of African Wood from Ghana (Macaulay Library), in which the first note is the lowest and the remainder of the call is at a nearly even, slightly higher pitch, a pitch contour similar to that of Omani Owl. Most sources agree that female African Wood have higher-pitched compound hooting than males (eg, Marcot 2007). Compound hooting of Omani differs from that of African Wood in a number of respects. Most obviously, it is lower pitched than either sex of African Wood, which occupies a frequency range similar to that of Hume’s Owl. Strophes of Omani also have a slower delivery and correspondingly longer duration than those of African Wood. Infrequent six- and seven-note strophes of Omani differ in rhythmic pattern from African Wood in that the second section is only a single hoot in Omani, and the final section starts with an upbeat preceding an accented note. African Wood has no upbeats in its compound hooting: each section begins with an accented note.

The recordings of African Wood Owl available to us contained almost exclusively compound

<table>
<thead>
<tr>
<th>Character</th>
<th>Omani Owl</th>
<th>Hume’s Owl</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Compound hooting</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Notes per strophe</td>
<td>usually 4 but sometimes up to 7</td>
<td>usually 5, rarely 6</td>
</tr>
<tr>
<td>Notes per 3 parts</td>
<td>usually 1 – 1 – 2 (never 2 in 2nd part)</td>
<td>1 – 2 – 2 (occasionally 3 in 3rd part)</td>
</tr>
<tr>
<td>Proportions</td>
<td>1st, 2nd &amp; 4th notes ± equidistant</td>
<td>1st to 2nd note &gt; 2nd to 4th note</td>
</tr>
<tr>
<td>Duration</td>
<td>c 3 sec</td>
<td>c 1.5 sec</td>
</tr>
<tr>
<td>Pitch</td>
<td>as male nominate Long-eared Owl <em>Asio otus otus</em> (see table 2)</td>
<td>as Eurasian Collared Dove <em>Streptopelia decaocto</em> or higher (see table 2)</td>
</tr>
</tbody>
</table>

| Pulsed hooting |           |            |
| Prevalence     | ± as often as compound hooting | rarely heard |
| Duration of bouts | many minutes, many strophes | only 1 or 2 strophes |
| Rate of delivery | c 3.5/sec (see table 3) | c 4-5/sec (see table 3) |

| Alarm calls |           |            |
| Pitch       | low: < 500 Hz | high: up to c 1000 Hz |

| Contact calls |           |            |
| Pitch and timbre | low and nasal | high ‘falsetto’ or whistled |

| Facial disc |           |            |
| Bicoloured (dark grey and grey) | plain (whitish, buffish or pale grey) |

| Underparts markings |           |            |
| Long black (vertical) lines, no horizontal bars | horizontal bar on feather, sometimes connected to short vertical line |

| Upperside colour |           |            |
| Very dark, greyish brown, with inconspicuous markings | variable greyish to brown, with conspicuous pale markings |
hootings and contact calls. In this species, the contact calls are distinctly arch-shaped as well as being higher pitched, longer and less nasal than in Omani Owl (see figure 9C). They are used extensively by both sexes. Only one recording contained what we assume to be a homologue to pulsed hooting, given by a female (see figure 7C). It is structured similarly to pulsed hooting of Hume’s Owl, starting with a note at a pitch similar to the higher notes of a compound hoot and continuing at a pitch similar to the lower ones. However, the individual notes are delivered almost as quickly as in ‘bubbling’ or pulsed hooting of Tawny Owl. Pulsed hooting of African Wood thus differs from that of Omani in being higher pitched and much faster, and apparently also in being used rather only occasionally.

**Provisional sexing of vocalisations**

Unfortunately, the vast majority of recordings and all visual observations of Omani Owl concerned single birds. We made no observations or recordings conclusively linking dimorphism in hooting with male and female owls. However, sexual dimorphism seems to be the most likely explanation for dimorphism in hooting of Omani, and a comparison with other *Strix* species allows us to make a provisional attribution.

In *Strix* owls, the usual pattern is for males to have a lower-pitched voice than females. This is known to be the case in, eg, Tawny (Andersen 1961), Spotted *S. occidentalis* (Gutiérrez et al 1995), Northern Barred (Kroodsma 2005, Odom & Mennill 2010), Fulvous *S. fulvescens* (König et al 2008), Chaco *S. chacoensis* (König et al 2008), Rufous-legged *S. rufipes* (König et al 2008), Ural (Svensson et al 2009) and African Wood Owl (Marcot 2007) and in three *Ciccaba* species regarded as *Strix* by König et al (2008): Mottled (König et al 2008), Black-and-white *C. nigrolineata* (König et al 2008) and Black-banded Owl (König et al 2008) (cf Dickinson & Remsen 2013). In Great Grey Owl, our recordings show no difference in pitch of male and female hooting but Bull & Duncan (1993), writing about nominate *nebulosa*, reported the female to be higher pitched. The only clear exceptions we are aware of concern Hume’s Owl, in which males are higher pitched than females in both compound hooting (Yoav Perlman pers comm, James Smith pers comm) and contact calls (own observation), and Mottled Wood Owl, in which females are said to be lower pitched than males in the descending nasal whinny (König et al 2008).

Where there is dimorphism in timbre, male *Strix* owls have the clearer voice (AvdB pers obs, MR pers obs). This is especially evident in some species (eg, Ural Owl and Great Grey Owl), weaker in others (eg, Tawny Owl) and apparently absent in a few (eg, African Wood Owl). However, we know of no *Strix* species where the female consistently has a clearer voice than the male. Even in Hume’s Owl, which forms an exception to the pitch rule, females are more muffled-sounding than males. Given the lack of known exceptions, it seems reasonable to assume that the muffled, hoarse-sounding individuals of Omani Owl are also females, despite having lower pitch than clear-sounding individuals. The lower pitch of females would then be an unusual character shared with Hume’s, suggesting either convergence or a sister species relationship between the two Arabian species.

If our provisional sexing of dimorphism in hooting is correct, then the holotype is a male. In support of this, it was nearly always the bird we heard hooting in its territory, where its hoarse-sounding mate only hooted on a couple of occasions.

**Biogeography, generic placement and etymology**

**Biogeography**

We have found six or seven individuals, including at least two pairs, in a c 3 km stretch of a single wadi located in the northern foothills of Al Jabal Al Akhdar, the central part of the Al Hajar mountains, northern Oman. As similar habitat exists in other still unsurveyed wadis besides the type location, it seems likely that the species will be found elsewhere in the Al Hajar mountains. Given an apparent requirement for cliffs for singing and nesting, its range may prove to be limited to this massif, of which the highest and largest parts lie within Oman. The nearest neighbouring mountain range in the Arabian Peninsula is the Dhofar range of southern Oman, separated from the Al Hajar range by c 700 km of low-lying and largely barren desert.

Omani Owl is the only bird known to be endemic to the Al Hajar mountains. It is also the only endemic bird for Oman and for the Eastern Arabia region sensu Jennings (2010). It joins at least 11 other bird species endemic to the Arabian Peninsula (cf Jennings 2010). The only other Arabian endemic species known to occur in the same area of northern Oman is Arabian Partridge *Alectoris melanocephala*, which however also breeds in southern Oman, Yemen and mountainous regions of Saudi Arabia. The Al Hajar mountains are home to one endemic mammal, Arabian
Tahr Arabitragus jayakari, and several endemic reptiles belonging to Asaccus, Lacerta and Pristurus.

Generic placement
We assign this species to the genus Strix because of both morphological and vocal affinities with existing members of that genus. Morphologically, the strongest affinities concern size, facial disc structure and the lack of ear-tufts, and we note an overall resemblance in plumage to Hume’s Owl. Vocally, the strongest affinity to other Strix owls concerns the structure of the vocal repertoire, with compound and pulsed hooting, as well as alarm calls and contact calls. Within that repertoire we would draw particular attention to the three-part, accelerating rhythm of compound hooting. Outside the genus Strix, similar rhythms can be found only in some Oriental Scops Owls O sunia and Socotra Scops Owl O socotrina, which however have much shorter gaps between strophes, and no equivalent to pulsed hooting in their repertoire.

Etymology
Both the scientific name Strix omanensis and the English name, Omani Owl, honour the Sultanate of Oman and the Omani people, in acknowledgement of their efforts to preserve the natural heritage of the country. In the words of His Majesty Sultan Qaboos bin Said al Said, the leader of the Omani people, ‘God’s gift of nature as a heritage carries with it a responsibility to guard it and to nurture it for the future generations of our people’. The name also refers to the fact that Omani Owl is, on current knowledge, endemic to Oman (see below).

Discussion and conclusions
Description without specimen
In the absence of a specimen we use sonagrams and photographs to document our hypothesis that this represents a previously undescribed species. We believe that presenting high-quality photographs and sonagrams of four different vocalisations of the holotype along with sonagrams of similar vocalisations from several other individuals provides sufficient and verifiable evidence for the uniqueness of this species. In time, we anticipate the collection of moulted feathers for DNA analysis and perhaps even biometrics of captured live individuals to further document its taxonomic status. Comparison of the DNA of the holotype of Hume’s Owl (see discussion above) with that of other Hume’s specimens and that of future topotypes of Omani Owl (eg, from birds captured or from lost feathers) may also help to clarify the geographical provenance of the Hume’s holotype.

We note that articles 72.5.6 and 73.1.4 of the International Code of Zoological Nomenclature (1999, amended 2012) allow the use of photographs to make a name available for the purpose of zoological nomenclature. Indeed, it is established that new species names can be based on illustrations, and that a live specimen can be a type (Wakeham-Dawson et al 2002, Nottin 2011). It means that a photograph in itself cannot be a type but the depicted bird can be. So, it should be stressed that the type is the individual that is photographed, not the photograph itself.

Describing a new taxon without a specimen is exceptional but not unique, as there are previous examples that did not result in confusion about the application of the name (cf Donegan 2008). Probably the best known example of a bird species described without a type specimen in recent decades is Bulo Burti Boubou Laniarius liberatus, known from a single bird trapped in Somalia in 1988, and freed after being DNA-sampled in 1990 because of its supposed rarity; the fact that it now appears to be a colour morph of Somali Boubou L erlangeri, a species split from Tropical Boubou L aethiopicus based on DNA analysis in 2008, has no relationship with the lack of a specimen (Smith et al 1991, Collar 1999, Nguembock al et 2008). A more recent example is Bugun Liocichla Liocichla bugunorum from Arunachal Pradesh, India, which was described despite the lack of a specimen because of fear for the survival of the species; there were only three known breeding pairs at the type locality (Athreya 2006, van Loon 2007). In addition, the subspecies sepikensis of Hooded Mannikin Lonchura spectabilis was named on the basis of photographs and has been accepted in subsequent works (Jonkers & Roersma 1990, Dickinson 2003). Likewise, a new African monkey Lophocebus kipunji (Jones et al 2005) and, from Galápagos, a new iguana Conolophus martheae (Gentile & Snell 2009) have been accepted without a specimen (for comments, see Landry 2005, Timm et al 2005, Donegan 2009, Dubois 2009, Nemésio 2009).

Although we are fully aware of the value of information-rich specimens for ornithological research and conservation, it was not an option to collect a specimen of Omani Owl. Trapping appeared virtually impossible at the three sites we found so far, as the birds were only active during the night and rarely left their high, steep, inaccessible
A new species of Strix owl from Oman

...sible cliffs. We could have asked museum professionals to shoot a specimen (cf Nemésio 2009a). However, there were at least three reasons not to do so: 1 Most importantly, there are only six or seven individuals known from three or four territories, too few to permit collecting a specimen without jeopardising the continued survival of the only known population (cf Collar 2000). For the time being, the population size remains a matter of speculation. Given that the species is only known from the highest of cliffs in a restricted mountain range and may be dependent on such cliffs, it may be very rare or at least hard to census. 2 Killing the most accessible bird(s) in these mountains would make it difficult to study this species in the future. 3 Collecting the only endemic bird of Oman would be disapproved of locally as we have little doubt that for the Omani authorities, conservation and protection of a possibly endangered taxon would come first. For instance, as far as we understand, the Natural History Museum at Muscat, Oman, does not collect birds by deliberately killing them but only encourages people to send specimens accidentally found dead, which further illustrates the local people’s respect for wild birds, incompatible with killing them.

We acknowledge that specimens may take away any uncertainty about the validity of a species and, therefore, increase the speed of necessary actions for conservation (Dubois & Nemésio 2007). Peterson & Lanyon (1992) and Banks et al (1993) have put forward that specimens guarantee verifiable taxonomy, verifiability being essential in science. However, we emphasize that the sound recordings and the photographs in raw file format present verifiable phenotypical information. Besides, the population of this species is not extinct, so its presence in Oman can be verified as well.

Lecroy & Vuilleumier (1992) and others stated that a specimen is of such importance that one should wait with describing a species without specimen after fieldwork has shown its population size. However, the fact that this owl has remained hidden for so long in a well-known birding area in one of the more populated regions of Oman shows that it is clearly very difficult to find. As a consequence, it is likely to take considerable time before further research establishes whether the species is really rare. Another reason for us to describe it without further delay is that, without a formal name and description, it will not get a protection status in, eg, the IUCN Red List of Threatened Species. By formally describing this species, we also hope to stimulate other people to look for it and collect information.

Conclusions

Omani Owl is probably most closely related to Hume’s Owl. Both species share a number of morphological features which differ from other Strix species, including relatively long legs and short tail, bands on wings and tail, orangey eyes and pale underparts. Both species also occupy rather similar rocky desert habitat although, so far, Omani has only been found on high cliffs, not in shallow wadis. In this context, it is worthwhile to mention that there are no records of Hume’s in northern Oman or the United Arab Emirates (Jennings 2010, Porter & Aspinall 2010). In Oman, Hume’s only occurs in the south, in Dhofar (and into Yemen), ie, further than 830 km from Oman’s locality (Jennings 2010), rendering the map of Hume’s in König et al (2008) erroneous.

While there is variation in ground colour within the population of Hume’s Owl, there is no such variation in its vocalisations. We compared sounds of Hume’s from its entire range, from Israel and Jordan in the north, Riyadh, Saudi Arabia, in the centre, to southern Oman in the south, and all these birds show the same song and calls, very different from the vocalisations of Omani Owl.

Omani Owl is the first entirely new ‘non-cryptic’ bird species to be discovered in the WP (sensu Martins & Hirschfeld 1998) for 40 years, the last being Algerian Nuthatch Sitta ledanti from Kabylia, Algeria, discovered in 1973 (Vieilliard 1976). The most recently described new WP species concerns Monteiro’s Storm Petrel Oceanodroma monteiroi from the Azores, previously a ‘cryptic’ population of Madeiran Storm Petrel O castro (Bolton et al 2008, Robb et al 2008). In 2009, one of the current authors played a decisive role in the rediscovery of Turkish Brown Fish Owl B zeylonensis semenowi in Turkey (van den Berg et al 2010). For us to have been involved in such events twice in five years suggests that there is still much to discover in the WP, especially during the night.

On current knowledge, Omani Owl is the rarest owl in the WP. Priority must now be given to a comprehensive survey of suitable habitat, in order to establish what level of protection it requires. Once this crucial information has been obtained, we look forward to the gradual filling in of details about every aspect of the physical attributes, genetic affinities and behaviour of the species.

Acknowledgements

We would like to thank His Majesty Sultan Qaboos bin Said al Said for answering a query regarding a proposed name for the new species and for his interest in our discovery. We are grateful to Cecilia
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Samenvatting

EEN NIEUWE SOORT STRIX-UIL IN OMAN


Geluids- en verenkleedkenmerken demonstreren dat de in mei opgenomen en gefotografeerde uilen een nieuw soort vertegenwoordigen, waarvoor de auteurs de naam Omaanse Uil Strix omanensis voorstellen. Het holotype betreft het naar wordt aangenomen nog leven-de exemplaar in plaat 374. Er worden ook andere foto’s en vier sonogrammen van hetzelfde exemplaar getoond. De coördinaten van de typelocatie in Al Jabal Al Akhdar, Al Hajar-gebergte, Al Batinah, Oman, zijn 23˚18’N, 57˚41’E.

Het beschrijven van een nieuwe soort door middel van een illustratie is controversieel maar wel expliciet toegestaan in artikel 72.5.6 en 73.1.4 van de International Code of Zoological Nomenclature, onder de conditie dat niet de illustratie maar het geïllustreerde exemplaar het holotype vormt. Verschillende voorbeelden worden genoemd waarbij het beschrijven van een nieuw taxon zonder balg niet tot taxonomische complicaties heeft geleid. De auteurs hebben geen exemplaar verzameld om drie rereden. 1 Slechts zes of zeven exemplaren waren bekend, te weinig om een exemplaar te verzamelen zonder de populatie in gevaar te brengen. 2 Het doden van de meest toegankelijke individuen zou onder andere studie kunnen verhinderen. 3 Het verzamelen van de enige endemische soort van Oman zou tot veel lokaal onbegrip leiden. Het Natuurhistorische Museum van Muscat, Oman, doodt bijvoorbeeld geen dieren ten behoeve van hun collectie en accepteert slechts dieren dat dood worden aangetroffen door het publiek of door de auteurs zelf. Er is dus nooit een Omaanse Uil ontdekt en dus ook geen Palestijnse Bosuil. Indien het type-exemplaar van Palestijnse in feite zou Omaanse Uil zou blijken te zijn, zou de nieuwe uil de naam S butleri moeten krijgen en Palestijnse een andere naam. De type-locatie van Palestijnse is echter altijd twijfelachtig geweest (Hume ontving de balg via tussenpersonen) en het type-exemplaar van Palestijnse in museumverzamelingen en er is geen exemplaar uit Oman aangetroffen.

De enige andere Strix-ul die op het Arabisch Schiereiland voorkomt is Palestijnse Bosuil S butleri. Het type-exemplaar van Palestijnse ligt thans in het Natural History Museum, Tring, Engeland. Op de typelocatie (Makran-kust, Beloetsjistan, Pakistan) is nimmer een Strix-ul aangetroffen en dus ook geen Palestijnse Bosuil. Indien het type-exemplaar van Palestijnse in feite zou Omaanse Uil zou blijken te zijn, zou de nieuwe uil de naam S butleri moeten krijgen en Palestijnse een andere naam. De type-locatie van Palestijnse is echter altijd twijfelachtig geweest (Hume ontving de balg via tussenpersonen) en het is dus onduidelijk welke soort het type-exemplaar vandaan komt. Ook elders in Pakistan, en vooral in Iran, is Palestijnse nooit een overtuigende naam gegeven, dan wel van Paleis-tijnse vastgesteld. Het type-exemplaar vertoont boven dienen de kenmerken van Palestijnse zodat geen namenruil verwacht hoeft te worden.

Omaanse Uil is een middelgrote uil zonder oorpluimen, met een duidelijk omrande gezichtsschijf, grote geeloranje tot oranje ogen, lange poten en een korte staart. De gezichtsschijf is tweekleurg, met donkergris boven en opzij van het oog, en lichtgrijs van net boven het oog naar beneden. De bovendelen zijn koud donkerbruin met vaag begrensde lichte vlekken. De onderdelen zijn bruingeelachtig wit, geleidelijk wit wordend vanaf de borst, met lange lentestrepen maar geen dwarsstrepen. De vleugel heeft donkere banden die van binnen naar buiten breder en donkerder worden, waardoor een brede donkere achterrand van de vleugel ontstaat. De staart heeft twee brede banden in het buitenste deel en twee smalle, vage banden in het binnenste deel. De staart heeft twee brede banden in het buitenste deel en twee smalle, vage banden in het binnenste deel.
A new species of Strix owl from Oman

teurs opgenomen. Samengestelde zang kan worden beschreven als HOE.............HWA....ha-HA. Het bestaat uit drie delen waarvan alleen de laatste meerdere noten heeft. De eerste, tweede en vierde noot staan op min of meer gelijke afstand van elkaar, terwijl de derde een op- maat vormt naar de vierde. De eerste noot is iets lager over de overige. Qua toonhoogte is de samengestelde zang van Omaanse Uil vergelijkbaar of lager dan die van Oeraluil S uralensis, met als hoogste tot nu toe gemeten frequentie 400 Hz. Er zijn ook varianten bekend met tot vier noten in het laatste deel en tot twee in het eerste, waardoor de meeste complexe variant dus zeven noten heeft. Pulserende zang kan worden beschreven als hoe-hoe-hoe-hoe-hoe-hoe-hoe-hoe-hoe-hoe-hoe-hoe, en bestaat uit een aantal min of meer gelijke tonen die even laag of lager zijn dan bij de samengestelde zang. Er zijn c 10-15 noten per strofo, en de strofen worden gemid- deld zes keer per minuut herhaald. De frequentie en de intensiteit stijgen iets tot het midden van de strofo, om daarna weer licht af te zakken naar het einde. Soms zijn tussenvormen van de zang te horen, meestal in de loop van series pulserende zang. Deze zijn erg onregelmatig maar neigen naar samengestelde zang, door bijvoorbeeld een suggestie van een driehoekige structuur. De alarmroep bestaat uit een snelle serie vrij nasale blaffende klanken, elk met een stijgende toonhoogte. De snelheid is iets groter dan bij pulserende zang, en het ritme is minder regelmatig. Bovendien is de alarmroep hoger en met sterkere boventonen: njek-njek-njek-njek-njek-njek.... De contactroep is een stijgende, nasaal klinkende roep die kan worden beschreven als NJEP of, wanneer er een lichte daling aan het einde komt, NJEpoe.

Omaanse Uil hoort duidelijk tot het genus Strix. De sterkste morfologische overeenkomsten met andere leden van dit genus zijn grootte, structuur van de gezichts- schijf en het ontbreken van uiterlijke stukken. Binnen Strix verschilt Omaanse van de meeste soorten door de oran- gegele ogen. In het Palearctische gebied hebben alleen de lichtere Palestijnse Bosuil en de veel grotere Laplanduil S nebulaota respectievelijk geeloranje en lichtgele ogen. Palestijnse Bosuil is waarschijnlijk de soort die het meest vergelijkbaar is met Omaanse. De lagere stem die niet wordt gebruikt. Bovendien is pulserende zang van Bosuil is veel langer, hoger en heeft andere pro- porties, hoewel de basisstructuur nog wel wat overeen- komsten met Omaanse toont. Drie Strix- soorten uit Azië hebben veel kortere samengestelde zang dan Omaanse: Bruine Bosuil B r. tomentosa, Indische Bosuil B r. ocel- lata en kleine Himalayabosuil S. nivicolum. Van die soor- ten is nog niet duidelijk of ze ook pulserende zang heb- ben. Afrikaanse Bosuil B. woodfordii heeft een samenge- stelde zang die even hoog is als die van Palestijnse Bosuil maar met zeven noten in plaats van vijf. De pulserende zang van Afrikaanse wordt zelden opgenomen. Uit één opname blijkt echter dat deze zeer vergelijkbaar is met die van Palestijnse Uil en als veel heldere stem heet. Op verschillende momenten kon worden vastgesteld dat twee Omaanse Uilen dicht bij elkaar zaten te roepen. In twee verschillende territoria kon worden gehoord dat één van de twee een iets hogere en meer heldere stem had dan de andere. Dit suggereert seksueel dimorfisme, wat bij de meeste uilen goed te horen is. Er zijn echter nog geen waarnemingen gedaan waardoor het duidelijk werd welk geslacht bij welke toonhoogte hoort. Bij vrij- wel alle Strix- soorten heeft het vrouwtje de hogere stem. De enige bekende uitzondering zijn Palestijnse Bosuil en, voor minstens één type vocalisatie, Indische Bosuil. Bij alle soorten waarvoor informatie beschikbaar was is er of geen verschil in timbre/klinkkleur, of het vrouwtje heeft de minder heldere stem. Er zijn nog geen Strix- soorten bekend waarbij het vrouwtje een heldere stem heeft dan het mannetje. Daarom is het ook waarschijnlijk dat bij Omaanse Uil de vogel met de lager liggende sterkere stem het vrouwtje betreft. De lagere stem zou een uitzondering zijn die Omaanse met Palestijnse deelt.

Palestijnse vrijwel altijd vijf zijn en nooit vier. Bovendien is het ritme anders bij Palestijnse, met twee noten in het tweede deel, terwijl er bij Omaanse nooit twee zijn. De frequentie is veel hoger bij Palestijnse, vergelijkbaar met of hoger dan Turkse Tortel Streptopelia decaocto, terwijl de toonhoogte van Omaanse kan worden vergeleken met een mannetje nominaat Ransuil A r. otus otus (dus lager dan Houtdui Columba palumbus). De lengte van de samengestelde zang is c 3 sec bij Omaanse en 1.5 sec bij Palestijnse. Bij Omaanse worden samengestelde en pulserende zang ongeveer even vaak gebruikt en voor lange perioden, terwijl bij Palestijnse pulserende zang veel minder vaak en slechts gedurende enkele seconden wordt gebruikt. Bovendien is pulserende zang van Omaanse lager en wordt deze iets trager voortgebracht. De alarmroep van Omaanse is vergelijkbaar met die van Palestijnse maar lager en langzamer, en wordt minder snel voortgebracht. De contactroep van Omaanse is veel lager dan de meer fluitende van Palestijnse, en heeft een veel sterkere nasale toon.

Verschillen in geluid tussen Omaanse Uil en Palestijnse Bosuil is waarschijnlijk de soort die het meest op Omaanse Uil hoort duidelijk tot het genus Strix, vooral wat betreft de pulserende zang. Bij Bosuil S aluco is de pulserende zang veel sneller, zodat het eerder bibrerend klinkt. De bekende samengestelde zang van Bosuil is veel langer, hoger en heeft andere pro- porties, hoewel de basisstructuur nog wel wat overeen- komsten met Omaanse toont. Drie Strix- soorten uit Azië heeft de pulserende zang even hoog als die van Palestijnse Bosuil maar met zeven noten in plaats van vijf. De pulserende zang van Afrikaanse wordt zelden opgenomen. Uit één opname blijkt echter dat deze zeer vergelijkbaar is met die van Palestijnse Uil en als veel heldere stem heet. Op verschillende momenten kon worden vastgesteld dat twee Omaanse Uilen dicht bij elkaar zaten te roepen. In twee verschillende territoria kon worden gehoord dat één van de twee een iets hogere en meer heldere stem had dan de andere. Dit suggereert seksueel dimorfisme, wat bij de meeste uilen goed te horen is. Er zijn echter nog geen waarnemingen gedaan waardoor het duidelijk werd welk geslacht bij welke toonhoogte hoort. Bij vrij- wel alle Strix- soorten heeft het vrouwtje de hogere stem. De enige bekende uitzondering zijn Palestijnse Bosuil en, voor minstens één type vocalisatie, Indische Bosuil. Bij alle soorten waarvoor informatie beschikbaar was is er of geen verschil in timbre/klinkkleur, of het vrouwtje heeft de minder heldere stem. Er zijn nog geen Strix- soorten bekend waarbij het vrouwtje een heldere stem heeft dan het mannetje. Daarom is het ook waarschijnlijk dat bij Omaanse Uil de vogel met de lager liggende sterkere stem het vrouwtje betreft. De lagere stem zou een uitzondering zijn die Omaanse met Palestijnse deelt.
Momenteel zijn er slechts zes of zeven individuen bekend van Omaanse Uil maar de beschikbaarheid van vergelijkbare habitat op andere locaties in het Al Hajar-gebergte maakt het aannemelijk dat er meer exemplaren zijn. Dit gebergte is sterk geïsoleerd en Omaanse Uil is daarom hoogstwaarschijnlijk endemisch binnen het Al Hajar-gebergte, waarvan het hoogste en grootste deel binnen Oman ligt. Palestijnse Bosuil is overigens nog nooit in het noorden van Oman of in de Verenigde Arabische Emiraten vastgesteld maar komt wel op meer dan 830 km afstand in Dhofar in zuidelijk Oman voor. Het Al Hajar-gebergte heeft één endemisch zoogdier en verschillende endemische reptielen. Omaanse Uil is de enige endemische vogelsoort van het gebergte en van heel Oman. Voor het Arabisch Schiereiland zijn ten minste 11 endemische vogelsoorten bekend, waarvan de meeste in Jemen en het zuidwesten van het Arabisch Schiereiland voorkomen.

De laatste soort die werd ontdekt in het West-Palearctische gebied (WP; inclusief het Arabisch Schiereiland en Iran) is het in 2008 beschreven Monteiro's Stormvogeltje Oceanodroma montei, voorheen een ‘cryptische’ populatie van Madeira Stormvogeltje O. castro. Omaanse Uil is echter de eerstste ‘niet-cryptische’ nieuwe vogelsoort voor de WP in 40 jaar. De vorige was Algerijnse Boomklever Sitta ledanti in 1973. Op basis van huidige kennis is Omaanse Uil de zeldzaamste uil in de WP. Het is belangrijk dat er eerst een grondige inventarisatie wordt uitgevoerd om te bepalen welk niveau van bescherming vereist is. Daarna kan door verder onderzoek de kennis over deze soort stapsgewijs worden uitgebreid.

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