Ela Foundation

ISSN 2319-4361 (Indexed in Google Scholar)
Volume 3 | Issue 2 | April - June 2014

ELA JOURNAL

The Quarterly Newsletter of Ela Foundation for Nature Conservation through Education and Research

Editorial

Satish Pande

O E N S L

The OENSL (Ornithology, Ethno-Ornithology and Natural Sounds Laboratory) of Ela Foundation and Maharashtra Education Society was formally inaugurated on Akshay Tritiya, 5th May 2014, which as per the Hindu calendar is one of the three most auspicious days in a year. The ceremony of worshipping the Goddess of learning Saraswati was conducted under the guidance of eminent Sanskrit scholar Yashwantrao Lele. Scholars, researchers and members from Ela Foundation and MES and alumni of the 'Certificate Course in Basic Ornithology' were present. Dilip Nawalkar donated some of his original bird drawings in colour to the OENSL. These drawings are displayed in the laboratory. The logo of the OENSL was designed by another artist and Ela Foundation member Pallavi Ghotkhindikar. The logo symbolically incorporates all the three aspects of the OENSL. The OENSL aims to promote conservation through education and research by involving the common man, the scientific community and culture. The activities of the OENSL also extend to the empowerment of people working in India's rural areas, where much of our biodiversity is still existing and needs urgent protection.

Since we are discussing our institute dedicated to the study of natural history, I would like to mention here that last month I had an opportunity to visit the famous 'Linnean Society' in London, which was founded in 1788. This prestigious and imposing institution preserves the works and collections of the legendary Carl Linnaeus,

Cliff nesting colony of pelagic birds at Fowlshugh, Scotland

The Linnean Society, London

Carl Linnaeus

the father of binomial nomenclature. The Society also houses a library having precious original manuscripts, books, drawings, illustrations, photographs and collections (insects, fish and shells) and herbariums of several great researchers related to the study of natural history, evolution and taxonomy including the works from the 19th century by Carl Linnaeus, Alfred Russell Wallace, Charles Darwin, J. E. Smith, and also by several contemporary scientists. The Society publishes the Zoological Journal of the Linnean Society, the Proceedings of the Linnean Society, the Biological Journal of the Linnean Society and the biannual newsletter The Linnean. Many of the collections can be viewed online. The Society also holds meetings and talks by eminent researchers to promote knowledge about conservation and natural history.

During my visit to London in the later part of June, I also visited the Royal Botanic Gardens, Kew where I had an opportunity to view the sanctum sanctorum for botanists where the world's largest herbarium, fungerium, DNA and seeds collection are preserved for science and posterity. Several original descriptions of plant and fungi including their type specimen are carefully preserved and catalogued in the herbarium. It also houses books, letters, drawings and botanical art. The Kew gardens also have a large repository of living plants in the arboretum which is frequented by visitors round the globe. The archives section holds works of Nathaniel Wallich and Joseph Hooker while the economic botany section has a large digital data base and plant collection. This is also an academic center where research on plants and fungi is promoted on an international scale. The visitor center is worth visiting where books, equipment, seeds and useful products for practicing horticulture are available for common people.

With Prof. Henry Noltie, plant taxonomist and historian, my next visit was to the Royal Botanical Gardens Edinburgh, founded in the 17th century. The RBG is a renowned academic center of excellence, housing living plant collections, herbariums and library. The RBG aims to document and conserve world's plant diversity and promotes research and education for conservation of plants, without which there would be no life on earth. I and Kiran Ghadge also visited the National Museum of Scotland and had an opportunity to visit the famous seaside nesting cliffs in Scotland where we saw thousands of nesting Kittiwakes, Razorbills, Fulmars, Guillemots, Puffins and gulls. The RSPB has made special efforts to protect these nesting sites and information about the birds is displayed for the education of visitors.

India has a rich biodiversity including avian diversity. We need more studies focused on various aspects of our species and doing excellent science and involving the common man for the effective conservation of our natural heritage. The starting of OENSL is one such small step to achieve a larger goal.

Brahma and Swan

Suruchi Pande*
*Ethno-Ornithilogist and Sanskrit scholar

Citation: Suruchi Pande (2014)
Brahma and Swan Ela Journal 3(2):3-4.

Date of Publication:
01-06-2014

ISSN 2319-4361

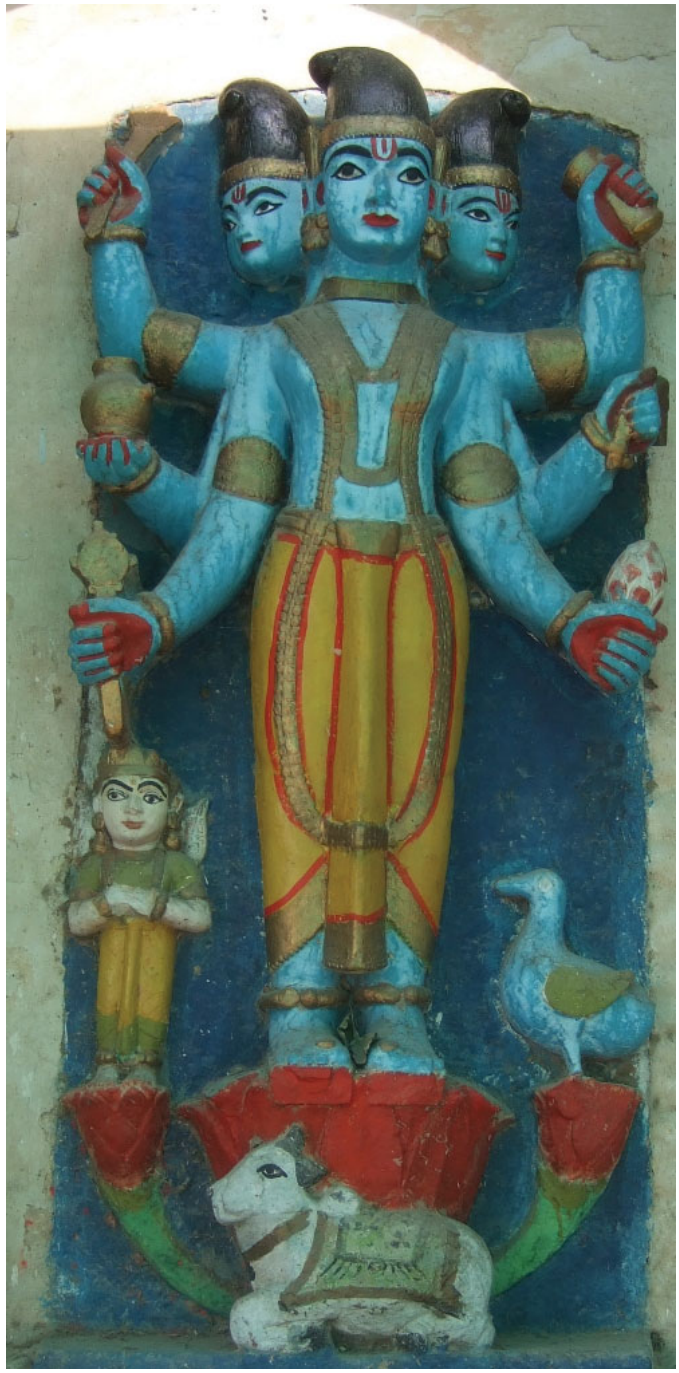
Email: suruchipande@gmail.com

Lord Brahma is the creator of our world. It is traditionally believed that creation took place on the day of *Gudhi Padawa* – one of the important festivals in Hindu calendar. Since it is the day of creation people also celebrate this day by inaugurating any new projects and starting new work. In ancient India there was a cult which worshipped Lord Brahma as the symbol of five gross elements (earth, fire, water, air and ether).

Brahma is also known as *Prajapati* and he is believed to have two forms – one consists of pure knowledge (*brahma-rupa*) and the other consists of application of knowledge (*deva-rupa*). The *Matsya Purana* (before 500 AD) describes Brahma as sitting either on a swan or on a lotus flower.

Lord Brahma on the Swan

Hamas (swan) is the symbol of pure knowledge and temperament and also of a ever increasing knowledge that moves forward and enriches itself. Whoever has a carrier vehicle of 'knowledge' is bound to achieve the highest goals in life. There can be impurities in water but the swan does not get affected by it and discerns between pure and impure. Likewise, it is suggested that there is always a mixture of virtues and vices in life, where one needs to adhere to virtues and leave vices. This thought is reflected in the words – "*saha aham*" or "*soham*" showing the identity of personal self to the impersonal self and a journey of moving from small personal interests to the larger universal interest. Thus the metaphor of Bramha and Swan has a deep symbolic meaning.



Brahma in the Trimurti with Vishnu and Mahesh at Manikarnika Ghat, Varanasi

Use Of Ricefields By Raptors In Northern Peninsular Malaysia

Nur Munira Azman, Nurul Salmi Abdul Latip* and Muhd. Hakim Saharudin
School of Biological Sciences, Universiti Sains Malaysia, 11800 Minden, Penang, Malaysia.
* Corresponding author. School of Biological Sciences, Universiti Sains Malaysia, 11800 Pulau Pinang, Malaysia.
Email: salmi@usm.my

Citation: Nur Munira Azman, Nurul Salmi Abdul Latip and Muhd. Hakim Saharudin (2014) Use Of Ricefields By Raptors In Northern Peninsular Malaysia *Ela Journal* 3(2):5-14.

Date of Publication:
01-06-2014

ISSN 2319-4361

Referee: Reuven Yosef

ABSTRACT :

Rice is the primary traditional Malaysian crop and rice fields are an important habitat of raptors. In Malaysia, very few studies have examined raptor communities present in rice fields. Data was obtained from Permatang Pauh, Penang, Peninsular Malaysia between 2000 and 2011 from field observation, road surveys and Bird-I-Witness database maintained by Malaysian Nature Society. Peninsular Malaysia's location on the East-Asian Australasian flyway makes it a host to more than 120 migratory birds with at least 44 species of diurnal raptors. In this study 20 species of raptors were sighted utilizing diverse habitats. Raptors recorded in rice fields belonged to families Pandionidae and Accipitridae, 10 were migratory, seven residents, one resident and migrant, and two vagrants. Species included *Aquila clanga* and *Aquila heliaca*, two wintering species ranked as IUCN Vulnerable. Others were *Pandion haliaeetus, Alviceda leuphotes, Pernis ptilorhynchus, Milvus migrans, Haliastur indus, Haliaeetus leucogaster, Elanus caerulus, Circaetus gallicus, Spilornis cheela, Circus spilonotus, Circus melanoleucos, Accipiter trivirgatus, Accipiter gularis, Aquila pennatus, Spizaetus cirrhatus, Microhierax caerulescens, Falco tinnunculus* and *Falco peregrinus*. The high diversity of raptor occurrence coincided with cultivation season and maximum abundance was seen during harvesting and migratory season (September-March). This could coincide with food availability like small mammals that feed on ripening rice. Resident raptors were believed to originate from nearby forest patches, mangrove and oil palm plantations. Rice fields serve as important feeding grounds, roosting and wintering habitats for resident and migratory raptors. Rice fields must be monitored for their role as emerging habitats of raptors.

KEYWORDS:

Raptors diversity, rice fields, temporary wetlands, man-made habitat, migratory season.

INTRODUCTION:

Rice field is the primary traditional crop for Malaysia and many Asian countries such as Indonesia, Thailand and Japan as rice is the main staple food for most Asians. Rice field is categorized by the Ramsar Convention 1971 (Ramsar, 2013) as a type of man-made wetlands and is considered an important habitat in agricultural ecosystem. Malaysia's land area for rice has remained fairly constant at no more than 0.7 million hectares since the 1980s (Abdul Rahman *et al*., 2004). In Peninsular Malaysia many large rice field areas are predominantly found along the west coast especially in the northern region including Kedah, Penang, Perak and Perlis while on the east coast, states of Kelantan and Terengganu have smaller acreages.

In Malaysia knowledge of birds including raptors in rice fields is extremely limited while studies of birds in rice fields in other countries mostly focuses on waterbirds (Fasola *et al*., 2004; Ichinose *et al*., 2006; Elphick, 2008). Along Peninsular Malaysia's west and east coasts, the presence of wide coastal plains, wetlands and hill ranges provide conducive migration routes on both sides of the land mass. In Peninsular Malaysia, most rice field areas are found at the downstream zone of major rivers and close to coasts. Here, rice is planted twice a year, with several growing stages in one season. These stages include ploughing, planting, growing, and harvesting activities, creating temporary wetlands. Various bird species including raptors and other birds are known to be attracted to different stages of rice growing season (Kelly *et al*., 2008, King *et al*., 2010). Small to large sized migratory raptor species have been recorded in rice fields at various locations along the migratory routes. Resident and migratory birds/raptors have been known to utilize rice fields for roosting, stopovers and foraging.

In recent years, studies on bird community in rice fields have been conducted in the Indian subcontinent, Korea and Japan (Elphick, 2010; Fujioka *et al*., 2010; Sundar & Subramanya, 2010). These studies highlighted the importance of rice field cultivation areas that serve as breeding habitat for waterbirds. However, raptors research in rice field areas remained isolated and low in numbers. A study by Remsen *et al*. (1991) on the importance of the rice growing region of south-central Louisiana to winter populations of raptors and waders is an example of early publication of raptor studies in rice fields. There were a few recent studies on the use of rice fields by raptors in two Portuguese wetlands (Lourenço, 2009) and a line transect survey of wintering raptors in the western Po Plain of northern Italy (Boano & Toffoli, 2002). One of the limitations in raptor studies is the small number of their occurrence in short period survey where a long term period monitoring is required in order to have a sufficient data (Amano *et al*., 2008).

In Peninsular Malaysia, a small number of bird studies in rice fields included one on avian diversity and feeding guilds in natural and man-made habitats (oil palm plantation and rice fields) in the Kerian River basin, Perak (Azman et al., 2011), and two other bird surveys conducted in the largest rice granary area of Muda River basin, Kedah (Maimon & Ho, 1998; Nik Fadzly & Shahrul, 2009), all in the northern region. Currently, in Malaysia there lack any dedicated scientific study or publication on raptors in rice field areas and raptors in general. However, two available works carried out by Malaysian Nature Society on the current status and distribution of raptors and a field study on the wintering ecology and behaviour of harriers, both in Peninsular Malaysia (Lim 2010; Lim 2013) are pioneer documentation on raptors in Malaysia.

Lim (2010) indicated that Malaysia has at least 44 species of diurnal raptors with reliable records. 21 and 26 species are resident and migratory respectively, including three species represented by both resident and migrant populations, i.e., (*Pernis ptilorhyncus* Oriental Honey Buzzard, *Hieraaetus kienerii* Rufous-bellied Eagle, and *Falco peregrinus* Peregrine Falcon). Lowland and montane forest, woodlands, open country, wetlands are all possible habitats for raptors to forage, breed and as stopover areas (Strange & Jeyarajasingam, 1999; Lim, 2010). Thirteen species of raptors were observed using open country habitat including rice fields, namely *Elanus caeruleus* Black-shouldered Kite, *Milvus lineatus* Black-eared Kite, *Circus spilonotus* Eastern Marsh Harrier, *Circus cyaneus* Hen Harrier, *Circus melanoleucos* Pied Harrier, *Bustastur indicus* Grey-faced Buzzard, *Buteo buteo* Common Buzzard, *Aquila clanga* Greater Spotted Eagle, *Aquila nipalensis* Steppe Eagle, *Aquila heliaca* Eastern Imperial Eagle, *Aquila pennata* Booted Eagle, *Falco tinnunculus* Common Kestrel, and *Falco peregrinus* Peregrine Falcon.

As there is insufficient publication on raptors in Malaysia

an alternative means of obtaining information on them is Bird-I-Witness which is now part of Worldbirds global family of internet-based data collection and provision systems to capture bird records (http://www.worldbirds.org/malaysia). Birdwatchers can participate by recording their personal observations in the database on the website. The database would be very informative and useful for bird conservation initiatives.

Due to the poorly known spatial distribution, behaviour, diet, life cycle, ecology etc. of raptors, habitat loss due to deforestation and land conversion becomes a growing concern in a fast-developing country such as Malaysia. This situation presents a greater urgency in the study and documentation of raptors, especially in the rice fields. This paper discusses the occurrence of diverse number of resident and migratory raptor species in the rice fields of Permatang Pauh, northern Peninsular Malaysia. The management and protection of these wetland areas for raptor conservation will also be highlighted.

MATERIALS AND METHODS:

Study Area

The study area is located in the Sungai Perai basin which borders Seberang Prai Utara and Seberang Prai Tengah. It is bounded by Sungai Dua in the north (5º 26' 78'' N, 100º 25' 15''E) and Kampung Permatang Rotan in the South (5º 22' 16'' N, 100º 25' 06'' E) (Figure 1). This rice fields areas are close to villages and a small reserve forest namely Air Itam Dalam Forest Reserve. Rice is cultivated and harvested twice a year in this region with four main stages in its growing season; (1) ploughing, (2) planting, (3) growing, and (4) harvest. During the first three stages of the season, rice plots were inundated with intermediate water level (5-10 cm). Harvesting seasons take place in June and December of every year. During ploughing and harvesting activities high number of waterbird and raptor species is found to congregate in the rice fields.

Survey methods

Data collection of bird species present in the Permatang Pauh rice field area had been conducted since year 2000 until 2011. Two types of methods were used for field observation. The first method was through by road survey either with a car or motorbike (field observation) conducted during selected days between 1000hr until 1400hr. All surveys were conducted during various stages of rice field growing seasons throughout the years. The equipment used were binocular (8x42), telescope and field guide book (Robson, 2008). The second method involved obtaining data from the Bird I-Witness (BIW) database spanning the years 2000-2011. All resident and migratory species were included in the checklist.

RESULTS:

Field observations and Bird I-Witness database for Permatang Pauh rice field, Penang, recorded a total of 25 raptor species representing three families and 19 genus. Families which recorded the highest number of species of birds were Falconidae (20 species; 80%), Strigidae (4 species; 16%) and Tytonidae (1 species; 4%) (Table 1). All raptors were further categorised into resident or migratory status. Resident bird species is defined as bird known to use Malaysia's political boundaries as

(a)

(b)

Figure 1. Location of the study area in northern Peninsular Malaysia: (a) Map of Peninsular Malaysia; the study site is shown in red box; (b) Point locations shows spatial distribution of the study area.

breeding place and migratory bird species is defined as bird known to use Malaysia's province during northern and southern winter passage (Strange & Jeyarajasingam, 1999). Out of 25 species of raptors documented, 12 were resident species (examples; *Microhierax fringillarius* Black-thinghed Falconet, *Haliastur indus* Brahminy Kite, and *Haliaeetus leucogaster* White-bellied Sea-eagle), nine species were migrant (examples; *Falco tinnunculus* Common Kestrel, *Aviceda leuphotes* Black Baza, and *Milvus migrans* Black Kite) and two were resident or migrant (*Pernis ptilorhynchus* Oriental Honey Buzzard and *Falco peregrinus* Peregrine Falcon).

All raptors species were observed foraging, soaring, or flying past the rice fields. *Elanus caeruleus* Black-shouldered Kite is the resident raptor species frequently observed in the rice fields. Through observation, Black-shouldered Kite used rice fields as their foraging habitat and were found roosting at the nearest habitat next to rice field areas. Some of the trees located close to rice fields were used by Black-shouldered Kite as nesting site. *Haliastur indus* Brahminy Kite was commonly observed foraging in different parts of the rice fields. During migratory season, open areas of rice fields give good advantage to observe wintering raptors. Two vulnerable raptor species, *Aquila clanga* Greater-spotted Eagle and *Aquila heliaca* Eastern Imperial Eagle were recorded using the rice fields as their wintering habitat. 2. Juveniles, adults and sub-adults of both *Aquila* species have been observed here, interacting with each other, with other raptors and bird species such as the egrets. This study also recorded raptor species that fly past the rice fields, such as *Haliaeetus leucogaster* White-bellied Sea-eagle, *Nisaetus limnaeetus* Changeable Hawk Eagle and *Accipiter trivirgatus* Crested Goshawk. Nocturnal raptor species from Tytonidae and Strigidae were also recorded resting on branches of closeby trees pacthes during the day.

(See Table 1.)

In Permatang Pauh the diversity of raptors occurring demonstrates that the west coast of Peninsular Malaysia is a dominant migratory route for both north and south-bound species. Most migratory raptors utilize suitable habitats along their migratory routes including rice fields (Masero *et al*., 2010 of Permatang Pauh. Farming activities, rice growing seasons and rice field landscapes were the main factors that influence bird foraging activities and occurrence (Kelly *et al*., 2008; King *et al*., 2010) which could be similar to the study area. Throughout the study period, observation indicates that farming activities and rice growing seasons regularly influenced bird occurrence in the rice plots of Seberang Prai Utara and Seberang Prai Tengah. Observations showed raptor species use rice field in different planting processes. For example, during harvesting season a flock of *Aquila sp.* were observed foraging, hunting and wintering in open areas of rice fields, while Black-shouldered Kite was seen in perch and ready to hunt. Temporal distribution of raptor species coincides with rice growing season is shown in Table 2.

(See Table 2.)

Rice field is a temporary wetland that supports diverse bird species especially water birds and raptors. The present study was able to record 25 species of raptors in the rice fields of Permatang Pauh, Pulau Pinang, Malaysia, which was higher than the study conducted by Lourenço (2009) in the rice fields around the estuaries of the Tejo and Sado rivers Portugal with nine species and Elphick (2004) in California with 18 species. High species richness of raptor in Permatang Pauh rice fields reveals that this area can provide suitable habitat for migratory raptor species as well as resident ones. According to Lourenço (2009) this agro-habitat is possibly important for wintering areas for migratory species and breeding ground for resident raptors. Takahashi & Ohkawara (2007) and Wood *et al.* (2010) also stated that rice fields is very significant in providing areas for breeding activities, foraging and shelter for other bird species.

All raptor species present in this study area were evaluated by IUCN (2013). All of the species were categorised as least concern (LC) except for two vulnerable species namely *Aquila clanga* (Greater-spotted eagle) and *Aquila heliaca* (Eastern Imperial eagle). Both species are winter visitors to this area as a regular migrant or vagrants. This shows the importance of rice fields as wintering and foraging grounds for threatened bird. The potential of rice fields for bird conservation is officially recognized in formulating the Japanese agricultural policies (Maeda, 2001).

According to IUCN (2013), 12 out of 25 species of raptors observed in Permatang Pauh have decreasing population trend (Table 1). These include *Aquila pennata* Booted Eagle, *Falco tinnunculus* Common Kestrel, and *Circus melanoleucos* Pied Harrier. Proper management in development activities within close proximity of

rice field areas and rice field management practices are needed in order to avoid the population trend of raptors to be further affected. The rest 11 species of raptors show stable population trend worldwide while one species, *Elanus caeruleus* Black-shouldered Kite has increasing population.

Raptors are the top predators in rice fields. Their existence in rice fields helps the farmers to control the population of pests especially rodents as this was a favourite prey taken during most of our observations with many raptor species. For example, during harvesting season and burning activity of straws, rodents emerged from their burrows to feed on the grains, or to avoid the burning fields, enabling the raptors to prey easily on them. Most resident raptors observed in the study were believed to inhabit the nearby forest patches, mangrove, and oil palm plantations. They used rice fields as foraging areas. Resident raptors are also nesting close to rice fields because they can easily obtain nesting material and food from rice fields. Rice fields were also used by migratory raptors as their wintering habitat because these open areas were located along their migratory routes.

Currently, there are several key threats for raptors in rice fields. Pesticides and fungicides were actively used to eliminate rodents, weeds and fungi. The use of insecticides, herbicides and fungicides in the rice fields might cause harmful impacts towards raptors. Some of these chemicals were believed to be highly toxic to raptors and could increase mortality rate and bioaccumulation in raptors resulting in negative reproductive effect (Parsons *et al*., 2010). Throughout our observations during the years, several unproductive rice planting areas in the northern parts of Peninsular Malaysia have been gradually converted and developed into housing areas and commercial lots. A number of rice field areas in these northern parts are currently located close to or surrounded by residential areas due to encroachment by development activities. Due to this, habitat fragmentation of rice fields is observed in recent years and could impact habitat suitability for wintering and resident raptors along the west coast migratory route. Conservation and protection measures of these wetland areas must not be taken lightly by authorities and areas with diverse resident and migratory raptor species such as Permatang Pauh should be given priority and gazetted as a protected area.

CONCLUSION:

Within 11 years of field observation at the rice fields of Permatang Pauh, in northern Peninsular Malaysia a diverse raptor assemblage consisting of both migrants and resident species has been recorded. In Malaysia, the importance of rice fields as an important wetland for raptors and bird species in general has been overlooked and thus, understudied. This study revealed that rice fields deserve greater attention from local authorities for its local and international status in terms of conservation importance and protection. This is highly critical since all rice field areas are located on non-protected sites, i.e. state lands or private lands, which has the potential to be transformed to other land uses. Proper conservation initiatives and good rice field management practice are important to guarantee the continuing existence of rice fields, especially in hotspot areas, as quality habitats for foraging and wintering raptors and other bird species. Local researchers also should focus on rice fields to better understand raptor ecology and biology in Malaysia. These studies could include (1) pesticide effect on raptors in rice fields, (2) rice fields as stop over and feeding area for migratory raptors and other birds, (3) behavioural studies of raptors and (4) intra and inter species interactions of raptors.

As Malaysia does not have a specific act or legal framework for raptor protection apart for the Wildlife Act 2010 (covers all fauna collectively), collaborative and integrative efforts between states, Wildlife Department, non-government organizations and individuals including farmers are mandetory. In accordance to Ramsar Convention's theme of "Wetlands and Agriculture: Partners for Growth" for World Wetlands Day 2014, the importance of agricultural lands such as rice fields as important wetland habitats is highlighted. It underscores the importance on the need for wetland and agricultural sectors to work together for the best shared outcomes including conservation and protection of raptors in rice fields.

REFERENCES:

- Abdul Rahman A. B., Rohani Y., Saad A., Aini Z., Othman O. Zulkifli M., Sariam O. & Azmiman (2004). Conversion of Kampong Ewa rice fields in Langkawi, Malaysia, into organic rice farming. 4th International Crop Science Congress, Brisbane, Australia, 26 September – 1 October 2004.
- Amano, T., Kusumoto, Y., Tokuoka, Y., Yamada, S., Kim, E. Y., & Yamamoto, S. (2008). Spatial

and temporal variations in the use of rice-paddy dominated landscapes by birds in Japan. *Biological Conservation*, 141(6): 1704-1716.

- Azman, N.M., Abdul Latip, N.S., Mohd Sah, S.A., Shafie, N.J. and Khairuddin, N.L. (2011). Avian diversity and feeding guild in secondary forest, oil palm plantation and paddy field in riparian area of Kerian River Basin, Perak, Malaysia. *Tropical Life Science Research,* 22(2): 61-84.
- Boano, G. & Toffoli, R. (2002). A line transect survey of wintering raptors in the western Po Plain of northern Italy. *Journal of Raptor Research,* 36(2): 128-135.
- Elphick, C. S. (2008). Landscape effects on waterbird densities in California rice fields: taxonomic differences, scale-dependence, and conservation implications. *Waterbirds,* 31(1): 62-69.
- Elphick, C. S. (2010). Why study birds in rice fields? *Waterbirds*, 33(sp1): 1-7.
- Fasola, M., Galeotti, P., Dai, N., Dong, Y., & Zhang, Y. (2004). Large numbers of breeding egrets and herons in China. *Waterbirds,* 27(1): 126-128.
- Fujioka, M., Don Lee, S., Kurechi, M., & Yoshida, H. (2010). Bird use of rice fields in Korea and Japan. *Waterbirds*, *33*(sp1), 8-29.
- Ichinose, T., Yokokawa, A., Asmiwyati, I., Arifin, N. H. S., & Kataoka, M. (2006). Relationships between bird distribution and land use in an agricultural landscape, Bali, Indonesia. *Conservation Biology in Asia*, *chapter 21*, 277-284.
- IUCN. (2013). The IUCN red list of threatened species. Available at: <http://www.iucnredlist.org/apps/redlist/search> (Accessed date: 10/10/2013)
- Lim, K. C. (2010). Current status and distribution of diurnal raptors in Malaysia. In:*Proceedings of the 6th International Conference on Asian Raptors*. Ulaanbaatar, Mongolia. (eds) Sundev G., Watson, R., Curti, M., Yosef, R., Potapov, E., & Gilbert, M.
- Lim, K.C., Lim, A.T. and Khoo, S.S. 2013. *A field study on the wintering ecology and behaviour of harriers in Peninsular Malaysia.* Report for Raptor Study Group – Malaysian Nature Society Bird Conservation Council, Kuala Lumpur.
- Lourenço, P. M. (2009). Rice field use by raptors in two Portuguese wetlands. *Airo*, 19: 13-18.
- Maeda, T. (2001). Patterns of bird abundance and habitat use in rice fields of the Kanto Plain, central Japan. *Ecological Research,* 16(3): 569-585.
- Maimon, A. & Ho, N.-K. (1998). Mist-netting records of some pest and non-pest rice field birds of the Muda Rice Agroecosystem. *Rice Agroecosystem of the Muda Irrigation Scheme, Malaysia*. Malaysian Institude for Nuclear Technology Research (MINT), Selangor, Malaysia.
- Masero, J. A., Santiago-Quesada, F., SAnchez-GuzmAn, J. M., Villegas, A., Abad- GOmez, J. M., Lopes, R. J., *et al*. (2010). Long lengths of stay, large numbers, and trends of the Black-tailed Godwit (*Limosa limosa*) in rice fields during spring migration. *Bird Conservation International, 1*(-1), 1-13.
- Nik Fadzly, N. R. & Shahrul Anuar, M.S. (2009). Species inventory and the distribution of avifauna of the Muda Rice Agroecosystem. *Rice Agroecosystem: Biodiversity and Its Environment with Special Reference to Muda Agricultural Development Authority (MADA)*. Universiti Sains Malaysia (USM), Pulau Pinang, Malaysia.
- Parsons, K. C., Mineau, P., & Renfrew, R. B. (2010). Effects of pesticide use in rice fields on birds. *Waterbirds,* 33(sp1)???: 193-218.
- Remsen, J. V., Swan, M. M., Cardiff, S. W., & Rosenberg, K. V. (1991). The importance of the ricegrowing region of south-central Louisiana to winter populations of shorebirds, raptors, waders, and other birds. *Journal of Louisiana Ornithology*, *1*(2), 35-47.
- Strange, M. & Jeyarajasingam, A. (1999). Birds: A Photographic guide to the birds of Peninsular Malaysia and Singapore. Sun Tree Publishing Limited, Singapore.
- Sundar, K. G., & Subramanya, S. (2010). Bird use of rice fields in the Indian subcontinent. *Waterbirds*, 33(sp1): 44-70.
- Takahashi, M., & Ohkawara, K. (2007). Breeding behavior and reproductive success of Grey-headed Lapwing *Vanellus cinereus* on farmland in central Japan. *Ornithological Science,* 6(1): 1-9.
- Wood, C., Qiao, Y., Li, P., Ding, P., Lu, B., & Xi, Y. (2010). Implications of rice agriculture for wild birds in China. *Waterbirds,* 33(sp1):3

Table 1. List of bird species recorded and their conservation status in Permatang Pauh rice field, Pulau Pinang, northern Peninsular Malaysia (IUCN, 2013; Strange & Jeyarajasingam, 1999)

Common Name	IUCN Status/ Population Trend	Malaysia Wildlife Act 2010	Locality and Rarity Status
Falconidae			
Black-thinghed Falconet; *Microhierax fringillarius*	Least concern/ stable	Totally protected	Resident, Common
Common Kestrel; *Falco tinnunculus*	Least concern/ decreasing	Totally protected	Migrant, Rare
Peregrine Falcon; *Falco peregrinus*	Least concern/ stable	Totally protected	Resident and passage migrant/ winter visitor, Uncommon
Black Baza; *Aviceda leuphotes*	Least concern/ decreasing	Totally protected	Migrant, Common
Oriental Honey Buzzard; *Pernis ptilorhynchus*	Least concern/ stable	Totally protected	Resident and passage migrant/ winter visitor, Common
Black Kite; *Milvus migrans*	Least concern/ unknown	Totally protected	Migrant, Uncommon
Brahminy Kite; *Haliastur indus*	Least concern/ decreasing	Totally protected	Rare, Abundant
White-bellied Sea-eagle; *Haliaeetus leucogaster*	Least concern/ decreasing	Totally protected	Rare, Common
Black-shouldered Kite; *Elanus caeruleus*	Least concern/ increasing	Totally protected	Rare, Common
Short-toed Snake Eagle; *Circaetus gallicus*	Least concern/ stable	Totally protected	Vagrant, Rare
Crested Serpent Eagle; *Spilornis cheela*	Least concern/ stable	Totally protected	Rare, Common
Eastern Marsh Harrier; *Circus spilonotus*	Least concern/ stable	Totally protected	Migrant, Common
Hen/Northern Harrier; *Circus cyaneus*	Least concern/ decreasing	Totally protected	Vagrant, Rare
Pied Harrier; *Circus melanoleucos*	Least concern/ decreasing	Totally protected	Migrant, Common
Crested Goshawk; *Accipiter trivirgatus*	Least concern/ decreasing	Totally protected	Rare, Uncommon
Greater-spotted Eagle; *Aquila clanga*	Vulnerable/ decreasing	Totally protected	Migrant, Uncommon
Eastern Imperial Eagle; *Aquila heliacal*	Vulnerable/ decreasing	Not protected	Migrant, Rare
Booted Eagle; *Aquila pennata*	Least Concern/ decreasing	Totally protected	Migrant, Rare
Changeable Hawk Eagle; *Nisaetus limnaeetus*	Least Concern/ decreasing	Totally protected	Rare, Common

Table 1 Continued

Common Name	IUCN Status/ Population Trend	Malaysia Wildlife Act 2010	Locality and Rarity Status
Tytonidae			
Barn Owl; *Tyto alba*	Least Concern/ stable	Totally protected	Rare, Common
Strigidae			
Collared Scops-owl; *Otus lettia*	Least Concern/ stable	Totally protected	Rare, Common
Barred Eagle Owl; *Bubo sumatranus*	Least Concern/ stable	Totally protected	Rare, Common
Buffy Fish Owl; *Ketupu ketupu*	Least Concern/ stable	Totally protected	Rare, Common
Brown Wood Owl; *Strix leptogrammica*	Least Concern/ decreasing	Totally protected	Rare, Common

Table 2. Temporal distribution of raptor species that coincide with rice growing season during the observation periods, 2000-2011

Species	Sighting according to month	Rice seasons
Falconidae		
Black-thinghed Falconet; *Microhierax fringillarius*	January-December	All seasons
Common Kestrel; *Falco tinnunculus*	October-March	• Direct seedling • Rice growing • Harvesting season
Peregrine Falcon; *Falco peregrinus*	January-December	All seasons
Black Baza; *Aviceda leuphotes*	October-April	• Direct seedling • Rice growing • Harvesting season
Oriental Honey Buzzard; *Pernis ptilorhynchus*	January-December	All seasons
Black Kite; *Milvus migrans*	September-April	• Transplanting • Rice growing • Harvesting season
Brahminy Kite; *Haliastur indus*	January-December	All seasons
White-bellied Sea-eagle; *Haliaeetus leucogaster*	January-December	All seasons
Black-shouldered Kite; *Elanus caeruleus*	January-December	All seasons
Short-toed Snake Eagle; *Circaetus gallicus*	February, March, December	• Feb: Harvesting season • Mar: Growing season (1st phase) • Dec: Just before harvesting, rice ripens about 100 days
Crested Serpent Eagle; *Spilornis cheela*	January-December	All seasons
Eastern Marsh Harrier; *Circus spilonotus*	September-April	• Transplanting • Rice growing • Harvesting season
Hen/Northern Harrier; *Circus cyaneus*	March, November	• Mar: Rice was about 70 days (1st phase) • Nov: Rice was about 70 days (2nd phase)

Table 2 Continued

Species	Sighting according to month	Rice seasons
Pied Harrier; *Circus melanoleucos*	August-April	• Ploughing activity • Transplanting • Rice growing • Harvesting season
Crested Goshawk; *Accipiter trivirgatus*	January-December	All seasons
Japanese Sparrowhawk; *Accipiter gularis*	September-Jun	• Transplanting • Rice growing • Harvesting season
Greater-spotted Eagle; *Aquila clanga*	August-March	• Ploughing activity • Rice growing • Harvesting season
Eastern Imperial Eagle; *Aquila heliaca*	November-March	• Rice growing • Harvesting season
Booted Eagle; *Aquila pennata*	January-March; August-November	• Harvesting season • Rice growing • Ploughing activity
Changeable Hawk Eagle; *Nisaetus limnaeetus*	January-December	All seasons
Tytonidae		
Barn Owl; *Tyto alba*	January-December	All seasons
Strigidae		
Collared Scops-owl; *Otus lettia*	January-December	All seasons
Barred Eagle Owl; *Bubo sumatranus*	January-December	All seasons
Buffy Fish Owl; *Ketupu ketupu*	January-December	All seasons
Brown Wood Owl; *Strix leptogrammica*	January-December	All seasons

Observed behaviour of Crested Serpent Eagle (*Spilornis cheela*) in Wild boar (*Sus scrofa*)-Wallow

Wido Rizki Albert[1*], W. Novarino[1], Rizaldi[1], J. Nurdin[1], M. N. Janra[2]

[1]Biology Department, Faculty of Mathematic and Natural Science. Andalas University, Padang, West Sumatra, Indonesia

[2] Biodiversity Institute at University of Kansas, US

*Corresponding author: email: widoalbert@yahoo.co.id, phone: +62-853-8417-8373

Citation: Wido Rizki Albert, W. Novarino, Rizaldi, J. Nurdin and M. N. Janra (2014) Observed behaviour of Crested Serpent Eagle (*Spilornis cheela*) in Wild boar (*Sus scrofa*)-Wallow *Ela Journal* 3(2):15-16.

Date of Publication:
01-06-2014

ISSN 2319-4361

Referee: Anand Padhye

INTRODUCTION:

Due to the role of raptors as top predators, they are considered important for maintaining healthy ecosystems. As such, in Indonesia, all diurnal raptor species are now protected by law (UU No 5/1990 and PP No 7 & 8/1991) (Rakhman et al., 2012). One of the most common raptor encountered in Indonesian forests is the Crested Serpent Eagle, *Spilornis cheela* (Prawiradilaga et al., 2003). These birds perch for long hours, possibly as part of a sit-and-wait hunting and foraging strategy (Liu, 2011). As their name indicates, serpent eagles hunt small animals like snakes, amphibians and reptiles as well as rodents and other small vertebrates (Gokula, 2012). Their reptilian and amphibian prey often lives in aquatic areas, serpent eagles are often found near water, and they hunt in and around water bodies on the forest floor (Wells, 1999; Gokula, 2012). Animal wallows (large muddy puddles where species like wild boars and rhinos often bath) may provide an important water source for forest eagles and their prey species, and may also provide minerals or resources that benefit the Crested Serpent Eagle. Our research seeks to explore the importance of animal wallows for these forest dwelling eagles.

MATERIALS AND METHODS:

We conducted camera trapping around wallow sites to observe the frequency of use and behaviour of raptors at wallows. Between September and December 2012 and April and July 2013, we placed three camera traps at wild boar-wallows inside the Biology Education and Research Forest (Hutan Pendidikan dan Penelitian Biologi—HPPB) at Andalas University, West Sumatera (Sumatra) Indonesia. Cameras took pictures and 5 second videos at both day and night (using infrared flash unseen by animals), and were set to be triggered a maximum of once per minute All photos and videos had date and time stamps.

RESULTS AND DISCUSSION:

Of total 122 days of observations in three different wallow sites, we obtained 113 photos and 150 video recording (of 5-second each). Twenty seven photos and twenty two videos recording were of Crested Serpent-Eagle, representing 13 unique visiting times amounting to 23.8 % of total photos taken at wallows. Crested Serpent Eagle visited wallows as single birds and only during the day (08.00 hrs to 17.00 hrs). The Crested Serpent Eagle's behaviour at wallow was as follows: it descended 1-2 m from the wallow, then walked into the pit (water puddle area) where it spent two to four minutes, often putting the head down to the water, either drinking or searching for prey, before it walked out of the water, and then flew away.

CONCLUSIONS:

The high frequency with which the Crested Serpent Eagles visited wallows indicates that it is an important habitat or resource for them in Indonesian forests. They visit wallows: possibly to hunt, clean themselves, drink water, or for geophagy to gain essential minerals. We conclude that more research is needed on the behaviour of Crested Serpent Eagles at wallows to understand why they are important for eagles living in closed tropical rain forests.

REFERENCES:

- Gokula, V. 2012. Breeding Ecology of The Crested Serpent Eagle *Spilornis Cheela* (Latham, 1790) (Aves: Accipitriformes: Accipitridae) In Kolli Hills, Tamil Nadu, India. *Taprobanica*, Vol. 04, No. 02: pp. 77-82
- Prawiradilaga, D.M., T. Muratte, A. Muzakkir, T. Inoue, Kuswandoro, A. A. Supriatna, D. Ekawai, M. Yayat, Afianto, Hapsoro, T. Ozawa, and N. Sakaguchi. 2002. Panduan Survei Lapangan dan Pemabtauan Burung-burung Pemangsa. PT. Binamitra Megawarna. Jakarta
- Rakhman, Z., I. Setiawan, D. M. Prawiradilaga, A. S. B Sutito, and I. S. Rejeki. 2012. Status and Conservation Raptor in Indonesia: Case Study on Javan Hawk-Eagle *Nisaetus Bartelsi* Conservation Efforts in Indonesia. Presented at the 7th Symposium of Asian Raptor Research & Conservation Network, Republik of Korea 13-16 January 2012.
- Liu, C.-H. 2011. Diurnal activity pattern of Crested Serpent-eagle Spilornis cheela hoya in Kenting, southern Taiwan. Master thesis, National University of Tainan, Tainan. [In Chinese with English abstract]
- Wells, D.R. 1999. The birds of the Thai-Malay Peninsula. Vol. 1. Non-passerines. Academic Press, San Diego, CA.

Mountain Scops Owl (*Otus spilocephalus*) in Chakrata, Uttarakhand, India

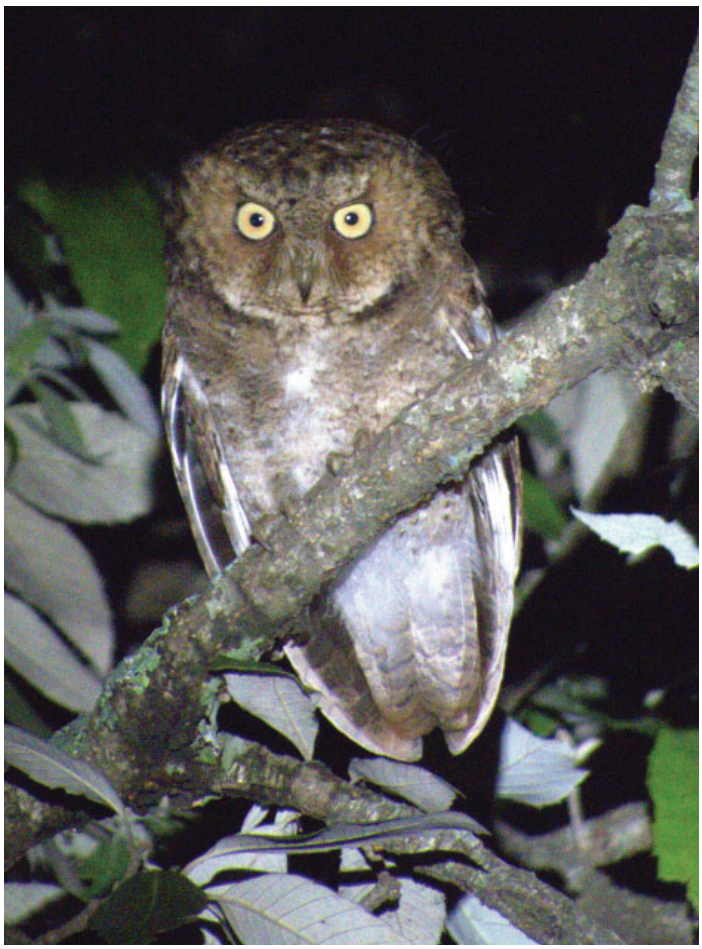
Saniya Kirloskar[1] and Rajgopal Patil*
[1] Corresponding author; * OENSL, Ela Foundation, Pune,

Citation: Saniya Kirloskar and Rajgopal Patil Mountain Scops Owl (*Otus spilocephalus*) in Chakrata, Uttarakhand, India
Ela Journal 3(2):17-19.

Date of Publication:
01-06-2014

ISSN 2319-4361

Referee: Satish Pande



Mountain Scops Owl (Otus spilocephalus) is a resident bird found in Himalayas, North-east India and Bangladesh. It is sometimes referred to as the spotted scops owl, is a species of owl in the Strigidae family. It is locally common in its main habitat which covers some parts of Asia, including Bhutan, India, Malaysia, Nepal, Taiwan, and Thailand. Otus stresemanni was formerly considered a distinct species following Marshall (1978), and it was treated as such in Collar and Andrew (1988). It has subsequently been tread as a subspecies of Otus spilocephalus following Sibley and Monroe (1990, 1993).

On May 4, 2014, during the course of bird survey at Chakrata, (30.69°N and 77.86°E (sea level)) in Dehradun district, Uttarakhand, India, we sighted this Mountain Scops Owl on a branch of Grey Oak (Quercus leucotrichophora).

Uttarakhand lies on the southern slope of the Himalaya range, and the climate and vegetation vary greatly with elevation, from glaciers at the highest elevations to subtropical forests at the lower elevations. Chakrata can be considered as the temperate western Himalayan broadleaf forests which lie in a belt from 2,600 to 1,500 meters (8,500 to 4,900 ft) elevation dominated by oaks.

The Mountain Scops Owl was sighted around 10.30 hr on 4th May, 2014. We tracked and followed the call of the owl coming from the valley in Chakrata. The oak tree on which Mountain Scops Owl was sitting was situated at a height of around 40 feet from ground. The Oak tree was situated near a small stream flowing down in the valley. When we were observing the owl, it stopped calling and after 15-20 minutes other call of the same species started down in the valley. The owl we were observing turned its head back in response to the call of other owl after few minutes and it started calling again when we left the place (switched off the torch)

We recorded the calls with a Samsung Galaxy smartphone in the 3GPP (.3ga) format. The bioacoustic traits were analyzed using the Raven

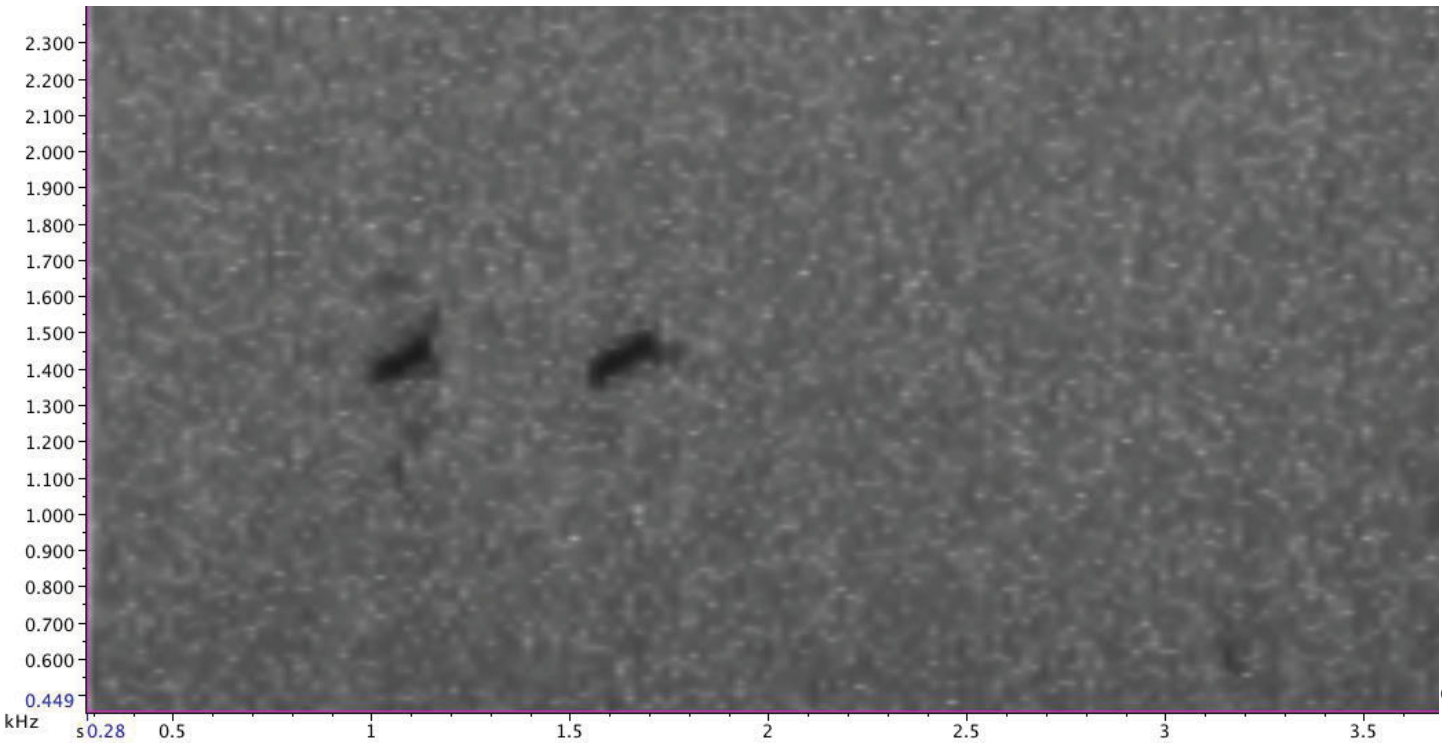


Fig 1- Sonogram of the call of Mountain Scops Owl

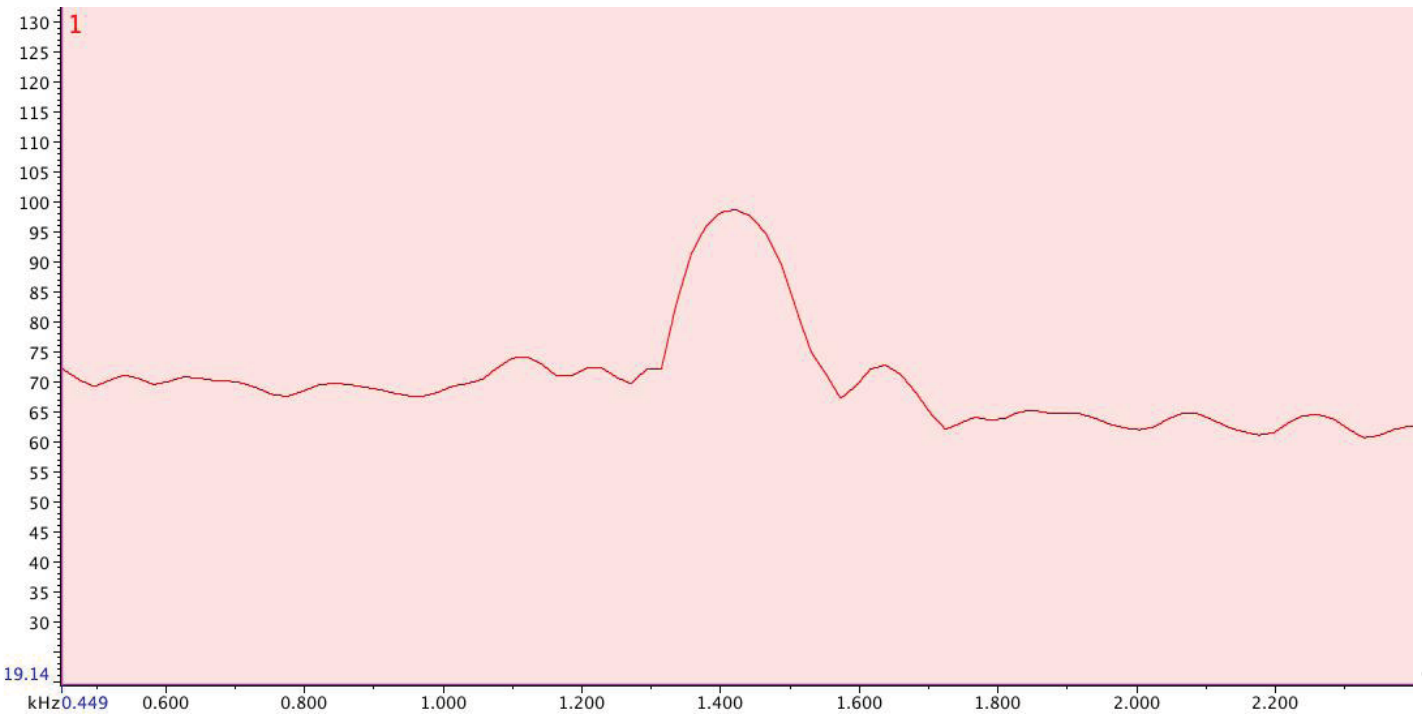


Fig 2- Power-Spectrum of the call of Mountain Scops Owl

Pro 1.5 (Bioacoustic Research Program 2013). The measurements were obtained from the spectrogram (Fig 1) and the power spectrum (Fig 2) (settings: window type = Hanning; window size = 1024 samples; brightness = 50%; contrast = 1%; overlap = 50%; DFT size = 1024 samples; grid spacing = 43.1 Hz)

The call of the Mountain Scops Owl consists of two short medium frequency notes or hoots that are repeated every few seconds. The notes are simple, slightly ascending, sweet mellow whistles given at an unhurried pace. Both the notes are similar.

The mean duration of of the first notes is 0.2s and of the second note is 0.22s. The mean inter-note duration is 0.54s. The mean duration of the entire call consisting of two notes is 0.8s and the mean inter-call duration is 4.56s. The maximum and minimum frequency of the notes is 1551Hz and 1316 Hz. The frequency at the maximum amplitude is 1421Hz.

ACKNOWLEDGEMENTS:

We thank Mr. Abhijeet Gandhi for locating the owl in Chakrata.

REFERENCES:

- Brazil, M. 2009. Birds of East Asia:eastern China, Taiwan, Korea, Japan, eastern Russia. Christopher Helm, London.
- Konig, Claus, Weick, Friedhelm, Becking, J.-H. 1999. Owls: a guide to the owls of the world. Pica Press, Robertsbridge, U.K. http://www.birdlife.org

A note on nest predation of Large Grey Babbler (*Turdoides malcolmi*) by an Indian Rat Snake (*Ptyas mucosa*) at Jejuri, Pune, Maharashtra

Kshitija Kulkarni, Avishkar Munje and Rajkumar Pawar

[Kshitija Kulkarni, Flat No. 2, Manasi Apts, Plot No 26, Anand Niketan CHS, Karve Nagar, Pune 411052, Maharashtra, India. Email: kshitija.18@gmail.com; Avishkar Munje, Flat No. 6, Bldg No. 4, Mahalaxmi Apts CHS, Erandwane, Pune 411004, Maharashtra, India. Email: aviar.1300@gmail.com; Rajkumar Pawar,
OENSL-Ornithology, Ethno-ornithology and Natural Sounds Laboratory, ELA Foundation & MES AG College, Pune, Maharashtra, India. Email: nisargrajkumar@gmail.com]

Citation: Kshitija Kulkarni, Avishkar Munje and Rajkumar Pawar
A note on nest predation of Large Grey Babbler (Turdoides malcolmi) by an Indian Rat Snake (Ptyas mucosa) at Jejuri, Pune, Maharashtra
Ela Journal 3(2):20-23.

Date of Publication:
01-06-2014

ISSN 2319-4361

Referee: Satish Pande

KEYWORDS:
Turdoides malcolmi, *Ptyas mucosa,* Jejuri, *Acacia nilotica*, threat display, babbler, snake

INTRODUCTION:

This report is a part of our project titled 'Study of interactions between members of the flocks of Large Grey Babbler (*Turdoides malcolmi*) during foraging and breeding, territorial behaviour and flock composition (temporal)'. The Large Grey Babbler (*Turdoides malcolmi*) (Sykes,1832) is a member of the Leiothrichidae family found in India. They inhabit scrub, open forest and gardens. They are usually seen in

Two babblers watch the snake in their nest

small groups, have distinctive nasal calls, lemon yellow iris and whitish outer feathers to their long tail (Ali and Ripley, 1996). They are known to breed throughout the year but mainly during March to September. The usual clutch size is of four eggs. The nest is a shallow cup placed in a shrub often of thorny species (Rasmussen and Anderton, 2005). Members of the flock may join in defending against predators (Dharmakumarsinhji, 1961). Birds nesting in areas with increased shrub cover may be at a higher risk of nest predation by snakes in addition to other predators (Klug *et al*, 2010). Previously reported nest predation instances by the Indian Rat Snake *Ptyas mucosa* include Black Bulbul *Hypsipetes ganeesa* (Balakrishnan, 2010) and Grey-headed Bulbul *Pycnonotus priocephalus* (Balakrishnan, 2011). We report a successful predatory event by the Indian Rat Snake at Jejuri, (18°16.131' N, 74° 08.910' E; 734 m ASL), Purandar, Pune District, Maharashtra, India on 4th September 2013 between 15:00 h to 18:00 h.

OBSERVATIONS:

The observations were taken from a distance of about 6.5 m. from the nesting Babul tree (*Acacia nilotica*). The nest was at a height of 2 m from the ground. We confirmed that one individual of *Turdoides malcolmi* was incubating four eggs in a broad shallow cup shaped nest at 15:13h. This activity was continued till 15:52h until the babbler in the nest gave an alert call and another babbler from an adjoining Babul tree responded in the same way and at 15:55h, approached the nesting tree while the babbler in the nest continued calling. The babbler which was incubating the eggs hurriedly came out of the nest and descended to the ground. It gave a threat display in response to a snake on the ground by constantly fluttering its wings vertically upwards and hopping at every step. At the same time, a pair of Bay-backed Shrike (*Lanius vittatus*) arrived and perched on a lower branch of an adjoining Babul and observed from a distance of about 1 m. The babbler from the adjoining Babul descended and perched on a branch lower than the nest but about 1 m above the ground. The babbler on the ground joined this babbler and was fed by the other babbler. The latter bird left and the former hurriedly perched on the nest. At 16:15 h, the babbler on the nest suddenly started calling loudly and left the nest. An Indian Rat Snake (*Ptyas mucosa*) was observed in the nest. Another babbler approached and both the babblers started calling loudly and started pecking the snake. The snake subsequently slithered away as the babblers chased it. We examined the babblers' nest immediately after the snake left and saw that the nest was empty, and inferred that the eggs were eaten by the snake. The Indian Rat Snake *Ptyas mucosa* is an alert, active, diurnal hunter that climbs well and inhabits open fields

Indian Rat Snake (*Ptyas mucosa*) near the nest

Indian Rat Snake (*Ptyas mucosa*) on the nest tree

A Large Grey Babbler eating a grasshopper

with shrubs as well as forests and feeds on frogs, toads, lizards, birds, rats, bats, snakes and in one case a young tortoise (Whitekar and Captian, 2004, 2008).

The commotion attracted the attention of eight avian species. Pairs of Common Woodshrike (*Tephrodornis pondicerianus*) and Red-vented Bulbul (*Pycnonotus cafer*) were the first to arrive followed by a pairs of Purple-rumped Sunbird (*Leptocoma zeylonica*) and Purple Sunbird (*Cinnyris asiaticus*). A male Black-headed Cuckooshrike (*Coracina melanoptera*), a pair of Bay-backed Shrikes (*Lanius vittatus)*, three Common Ioras (*Aegithina* tiphia) and a Pale-billed Flowerpecker (*Dicaeum erythrorhynchos*). All the birds had gathered around the snake, and were mobbing the snake. Mobbing is characterized by alarm calls, changing positions frequently and performing stereotype wing and tail movement (Curio, 1978). During this commotion one babbler found a grasshopper, and ate it, examined the nest and joined the other birds. By 17:42 h all birds flew away.

ACKNOWLEDGEMENTS:

We thank Dr. Satish Pande, OENSL-Ornithology, Ethno-ornithology and Natural Sounds Laboratory, Ela Foundation, Pune; Dr. Anand Padhye of M.E.S. Abasaheb Garware College, Pune; Department of Biodiversity, M. E. S. Abasaheb Garware College for their constant encouragement, support and guidance; Medha Pawar, Jejuri for accompanying us on-field.

REFERENCES:

- Ali, S & S. D. Ripley (1996) Handbook of the birds of India and Pakistan. Oxford University Press. pp. 220–222.
- Dharmakumarsinhji, R.S. (1961) Communal distraction display in Large Grey Babbler, Turdoides malcolmi (Sykes) J. Bombay Nat. Hist. Soc. 58 (2): 512.
- Rasmussen, P.C. & Anderton J. C. (2005) Birds of South Asia. The Ripley Guide. Vol. 2. Smithsonian Institution & Lynx Edicions. p. 444.
- Klug P.E., Jackrel S.L., With K.A. (Received: 14 July 2009 / Accepted: 9 December 2009 / Published online: 6 January 2010- Springer-Verlag (2010). Linking snake habitat use to nest predation risk in grassland birds: the dangers of shrub cover. p. 1.
- Balakrishnan, P. (2011). Breeding biology of the Grey-headed bulbul *pycnonotus priocephalus* (Aves: Pycnonotidae) in the Western Ghats, India. *Journal of Threatened Taxa* 3(1): 1415-1424.
- Balakrishnan, P. 2010. Reproductive biology of the Square-tailed Black Bulbul *Hypsipetes ganeesa* in the Western Ghats, India. *Indian Birds* 5 (5): 134–138
- Curio, E. 1978: The adaptive significance of avian mobbing: I. Teleonomic hypotheses and predictions. *Z. Tierpsychol.* 48, p175-183.

Introduction Of Invasive And Alien Plant Species Due To Wind Mills On Plateaus Of The Northern Western Ghats Of Mahrashtra.

Mandar N. Datar and Satish A. Pande

Agharkar Reseach Institute, G. G. Agarkar Road, Pune 411004, Maharashtra E-mail: datarmandar@gmail.com

[#] Ela Foundation, C-9, Bhosale Park, Sahakarnagar-2, Pune 411009, Maharashtra E-mail: pande.satish@gmail.com

Citation: Mandar N. Datar and Satish A. Pande Introduction Of Invasive And Alien Plant Species Due To Wind Mills On Plateaus Of The Northern Western Ghats Of Mahrashtra. *Ela Journal* 3(2):24-25.

Date of Publication:
01-06-2014

ISSN 2319-4361

Plateaus or lateritic outcrops are characteristic habitats of Northern Western Ghats. These lateritic outcrops are located in fragile semi-evergreen and evergreen forest vegetation along the northern Western Ghats. They are peculiar for having ephemeral vegetation composed of many seasonal elements. (Porembski and Watve, 2005). These lateritic outcrops, popularly known as plateaus or table lands are type localities of new species of plants and animals (Watve, 2008). However, these habitats are being increasingly used for construction of windmills for power generation in Northern Western Ghats.

For studying impact of these windmills on the natural vegetation on lateritic outcrops, field surveys were conducted in Kolhapur district of Northern Western Ghats. Our observations during the floristic survey at Gude-Pachgani area are summarized in this short communication.

Though these outcrops appear to be barren during the dry period, they shelter a rich vegetation of ephemeral, seasonal plant communities, including endemic and threatened species, which become evident during the monsoon season. Many elements of ephemeral fauna like spiders, arachnids and insects depend directly or indirectly on these plant communities. Semi-evergreen vegetation patches mostly composed of Memecylon, Syzygium, etc. and deciduous trees like Terminalia, Careya are seen scattered on these plateaus.

Construction of windmills on lateritic outcrops has primarily resulted in destruction of such habitats and their vegetation during road construction, windmill erection and deployment of power lines. The actual affected area depends on the size of the wind farm and the power in Mega Watt generated by each wind mill. The construction of roads in windmill areas has not only resulted in partial clearing of such patches of vegetation, but also led to the introduction of alien flowering plant species like Argemone mexicana L. (Papaveraceae) and Parthenium hysterophorus L. (Asteraceae). These species are not a part of the natural vegetation of Lateritic outcrops (Porembski, & Watve, 2005). In addition to these species,

some indigenous herbs, which are non-native to plateau habitats, like Solanum virginianum L. (Solanaceae) and Acacia nilotica (L.) Willd. (Mimosaceae), usually reported from dry deciduous and thorny scrub forests, were also seen introduced in windmill areas (Singh and Karthikeyan, 2000).

We found that these species were introduced to these windmill plateaus from the stone metal debris brought from other areas for infrastructure construction. Change in vegetation and habitat loss of Western Ghats due to activities like road widening, dam construction and impact of tourism are discussed (Ghate and Watve, 2004; Watve and Thakur, 2006), but reasons for introduction of invasive species are not mentioned. The seeds of the mentioned invasive species are introduced to the plateaus with stone metal debris used for infrastructure construction activities, and start establishing themselves over a period of time. At a few windmill construction sites we recorded about 9 - 45 individuals of these species.

We recommend that these invasive and alien plant species should be periodically removed before flowering such that the invasive species is exterminated locally and natural habitats are restored and the threat from such fast growing plants is addressed. Long term monitoring of such sites for identification and removal of invasive plant species is also recommended.

ACKNOWLEDGEMENTS:

This report is a one of the outcomes of a study undertaken by Ela Foundation, Pune for Enercon India Ld. on the request of Forest Department, Government of Maharashtra. The first author is thankful to Dr. D. R. Ranade, Officiating Director, Agharkar Research Institute, Pune for his cooperation. The second author would like to thank Mr. Sunil Banubakode, Mr. S. S. Notey and Mr. M. K. Rao, IFS, Conservator of Forests, Kolhapur, Maharasthra, for their assistance.

REFERENCES:

- Ghate, Vinaya and Aparna Watve. (2004). Table Land Flora of Pachgani with special reference to Impact of tourism. In National Seminar on New Frontiers in Taxonomy and Biodiversity Conservation. Abstract Book, Thiiruvananthapuram.
- Porembski, Stefan and Aparna Watve. (2005). Remarks on the species composition of ephemeral flush communities on paletropical rock outcrops. Phytocoenologia 35(2-3): 389- 401.
- Singh, N. P. and S. Karthikeyan. (2000). Flora of Maharashtra State. Dicotyledonous. Vol. I. Botanical Survey of India, Calcutta.
- Watve, Aparna and Sanjay Thakur. (2006). Ecological Studies of Lateritic Plateaus Habitats in Northern Western Ghats. In H. N. Pandey and S. K. Barik (eds.) Ecology, Diversity and Conservation of Plants and Ecosystems in India. Regency Publishers, New Delhi. pp 22-28.
- Watve, Aparna. (2008). Rocky Outcrops as Special Habitats in North Western Ghats, pp 147-154. In: Rawat, G.S. (Ed.). (2008). Special Habitats and Threatened Plants of India. ENVIS Bulletin: Wildlife and Protected Areas, Vol. 11(1). Wildlife Institute of India, Dehradun, India.

TABLE OF CONTENTS

Royal Botanic Gardens, Kew

ISSN 2319 - 2461
Journal for Private Circulation only