



Short Communication

Diversity and Nest Characteristics of Owl Species Inhabiting Margalla Hills National Park Islamabad, Pakistan

Tariq Mahmood^{1*}, Shafqat Rasool¹, Faraz Akrim¹, Shaista Andleeb¹,
Muhammad Sajid Nadeem² and Fiaz Nadeem³

¹Department of Wildlife Management, Pir Mehr Ali Shah, Arid Agriculture University, Rawalpindi

²Department of Zoology, Pir Mehr Ali Shah Arid Agriculture University, Rawalpindi

³Islamabad Model College for Boys, Sector I-8/3, Islamabad

ABSTRACT

Field surveys were conducted fortnightly from February 2014 to May 2015 for recording diversity of owl species inhabiting Margalla Hills National Park, Islamabad (MHNP). Three owl species viz., Spotted Owllet (*Athene brama*), Little owl (*Athene noctua*) and the Tawny Owl (*Strix aluco*) were recorded from the park at five different sampling sites, at elevations ranging from 615 m to 655 m above sea level. Only one of the three species Tawny owl was previously known from the park while the other two species have been recorded for the first time from the MHNP. On the contrary, three other owl species that were previously known from the park (Asian Barred Owllet *Glaucidium cuculoides*, Oriental Scops-owl *Otus sunia* and Pallid Scops Owl *Otus brucei*) were not recorded in the current study. Nests of Spotted owl were found at three sampling sites (Kalingar, Gandhian and Shah Allah Ditta), those of little owl at Kalingar valley, while single cavity nest of the Tawny owl was located in a mountain ridge at Kalingar valley site.

Article Information

Received 30 January 2018

Revised 11 March 2018

Accepted 21 March 2018

Available online 21 June 2018

Authors' Contributions

TM and SR designed the study. SR and FN collected the data. FA and SA helped in manuscript compiling and data analysis. MSN identified and recorded the owl species.

Key words

Spotted owl, Little owl, Tawny owl, Diversity, Nest, MHNP.

Owls, the apex predators, belong to two bird families, namely Strigidae and Tytonidae; family Strigidae is represented by 19 species while Tytonidae by a single species in Pakistan (Roberts, 1991). The list of owl species has grown from 144 species (Peters, 1940) to 211 species in 2012 (Gill and Donsker, 2012). The International Union for the Conservation of Nature (IUCN) has listed the status of 32 owl species as “Vulnerable” to “Critically Endangered”, 22 species as “Near Threatened” and other 27 have either not been evaluated or do not have sufficient data to assign a status (Sergio *et al.* 2004; Movalli *et al.* 2008). Out of 20 owl species occurring in Pakistan, four species were already known from Margalla Hills National Park (MHNP), viz., Himalayan Barred owl (*Glaucidium cuculoides*), Oriental Scops owl (*Otus sunia*), Pallid Scops owl (*Otus brucei*) and Tawny owl (*Strix aluco*) (Roberts, 1991).

Monitoring and observing owls and their habitat can be an efficient method of monitoring and conserving biodiversity. The greatest threat to owls is the loss of

habitat, though they are also negatively impacted by pesticide use, vehicle collisions and illegal trade (Konig *et al.*, 1999; Sergio *et al.*, 2004; Ahmed, 2010). Although studies related to ecology of many other bird species have been conducted in Pakistan such as by Abdullah *et al.* (2017), however, different owl species, mainly have stayed neglected for their ecological investigations. A few earlier studies conducted on owls in Pakistan have focused on their food habits in the central and southern Punjab (Nadeem *et al.*, 2012), however, ecological data regarding their nesting habitat and other aspects are lacking in the country. Therefore, the current study was focused on recording the current diversity and nests of owl species occurring in the MHNP, Islamabad.

Methodology

The current study was conducted in the Margalla Hills National Park, Islamabad (33°40' 01" to 33°42' 43" N and 72° 45' 01" to 72° 52' 32" E) situated along the northern border of the Federal Capital Territory, Islamabad. MHNP covers an area of 17,386 ha (Masroor, 2011; Iqbal *et al.*, 2013). The hill range nestles between an elevation of 685 m at the western end and 1604 m on its east. The topography of the park is rugged, general aspect

* Corresponding author: tariqjanjua75@uaar.edu.pk
0030-9923/2018/0004-0001 \$ 9.00/0

Copyright 2018 Zoological Society of Pakistan

is southerly and the terrain is interspersed with both large and small valleys. Climatically, the area has five distinct seasons: winter (December-February), spring (March-April), summer (May-June), monsoon (July-September) and autumn (November). Average minimum and maximum temperatures are 19.5°C and 33.3°C, respectively while the average annual rainfall is about 94 cm (Hussain, 1986). The fauna of the Park is mainly Indo-Malayan with some overlapping of Palearctic species. It is home to a large number of birds such as sky lark, paradise flycatcher, black francolin, grey francolin, shrikes, pheasants, spotted dove, Egyptian vultures, falcons, hawks and eagles, apart from having a variety of mammals and reptiles. The bird species are both resident, as well as winter migrant (from higher altitudes of the north). Spring and summer visitors breed and short day arrive in spring.

Initially surveillance surveys were conducted in the potential areas of the National Park, such as, old buildings in villages, chimneys of houses, towers of mosques, abandoned buildings, tall trees at different locations and elevations, and natural areas, to search and locate the roosting and nesting sites of owl species. The particular owl species using the nest was identified, using binoculars, by taking field photographs using digital camera and

following field guides such as one by Grimmett *et al.* (2008).

After locating nests of different owl species, data were recorded about nest variables, *viz.*, nest type (cavity nest, platform, and tree holes), nest composition, size, structure and height above the ground level. Diameter of the nesting surface was recorded using measuring tape. Structure of the nest was observed and each nest was categorized as cavity nest, stick nest or platform nest.

Results and discussion

During field surveys of the study area, 14 potential sampling sites of owl occurrence were identified (Supplementary Table I), from 525 m (Rawal Lake) to 885 m (Talhar village) above mean sea level (amsl). Eleven sampling sites were found negative regarding occurrence of any of the owl species since no detectable signs of owl presence like nest, prey remains were found. Three sampling sites *viz.*, Klinger village (N 33°43.746 E 073°01.149), Shah Allah Ditta (N33°4251.28 E 72° 5513.31), and Gandhian village (N33°43.742 E 073° 01.358) were found positive, showing signs of owls' occurrence, especially their nests. The elevation of sites found positive for occurrence of owl species ranged from 615 m to 655 m.

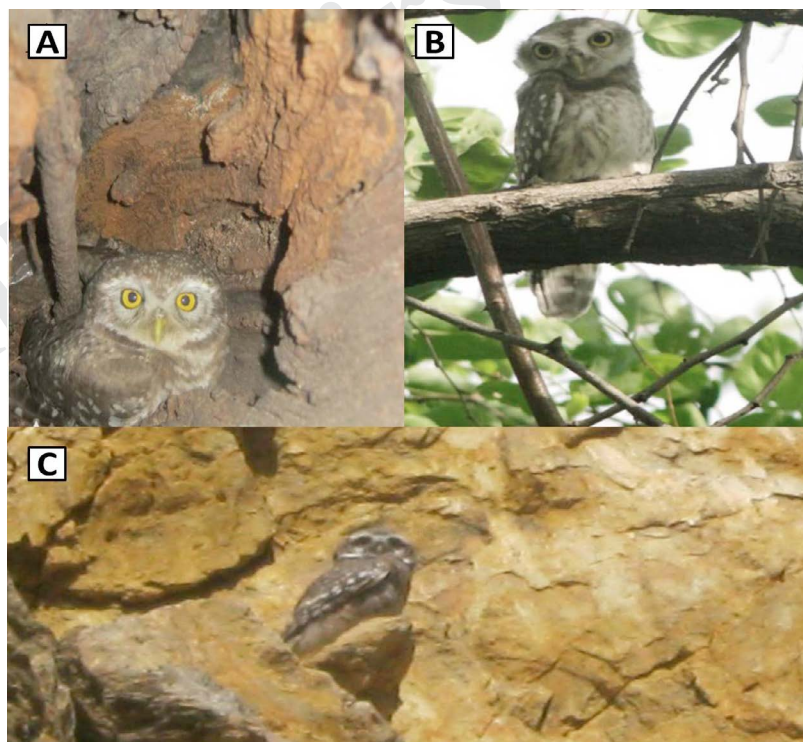


Fig. 1. Three owl species recorded in the Margalla Hills National park Islamabad. **A**, Spotted owl (*Arhene brama*) at the opening of nesting cavity in *Accacia arabica* tree at Ghandian village; **B**, Little owl (*Athene noctua*) sighted sitting on a branch of *Zizyphus jujuba* at sampling point A at Klinger valley; **C**, Tawny owl (*Strix aluco*) sighted sitting on a mountain rock at Klinger village sampling point "C".

Spotted owlet (*Athene brama*) was observed at Kalinger village (626 m amsl), Shah Allah Ditta (615 m amsl) and Ghandhian (655 m amsl). Little owl (*Athene noctua*) was observed at Shah Allah Ditta (615 m amsl) and Tawny owl at Ghandhian (655 m amsl).

Spotted owlet (Fig. 1A) was sighted four times at three different sampling sites in the National Park viz., Kalinger, Shah Allah Ditta and Gandhian. At Kalinger site, it was sighted sitting on branches of a berry tree *Zizyphus mauritiana* and again in a cavity among stones of a wall, at a distance of about 500 m another Spotted owl was sighted in a cavity inside a big banyan tree *Ficus bengalensis*. At Shah Allah Ditta, the spotted owl was sighted sitting in the ventilating opening left in the wall of an abandoned house. At Gandhian, the owl was sighted at the opening of a cavity in the trunk of a large tree of *Acacia nilotica*.

Little Owl was sighted only once at sampling point "A" at Kalinger valley site where it was found sitting on a branch of berry tree (Fig. 1B).

The Tawny owl (*Strix aluco*) (Fig. 1C) was recorded at Kalinger village site at sampling point "C". A pair of Tawny owls was sighted sitting in a mountain ridge; one member on a mountain rock while the other inside the cavity. The nesting cavity was located at 655 m amsl.

Out of 14 sampling sites, we recorded three different owl species at five different locations including Klinger village, Ghandhian village and Shah Allah Ditta in the MHNP (Supplementary Tables I, II). At Klinger site, further three different sampling points recorded owl and their nests viz., sampling point "A", "B" and "C".

For spotted owlet, the elevation of the nests above mean sea level ranged from 615m to 717 m; the first nest was located in a cavity in the trunk of large ber tree at Kalinger valley sampling point "A". The cavity in the trunk of the tree also had large quantities of insect body remains, probably consumed by this owl species. The second nest of spotted owlet was also found at Kalinger village site near a water stream "sampling point B" Here the owl nest was in the trunk of an old banyan tree. Straws and some anthropogenic materials like pieces of polythene bags were found inside the nesting cavity in the tree trunk. Another nest of the spotted owlet was found in a large plastic pipe hanging on a wall of an abandoned house at Shah Allah Ditta sampling site.

Only one nest of little owl was found, at Gandhian valley located in the cavity of keekar tree near to human dwellings. Similarly, single nest of the Tawny owl was discovered in a cavity of a mountain ridge at Kalinger village sampling site "C", where the owl was sighted sitting outside as well as inside the cavity nest.

Owls are nocturnal birds and apex predators, grouped

into two families namely Strigidae and Tytonidae. The family Strigidae is represented by 19 species and the family Tytonidae by a single species, in Pakistan. They are wide spread geographically; however, only a few areas are inherently species-rich. Owl biodiversity serves as a good bio-indicator for ecosystem health and conservation efforts that target owl species inherently protect many other species, habitat, and ecological functions (Caro and O'Doherty, 1999; Sergio *et al.*, 2004; Movalli *et al.*, 2008). They are found in forests which are not intruded by human beings, abandoned old buildings and barns. They are nocturnal in habit and active predators. Roberts (1991) has reported 20 owl species from Pakistan; four from MHNP. The aim of the current study was to find out the current diversity and nest characteristics of owl species inhabiting MHNP. Surveys were conducted at different elevations in the study area to search the owl species and their suitable habitat in the National Park. Old buildings (present inside the Park), minarets of mosques, natural areas, sites near grave yard, and sites near water reservoirs were visited.

Out of four owl species reported by Roberts (1991) from MHNP viz., Himalayan Barred Owl (*Glaucidium cuculoides*), Oriental Scops owl (*Otus sunia*), Pallid Scops owl (*Otus brucei*) and Tawny owl only Tawny owl was recorded during the study. Other owl species recorded are: spotted owlet and little owl

Nest site selection is a key component of avian habitat selection with significant consequences for survival and reproductive success (Cody, 1985). Nest site choice influences the probability of nesting success through such factors as predation, starvation, and competition (Martin, 1995). Nesting habitat is important for the survival of a bird species and owls are very sensitive to changes in the environmental conditions. So it is vital to study the nest characteristics of owl species. In the current study, most of the field sightings and owl nests were recorded on the lower slopes as reported by some earlier researchers (Blackesley *et al.*, 1992; Seamans and Gutierrez, 1995; Hershey *et al.*, 1998) that lower slopes and river terraces were the most productive habitats for owl nesting in northwestern California. Such areas usually have large trees and forest structure needed by spotted owls for nesting. Spotted owlet is known to nest in natural hollows of tree-trunks, holes in dilapidated walls or between the ceiling and roof of deserted as well as occupied dwellings. Its nest is sometimes, lined with a little grass, low, and feathers (Ali and Ripley, 1983). Spotted owls therefore, select large trees to nest which is consistent with observations throughout their range. The current study has produced similar consistent results regarding spotted owl nests, in the tree cavities of *Ber* and Banyan trees.

The preference of the Little owl for built-up areas

indicates that the species is strongly associated with human settlements and confirms earlier results reported from Spain (Martinez and Zuberogitia, 2004; Grzywaczewski, 2006) where the little owl withdrew from farmlands and colonized more urbanized areas. Recently, the nests of this owl species have been reportedly found in man-made structures (e.g. buildings) more frequently than in natural tree holes (Grzywaczewski, 2006). In the present study only one nest of Little owl could be located in Gandhian valley. The particular nest was located in the cavity of a Keekar tree close to a house in the village.

The third owl species, the Tawny owl, being reported from MHNP occupied open woodlands in preference to compact block woodlands with large home ranges and territories (Hirons, 1985; Hardy, 1992). The single nest of the Tawny owl was located in a cavity of a mountain ridge at Kalingar village sampling site C.

Conclusion

The study concludes that three owl species; Spotted owl, Little owl and the Tawny owl, inhabit MHNP Islamabad whereas three owl species viz., Himalayan Bared Owl, Oriental Scops owl, Pallid Scops owl, previously reported by Roberts (1991) have not been sighted during the current study. The three species sighted in MHNP are cavity nesting utilizing both tree trunks and cavities in rocks and mountains in the study area.

Supplementary material

There is supplementary material associated with this article. Access the material online at: <http://dx.doi.org/10.17582/journal.pjz/2018.50.4.sc16>

Statement of conflict of interest

Authors have declared no conflict of interest.

References

- Abdullah, M., Khan, R.A., Rafay, M., Hussain, T., Ruby, T., Rehman, F., Khalil, S. and Akhtar, S., 2017. *Pakistan J. Zool.*, **49**: 1863-1870.
- Ahmed, A., 2010. *Imperiled custodians of the night: A study on illegal trade, trapping and use of owls in India*. TRAFFIC India/WWF-India. New Delhi, India, pp. 76.
- Ali, S. and Ripley, S.D., 1983. *Handbook of the birds of the India and Pakistan*, Compact Edition. Oxford University Press, Delhi, pp. 737.
- Blackesley, J.B., Franklin, A.B. and Gutierrez, R.J., 1992. *J. Wildl. Manage.*, **56**: 388-392. <https://doi.org/10.2307/3808840>
- Caro, T. and Doherty, G.O., 1999. *Conserv. Biol.*, **13**: 805-814. <https://doi.org/10.1046/j.1523-1739.1999.98338.x>
- Cody, M.L., 1985. *An introduction to habitat selection in birds*. Academic Press, Orlando, FL, pp. 3-56.
- Gill, F., and Donsker, D. (eds.), 2012. *IOC world bird names (v 2.11)*. Accessed at: <http://www.worldbirdnames.org/> (March 2012).
- Grimmett, R., Roberts, T. and Inskip, T., 2008. *Birds of Pakistan*. Christopher Helm, London, pp. 256.
- Grzywaczewski, G., 2006. *Not. Ornitol.*, **47**: 147-158.
- Hershey, K.T., Meslow, E.C. and Ramesy, F.L., 1998. *J. Wildl. Manage.*, **62**: 1398-1410. <https://doi.org/10.2307/3802006>
- Hardy, A.R., 1992. In: *The ecology and conservation of European owls* (eds. C. A. Galbraith, I.R. Taylor and S. Percival). UK Nature Conservation No 5, Joint Nature Conservation Committee, Peterborough, pp. 55-63.
- Hirons, G.J.M., 1985. *J. Zool. (Lond.)*, **1**: 21-48. <https://doi.org/10.1111/j.1469-7998.1985.tb00067.x>
- Hussain, M., 1986. *Re-introduction of cheer pheasant in Margalla Hills National Park*. A report by World Wide Fund for Nature, Pakistan and Capital Development Authority, Islamabad.
- Iqbal, M.F., Khan, M.R. and Malik, A.H., 2013. *J. Himal. Earth Sci.*, **46**: 89-98.
- König, C., Weick, F. and Becking, J., 1999. *Owls: a guide to the owls of the world*. Yale University Press, New Haven, CT, pp. 462.
- Martin, T.E., 1995. *Ecol. Monogr.*, **65**: 101-127. <https://doi.org/10.2307/2937160>
- Martinez, J.A. and Zuberogitia, I., 2004. *Ardeola*, **51**: 303-317.
- Masroor, R., 2011. *Pakistan J. Zool.*, **43**: 1041-1048.
- Movalli, P., Duke, G. and Osborn, D., 2008. *Ambio*, **37**: 395-396. [https://doi.org/10.1579/0044-7447\(2008\)37\[393:E\]2.0.CO;2](https://doi.org/10.1579/0044-7447(2008)37[393:E]2.0.CO;2)
- Nadeem, M.S., Imran, S.M.K., Mahmood, T., Kayani, A.R. and Shah, S.I., 2012. *Anim. Biol.*, **62**: 13-28. <https://doi.org/10.1163/157075511X597593>
- Peters, J., 1940. *Check-list of birds of the world*, Vol 4. Museum of Comparative Zoology, Harvard University. Cambridge, MA 02138, pp. 303.
- Roberts, T.J., 1991. *The birds of Pakistan*. Oxford University Press, London, UK.
- Seamans, M.E. and Gutierrez, R.J., 1995. *Condor*, **97**: 944-952. <https://doi.org/10.2307/1369533>
- Sergio, F., Newton I., Marchesi, L. and Pedrini, P., 2004. *J. Biogeograph.*, **31**: 619-628. <https://doi.org/10.1046/j.1365-2699.2003.01002.x>



Supplementary Material

Short Communication: Diversity and Nest Characteristics of Owl Species Inhabiting Margalla Hills National Park Islamabad, Pakistan

Tariq Mahmood^{1,*}, Shafqat Rasool¹, Faraz Akrim¹, Shaista Andleeb¹, Muhammad Sajid Nadeem² and Fiaz Nadeem³

¹Department of Wildlife Management, Pir Mehr Ali Shah, Arid Agriculture University, Rawalpindi

²Department of Zoology, Pir Mehr Ali Shah Arid Agriculture University, Rawalpindi

³Islamabad Model College for Boys, Sector I-8/3, Islamabad

* Corresponding author: tariqjanjua75@uaar.edu.pk

0030-9923/2018/0004-0001 \$ 9.00/0

Copyright 2018 Zoological Society of Pakistan

Supplementary Table I.- Details of surveys conducted for recording diversity of owl species and their nests in the Margalla Hills National Park, Islamabad.

Site Visited	Geographical coordinates	Elevation (m)	Vegetation	Presence/Absence	Owl species identified
Shakarparian	N 33°41'38.35 E 73°04'15.23	570	-	-	-
Rawal Lake	N 33°42'78.1 E 73°07'07.809	535	-	-	-
Rawal Dam	N 33°41'52.9 E 73°06'06.843	528	-	-	-
Fish Hatchery	N 33°43'70.6 E 73°01'01.098	525	-	-	-
Saidpur Village	N 33°44'68.6 E 73°04'04.050	589	-	-	-
Damn e Koh	N 33°44'19.65 E 73°03'20.82	721	-	-	-
Talhaar	N 33°46'10.87 E 73°02'57.51	885	-	-	-
Kalinger	N 33°43'74.6 E 73°01'14.9	Site A: 626 Site B: 615 Site C: 655	Main herbs and shrubs: Included jhamp, Kandiarra (<i>Echinopus echinatus</i>) and Bhaikar (<i>Justicia adhatoda</i> etc. Main Trees: included keeker (<i>Acacia nilotica</i>), Phulai (<i>Acacia modesta</i>), Taman (<i>Grewia tenax</i>), Beri (<i>Zizyphus mauritiana</i>), and Sumbal (<i>Bombax ceiba</i>),	Two pairs of owls recorded One pair of owl recorded One pair recorded	Spotted owlet and little owlet Spotted owlet Tawny owl
Golra Railway Station	N 33°40'10.03 E 72°51'51.51	602	-	-	-
PindSangrial	N 33°41'24.98 E 72°51'55.81	604	-	-	-
Shah Allah Ditta	N 33°42'51.28 E 72°55'13.31	640	Bhaikar, Taman, Phulai, Jangli toot (<i>Morus alba</i>), Kikker, Granda (<i>Carissa opaca</i>) and Kandiarra	One pair of owls	Spotted owlet
Trail 6 Margalla	N 33°45'11.93 E 73°01'31.74	823	-	-	-
Bari Imam (Chillaghah)	N 33°45'83.1 E 73°07'15.9	885	-	-	-
Gandhian	N 33°43'74.2 E 73°01'35.8	Site C: 620	Trees: included: Beri, Phulai, Taman, Kikka, Mulberry, Siris, Granda, and Bohr were present around the owl nesting site. Thick vegetation of jungle Booti under the trees.	One pair of owls	Spotted owlet

Supplementary Table II.- Nest characteristics of three different owl species recorded in the Margalla Hills National Park (MHNP) Islamabad.

Nest type	Nest diameter (cm)	Height of nest (m)	Tree species	DBH of tree (m)	Elevation (m) amsl	Name of place	Geographical coordinates	Number of owls sighted	Depth of cavity (cm)
Spotted owlet (<i>Athene brama</i>)									
Tree Cavity	17.738	6.096	<i>Zizyphus mauritiana</i>	-	626	Klinger valley	N 33°43.448 E 073°01.144	04	91.44
Tree Cavity	15.24	8.53	<i>Ficus bengalensis</i>	3.05	615	Klinger valley	N 33°43.75 E 073°01.041	02	60.96
Cavity in a pipe	10.16	6.096	-	-	717	Shah Allah Ditta	N 33°46.121 E 073°07.310	02	30.48
Little owlet (<i>Athene noctua</i>)									
Tree Cavity	25.4	3.66	<i>Acacia nilotica</i>	2.90	620	Gandhian valley	N 33°43.742 E 073°01.358	02	45.72
Tawny owl (<i>Strix aluco</i>)									
Cavity nest in mountain rocks	40.64	6.096	-	-	655	Klinger valley	N 33°44.058 E 073°01.143	02	45.172