

Farmer friendly Owls

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Owls are natural predators of rodents, of which seven species are agriculturally important pests. Conserving owls will not only result in better rodent control preventing huge crop losses, but will also prevent indiscriminate chemical use, thus preserving the ecological diversity. Educational programs will go a long way in achieving this.

Agriculture is a major source of livelihood in India. Indian agriculture is rapidly shifting from natural subsistence type farming to a managed intensive agricultural practice. Despite the developments in the infrastructure for production and storage of agricultural produce, it is estimated that rodents damage between 2–15 % of the crops annually throughout the country; while severe damage can escalate to 100%. As a result, agricultural pest control is a major concern. Chemical control using pesticides and biological control through predators and pathogens have been suggested for pest control. However, chemical pesticides and control of pests using pathogens often affect the environment and human health adversely. Hence, utilization of natural predators is an environment friendly solution to pest control.

Several natural predators of rodent pest have been identified. If the importance of wildlife in pest control can be backed up with convincing scientific data it will serve two purposes. First, predation by wildlife can be promoted as an environment friendly pest control method and second, if the importance of wildlife in pest control is conveyed to the farmers, it can be used as a step towards conflict resolution and conservation of wildlife. This is especially true for predators like owls that are till today shrouded in superstition, which are often killed as they are considered as bad omens and also for their demand for use in black magic. With the exception of few sporadic examples as in West Bengal, where, owls are worshipped as the vehicles of Laxmi, the goddess of wealth, owls are considered as harbingers of bad omen throughout India.



The Indian Eagle Owl preys on rodent pests on farm

Of 13 species of rodent prey, which formed the major part of the diet of the Indian Eagle Owl, seven were agriculturally important pests.

We, therefore completed a study to elucidate the importance of the Indian Eagle Owl (IEO) *Bubo bengalensis* as a potential predator of agricultural pests by studying its reproductive output in relation to diet and habitat selection. The study was conducted in Pune, Raigad and Ratnagiri districts in Maharashtra. We studied 44 occupied nest sites during the breeding season of the owls (October–March) in the years 2004–05 and 2005–06. Habitat types around the nest sites were quantified and the food items taken by the owls were analyzed from prey remains and pellet analysis. Prey was quantified in terms of species richness and percent biomass of each prey species. Breeding time and nest site occupation dates were monitored to record the dates of egg-laying, to monitor the number of hatchlings and count the number of fledgling to evaluate the breeding success of the owls. This also enabled us to understand the amount of time that the owls spend in each habitat.

The Indian Eagle Owl builds terrestrial nests on hill slopes, earth cuttings, rocky outcrops and under bushes, where the surrounding

areas, which are its hunting grounds, consisted of agriculture, scrub, grassland, water body, hills and rural habitats. IEO preferred to nest in landscapes with a high percentage of agriculture followed by grassland and scrubs.

It fed on rodents, birds, reptiles, arachnids, insects and other prey species. Rodent prey included Lesser Bandicoot Rat (*Bandicota bengalensis*), Large Bandicoot Rat (*B. indica*), Indian Bush Rat (*Golunda ellioti*), Soft-furred Field Rat (*Millardia melitana*), House Mouse (*Mus musculus*), Field Mouse (*M. booduga*), Elliot's Spiny Mouse (*M. saxicola*), House Rat (*Rattus rattus*), Indian Gerbil (*Tatera indica*), Long-tailed Tree Mouse (*Vandellura olivacea*), Common House Shrew (*Suncus murinus*), Pigmy Shrew (*S. etruscus*) and Anderson's Shrew (*S. stoliczkanus*). Bat prey included Indian Fulvous Fruit Bat (*Rousettus lesheanaulti*) and Lesser Dog-faced Bat (*Cynopterus sphinx*). Bird prey included Ashy-crowned Sparrow-Lark (*Eremopterix grisea*), Rufous-tailed Sparrow-Lark (*Ammomanes phoenicura*), Blue Rock Pigeon (*Columba livia*), Common Myna (*Acridotheres tristis*), Jungle Myna (*A. fuscus*), Egret species (*Egretta sp.*), Asian Koel (*Eudynamis scolopacea*), Large Grey Babbler (*Turdoides malcolmi*), Painted Francolin (*Francolinus pictus*), Quail species (*Coturnix sp.*), Eurasian Collared Dove (*Streptopelia decaocto*), Common Kingfisher (*Alcedo atthis*), Little Green Bee-eater (*Merops orientalis*), House Sparrow (*Passer domesticus*), Sunbird species and House Crow (*Corvus splendens*). Reptiles included lizards (*Calotes sp.*), geckos, skinks and snake (*Coelognathus helena*). Arachnids included *Mesobuthus tamulus*, *Heterometrus xanthopus*, *Heterometrus granulomanus*, *Galeodius orientalis* and *Galeodius indica*. Insect prey included Rhinoceros Beetle (*Oryctes rhinoceros*), Long-horned Beetle (*Batocera rufomaculata*), Stag Beetle (*Lucanus cervus*) and Grasshoppers and Mantids. Other unidentified prey items included juveniles of Fellidae and Leporidae (*Lepus nigricolis*) and amphibians.

Our analysis revealed that though this owl is a dietary generalist, rodents were the most important prey in terms of biomass consumed by the owls followed by birds and bats. Though the amount and species of insects taken were also high the overall biomass was low due to the smaller size of the insects. The harmful ones such as snakes and scorpions were also consumed by the owls.

Of thirteen species of rodent prey, which formed the major part of the diet of the IEO (55% relative abundance and 85% total biomass), seven were agriculturally important pests. Agriculturally important rodent pests contributed 88% of the abundance and 98% of the biomass of the total rodent in the owl diet. Our analysis suggests that both productivity and duration of the breeding of IEO was high in agriculture and scrub dominated habitats. Productivity was strongly correlated to the high relative abundance and percentage biomass of rodents and birds followed by bats.

Thus, owls are not just the predators of important agricultural pests, the rodents, but are in turn dependent on them for increasing their productivity. Therefore, there appears to be a delicate

interdependence between owls and rodent population. However, this interdependence points to another alarming threat to the owls. Chemical pesticides are used for rodent pest control which can affect the non-targeted wildlife. Because the IEO has shown a dependence on the rodents, use of these rodent pesticides could affect IEO populations because of secondary poisoning. So also, since the productivity of owls is higher in the agricultural lands, the duration of breeding in the agricultural land is greater. As a result, owls may be prone to detection and anthropogenic activities and are likely to be persecuted and their breeding is likely to be interrupted by humans.

If the importance of wildlife in agricultural pest control through predation can be conveyed to the farmers, it can play an important role in the conservation of wildlife. However, such a strategy needs to be backed with convincing data. Thus, reliable data highlighting the habitat preference, diet and reproductive behavior of the Indian Eagle Owl can become a convincing tool to explain to farmers, the friendly role that the owls play in the agricultural scenario in India.

The Indian Eagle Owl can be conserved by protecting the nest sites in natural habitats. The Barn Owls (*Tyto alba*) and the Spotted Owllet (*Athene brama*) can be lured by placing appropriately sized artificial nest boxes on the trees in farm lands. Unfortunately, the owls are often subject to indiscriminate hunting, out of superstition or fear or trapping for use in black magic. If we can promote the importance of owls in the control of agricultural pests, especially rodents, then such a strategy will help reduce human persecution of the owls. We believe that interactive educational programs based on scientific data, can be used to remove superstitions and further owl conservation in the Indian agriculture.

Reference

Pande, S. & N. Dahanukar (2011). **The diet of Indian Eagle Owl *Bubo bengalensis* and its agronomic significance.** *Journal of Threatened Taxa* 3(8): 2011–2017.

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