

Winter diet of Short-eared Owls *Asio flammeus* in Akola, Maharashtra

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Short-eared Owl *Asio flammeus*.

Introduction

"The Short-eared Owl *Asio flammeus* breeds across sub-arctic, temperate North America, Eurasia as well as on the grasslands of South America and some islands including Hawaii, Galapagos, Falkland Islands, Cuba, Puerto Rico, Borneo, and Philippines. Some populations are resident; however, the northernmost populations are migratory. In North America, birds winter from extreme southern Canada, south to central Mexico. Eurasian birds winter in the Mediterranean region of Europe, Northern Africa, and southern Asia to Malaysia," (Holt & Leasure 1993).

The Short-eared Owl is a winter migrant to India (Blanford 1894). It prefers grassland and open country (Ali & Ripley 1987). It is reported from many regions of India, such as, Maharashtra (Jamdar & Shrivastava 1988; Chandrasekaran 1995), Madhya Pradesh (Pasha *et al.* 2004), Tamil Nadu (Thyagaraju 1933), Kerala (Jayson & Mathew 2002; Chandrasekhara & Nameer 2003), Gujarat (19 November 1993 specimen: The Field Museum), Rajasthan (5 January 1949 specimen: The Field Museum; Singh 1997), Karnataka (20 January 1941 specimen: The Field Museum), Uttar Pradesh (Grewal 2000), and Andhra Pradesh (Kanniah & Ganesh 1993).

Although there are several records of Short-eared Owl from India there is very little information available on its diet. Ali & Ripely (1987) stated that it mainly feeds on rats, mice, birds, grasshoppers, locusts, beetles, etc. However, details of its diet and biomass consumption are unknown. This study tries to assess the wintering diet and biomass consumption of Short-eared Owls. The Biomass of the mammals and birds was taken from Bombay Natural History Society's museum specimens.

Study area

The study area, consisting of a c. 3.7 km² mosaic of grassland and crop fields, is situated 15 km east of Akola city (20°40'05.7"N 77°09'24.0"E), in Maharashtra, India. The habitat is typical scrub forest interspersed with grassland and crop fields. The dominant plant species are *Acacia nilotica*, *A. katechu*, *Anogeissus latifolia*, *Zizyphus* sp., *Hardwickia pinnata*, *Butea monosperma*, and *Bombax ceiba*. The main grass species found in this area are

Heteropogon contortus, *Pennisetum pedicellatum*, *Andropogon tumulus*, *Apluda mutica*, *Aristida reducta*, *Chrysopogon fulvus*, and *Cymbopogon martinii*. The crop species are cotton *Gossypium* sp., jowar *Sorghum bicolor*, wheat *Triticum* spp., and soybean *Glycine max*.

Methods

From January to March 2006 we collected pellets¹ once per week from diurnal roosts of two individual Short-eared Owls. A total of 66 pellets were collected, of which 58 were intact. Efforts were made to collect a large number of pellets and care was taken to avoid collecting pellets of harriers (*Circus* spp.), which roosted nearby. To avoid this we confirmed the diurnal roosts of the two Short-eared Owls by flushing them out of grass clumps and acacia shrubs. We assumed that only two owls used the area of 3.7 km. The birds were not banded hence we cannot say decisively that they were same individuals. However, we collected pellets only from two roosting sites. Mostly the Short-eared Owls showed site fidelity, shifting roosts only after cattle had grazed the area.



Ajit Deshmukh

Scrub and grassland, Akola, Maharashtra.

1. A pellet is the mass of undigested parts of a bird's food that some species regurgitate. The contents of a bird's pellet depend on its diet, but can include the chitinous exoskeletons of insects, indigestible plant matter, bones, fur, hair, feathers, bills, claws, and teeth.

All pellets were sun-dried, numbered, and placed in polythene bags, with information on date, location, and number of pellets. The pellets were dissected using standard technique after Yalden (1990). All the pellets were soaked in water and dissected with forceps under a magnifying glass. The contents of the pellets were segregated according to the Class, such as insects, birds, and mammals. Prey items were identified to the finest possible taxonomic level at Bombay Natural History Society (BNHS), Mumbai, and Zoological Survey of India (ZSI), Pune. Jawbone and skull pieces showing key characters like molars, incisors, nasals, pallet, and mandibles were used for the identification of mammals up to the generic level, using Corbet & Hill (1992), and Agrawal (2000). Some bird species could be identified by comparing pellet contents with museum specimens in the Natural History Collection of Bombay Natural History Society. We could identify the Common Babbler *Turdoides caudata* due to presence of entire leg, and complete primary feather, and Greater Short-toed Lark *Calandrella brachydactyla* on the basis of pale bill, pink legs, and feathers. Remnants of other birds could not be identified up to species level. Unidentified mammal and bird species were excluded from the biomass analysis, as we could not determine their biomass.

The weights of insectivores (shrews), and birds were taken from BNHS collection records, and weights of all rodents were taken from Ellerman (1961). The weights of grasshoppers ($n = 45$) and scarabid beetle ($n = 27$) were determined from live field specimens using a 50 gm Pesola balance.

Results

A total of 94 prey items were segregated from 66 pellets. The mean prey per pellet ratio was 1.4 ± 0.61 . It was observed that the Short-eared Owl feeds on eight taxa, which comprised one insectivore, three species of rodents, two species of birds, and two species of insects. Some rodents and birds could not be identified even to generic levels. The average length of pellets was 3.4 ± 0.87 cm and width was 1.64 ± 0.33 cm. The mean dry weight of pellets was 2.5 ± 1 gm.

The results suggest that the Short-eared Owl feeds primarily on vertebrates, which comprise 81% of its diet, and invertebrates (insects) account for the remaining 19%. Among vertebrates, 62% were small mammals (rodent and shrew) and 19% were birds (Table 1). Numerically, rodents were the most frequent prey of the Short-eared Owl during the study period; *Mus musculus*

being the most preyed upon species followed by *M. platythrix* and other *Mus* spp. Among birds, the Greater Short-toed Lark was preyed upon more often than any other bird species found in study area.

In terms of biomass, rodents were the most important prey (70% of the biomass) followed by birds (14%), and the shrew and insects (16%).

Discussion

Our results suggest that rodents are the most important prey species in terms of frequency and biomass. Wiebe (1991), Sullivan (1992), and Holt & Leasure (1993) speak of similar results. Holt (1993) states, "Short-eared Owls are generally considered to prey on small mammals of which usually one or two species predominate." Our study supports this conclusion and shows that the Short-eared Owl is a small mammal specialist with a narrow food-niche.

Although the relative abundance of prey species within the Short-eared Owls' territory was not estimated, it appears that small mammals, especially *Mus* spp., were hunted in the proportion to their relative abundance. Studies on the Barn Owl *Tyto alba* (Evans & Emlen 1947) have proved that the change in consumption of prey is directly related to the periodic change in the population of prey species. Studies carried out by Jathar *et al.* (2006) in Satpuda Hills on Forest Owllet *Heteroglaux blewitti* suggest a similar pattern. Similarly, the Greater Short-toed Larks were seen in the study area in huge flocks. During the study period Short-eared Owls were observed to successfully hunt Greater Short-toed Larks ($n = 3$), and also chase their flocks ($n = 17$).

It was observed that the Short-eared Owl is hounded by habitat disturbance. Grass is harvested during February and early March. This forces the Short-eared Owl to occupy new territories, in the process, competing with harriers for roosting sites, as well, perhaps, for food. We have seen five such encounters between harriers and Short-eared Owls in February and March. Therefore, it is important to protect these grassland and scrubland for the survival of the Short-eared Owl as well as other birds of prey. The land tenure of the current study area is with State Revenue Department, State Forest Department, and privately held. The privately owned area is well protected and Short-eared Owls prefer this area for roosting, once the grass in other areas has either been cut, or grazed.

Table 1. Diet items and biomass estimated from pellets of Short-eared Owl at Akola ($n= 64$)

Species	No. of Individuals (a)	Percentage of Occurrence	Total of percentage	Mean weight of animals in gm (b)	Biomass consumed (axb)	Percentage of Biomass	Total of Biomass consumed in percentage
Insectivorous							
<i>Suncus murinus</i>	6	6.38	6.38	26	156	7.36	7.36
Rodents							
<i>Mus</i> spp.	10	10.64					
<i>Mus musculus</i>	25	26.60		17	425	20.05	
<i>Mus platythrix</i>	12	12.77		26	312	14.72	
<i>Tatera indica</i>	5	5.32	55.32	148	740	34.91	69.67
Birds							
<i>Calandrella cinerea</i>	12	12.77		22	264	12.45	
<i>Turdoides caudata</i>	1	1.06		39	39	1.84	
Unidentified birds	5	5.32	19.15				14.29
Insects							
Grasshopper	8	8.51		8	64	3.02	
Scarabidae beetle	10	10.64	19.15	12	120	5.66	8.68
Total	94				2120		

Conservation measures

The proactive initiative taken by one of us (AJD) to protect the grassland and scrubland is helping conservation of the birds of prey and owls of this area. The conservation measures include protection of 10 ha of grassland where grazing, grass cutting, forest fires, bird hunting, and use of pesticides and rodenticides have been totally stopped. Along with this farmers in neighbourhoods were motivated to protect grasslands nearby their farms. We recommend that the state forest department protect these grasslands at least till the end of March, when these birds of prey and owls start the return journey to their breeding grounds.

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References

- Agrawal, V. C., 2000. Taxonomic studies on Indian Muridae and Hystricidae (Mammalia: Rodentia). *Rec. of Zool. Surv. India Occ. Paper* No.180. Kolkata: Director, Zoological Survey of India.
- Ali, S., & Ripley, S. D., 1987. *Compact handbook of the birds of India and Pakistan together with those of Bangladesh, Nepal, Bhutan and Sri Lanka*. 2nd ed. Delhi: Oxford University Press.
- Blanford, W. T., 1894. Notes on the Indian Owls. *Ibis* 6 (24): 524–531.
- Chandrasekaran, S., 1995. A survey of migratory birds at Dativara. *Black-buck* 11(2): 41–52.
- Chandrasekhara, S., & Nameer, P. O., 2003. Short-eared Owl (*Asio flammeus*) in Kerala, India. *Zoos' Print Journal* 18 (10): 1235.
- Corbet, G. B., & Hill, J. E., 1992. *The Mammals of the Indomalayan Region*. U.K.: Oxford University Press.
- Debrot, A. O., de Freits, J. A., Brouwer, A., & Kooy, M. V. M., 2001. The Curacao Barn Owl: Status and diet, 1987–1989. *Caribbean Journal of Science* 37 (3&4): 185–193.
- Ellerman, J. R., 1961. *The fauna of India including Pakistan, Burma and Ceylon*. Mammalia (2nd ed.). Vol. 3 (Part I & II). ZSI Calcutta: Manager of Publications, Delhi.
- Evans, F. C., & Emlen Jr., J. T., 1974. Ecological notes on the prey selected by a Barn Owl. *Condor* 49: 3–9.
- Grewal, B., 2000. *Birds of the Indian Subcontinent*. 3rd revised ed. Hong Kong: Local Colour Limited.
- Holt, D. W., 1993. Trophic niche Of Nearctic Short-Eared Owls. *Wilson Bulletin*. 105 (3): 497–503.
- Holt, D. W., & Leasure, S. M., 1993. Short-eared Owl (*Asio flammeus*). In: *The birds of North America*, No. 62. Poole, A., & Gill, F., (Eds). Acad. Natl. Sci., Philadelphia, Penn., and Am. Ornith. Union, Washington, D.C. 22 pp.
- Jamdar, N., & Shrivastava, K., 1988. A note on possible migration route of Short-eared Owl (*Asio flammeus*) over sea. *J. Bombay Nat. Hist. Soc.* 85 (2): 423–424.
- Jathar, G. A., Talmale, S. S., Pradhan, M. S., & Rahmani, A. R., 2006. Mammalian prey species of the Forest Owllet *Heteroglaux blewitti* Hume. *J. Bombay Nat. Hist. Soc.* 102 (2): 230–232 (2005).
- Jayson, E. A., & Mathew, D. N., 2002. Structure and composition of two bird communities in the southern Western Ghats. *J. Bombay Nat. Hist. Soc.* 99 (1): 8–25.
- Kanniah, P., & Ganesh, T., 1993. Some interesting owl species around Alwal. *Mayura* 10: 1–4.
- Pasha, M. K. S., Jaypal, R., Areendran, G., Qureshi, Q., & Sankar, K., 2004. Birds of Pench Tiger Reserve, Madhya Pradesh, central India. *Newsletter for Ornithologists* 1 (1&2): 2–9.
- Singh, B., 1997. Houbara Bustard and Short-eared Owl in eastern Rajasthan. *Newsletters for Birdwatchers* 37: 17.
- Sullivan, T. M., 1992. Population, distribution and habitat requirements of birds of prey. In *Abundance, distribution and conservation of birds in the vicinity of Boundary Bay, British Columbia*. Butler, R. W., (Ed.). Candian Wildlife Services, Delta, B.C. Tech. Rep. Pp. 86–108.
- The Field Museum. URL: http://fm1.fieldmuseum.org/birds/brd8.php?n=&rpno=1&order=&dir=&terms=&FMNH_No=&family=&genus=Asio&species=flammeus&subspecies=&country=&state=&county=&fam_cond_type=1&genus_cond_type=1&species_cond_type=1&subspecies=&cty_cond_type=1&state_cond_type=1&co_cond_type=1 [Accessed on 3 January 2010.]
- Thyagaraju, A. S., 1933. On the occurrence of the Short-eared Owl (*Asio flammeus flammeus*) in Madras city. *J. Bombay Nat. Hist. Soc.* 36 (3): 752–753.
- Wiebe, K. L., 1987. Food and foraging behavior of Short-eared Owls in southwestern British Columbia. Unpublished report. Simon Fraser University, Burnaby, British Columbia, Canada.
- Yalden, D. W., 1990. The analysis of owl pellets. *Occ. Publ, Mammal, Soc.* 13, London, UK.

