Ela Foundation

Ela Journal of Forestry and Wildlife

ISSN 2319-4361
(Indexed in Google Scholar)

Volume 5 | Issue 1
January - March 2016

A quarterly scientific refereed e-Journal of Ela Foundation and Forest Department, Maharashtra for Nature Conservation through Education and Research

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Fascinating Orchids

Dr. Satish Pande

Robert Brown (1773-1858), a surgeon and a physicist who discovered the 'Brownian Movement', was also a botanist who showed the difference between gymnosperms and angiosperms and was rightfully referred to as *botanicorum facile princeps* by Alexander von Humboldt. He founded the Department of Botany at the British Museum. Interestingly, Robert Brown had also studied orchids. His paper on orchids was included in *Hortus Kewensis* (1812) and was later reprinted in *Transactions of the Linnean Society of London*, 16 [1833], 685–742) as "Observations on the Organs and Mode of Fecundation in Orchideae and Asclepiadeae". He was fascinated by the pollination mechanisms in orchids. His observations on orchid pollens recorded in that paper were to form the basis of cytology. He described that, 'when pollen of orchids, were placed upon the stigma, they emit pollen tubes traceable into the ovary'. While examining the orchid cells under the microscope he described the cell nucleus, which in reality was the 'stomata' for breathing, as shown in recent experiments by scientists using his microscope that is preserved in the "Linnean Society of London". In "*Observations*" (1831), 19–2 and in "*Transactions"* (1833), 710–712, he wrote, "The nucleus of the cell is not confined to the Orchideae but is equally manifest in many other Monocotyledonous families; and I have even found it, hitherto however in very few cases, in the epidermis of Dicotyledonous plants".

Later in 1862, the famous Charles Darwin was also fascinated by the orchids and wrote a book on the fertilization mechanisms in orchids. The name of this publication was, "The various contrivances by which orchids are fertilised by insects". The book was translated in to French and German and was widely read and became popular. Darwin himself acknowledgde the inspiration given to him by Robert Brown when he had recommended Darwin to read the wonderful book by C. K. Sprengel, "*Das entdeckte Geheimnis der Natur"*. Darwin's orchid book was followed by several books that described 'fertilization mechanisms in all kinds of flowers' (in Darwin's own words in his autobiography).

Orchids have stimulated man's attention and have attracted his curiosity since long. Because of their unique structure and beautiful appearances, they are globally supporting a large horticultural industry with a huge monetary turnover. The 'tulip mania' waned but the 'orchid mania' still remains. Incidentally, I was also fascinated by the beauty of orchids since my school days and eventually wrote with Niranjan Sant and Dr. Mandar Datar a photographic treatise revealing the life and beauty of the "Wild Orchids of the Northern Western Ghats, including Goa and Maharashtra' based on a great deal of hard field work.

In India, the pollinating mechanisms of several endemic orchids are shrouded in mystery and remain un-described till date. A great deal of work on this subject can be done by young botanists, entomologists or budding foresters. In this issue of the *Ela Journal of Forestry and Wildlife*, an interesting paper takes stalk of the known pollination mechanisms in orchids in a broader perspective. I hope that the minds of young scientists and orchid enthusiasts are stimulated and they shall dive into the mystical beauty of this enigmatic family and investigate the unknown mechanisms used by Indian orchids..

The importance of wing tagging, collaring and ringing and subsequent recovery of tagged birds, thereby contributing to ornithology, is shown in the paper on tagged Bar-headed Geese from Mongolia. The predator-prey behaviour is described in a paper that discusses how a juvenile Golden Eagle was deterred from predating on a baby marmot by its parent, demonstrating the edge given to a prey species by the virtue of experience. The journal also includes interesting records, range extensions, ethno-ornithology and ethno-cosmology; the latter disciplines are new in scientific proceedings.

I look forward to interesting papers in the future and a wider participation from grass root level workers who spend a lot of time in the field for the protection and conservation of our treasured fauna and flora. Documentation goes a long way because it helps in the formulation of policies thereby ensuring meaningful and long lasting conservation.

Ring Recovery of Mongolian tagged Bar-headed goose *Anser indicus* (Latham, 1790) (Anseriforms: Anatidae) from Kumbhargaon, Maharashtra, India.

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Citation: Khan, Ashahar, Aman Gujar and Nyambayar Batbayar (2016). Ring Recovery of Mongolian tagged Bar-headed goose *Anser indicus* (Latham,1790) (Anseriforms: Anatidae) from Kumbhargaon, Maharashtra, India. *Ela Journal of Forestry and Wildlife* 5(1):137-140

Date of Publication:
31-3-2016

ISSN 2319-4361

Referee: Dr. Satish Pande

Abstract

We present the visual recovery record of a tagged Bar-headed Goose *Anser indicus* during the biodiversity assessment program at Kumbhargaon, Taluka Indapur, district Pune, Maharashtra, India. This tagged goose was encountered for the first time in the Indian Subcontinent since it was ringed in Mongolia in 2010. Current report shows the migration destination on its wintering grounds.

Introduction

The Bar-headed Goose *Anser indicus* is endemic to Asia and breeds on the high plateaus of central Asia and winters in China from southern Tibet east to Guizhou, and from Pakistan east to Myanmar (Flint et *al.,* 1984; Lu, 1991 and Perennou & Mundkur, 1994). The species is an exemplary record of evolution and adaptation in birds since the Bar-headed goose *Anser indicus* is one of the most celebrated high altitude performers. This species crosses the Himalayas on its biannual migration

Fig. 1. Mongolian tagged *Anser indicus* with neck band initialled 'X15' at Kumbhargaon, Maharashtra, India.

Fig. 2. Researcher holding same specimen 'X15' during an avian influenza survey in 2010 at Nogoon Lake, Arkhangai, Mongolia.

between southern and central Asia, flying over the highest mountains in the world and reaching altitudes of up to 9000m (Swan, 1970). During steady flight in hypoxic conditions, bar-headed geese and other birds increase their rate of O_2 consumption between 10 and 20 fold (Bernstein, 1987). The haemoglobin of *Anser indicus* lacks a salt bridge important for the Bohr Effect (Liang, 2001). This species also have proportionally larger lungs than those of other species of waterfowl (Scott et *al.*, 2009). In India the geese appear to arrive

Table 1. Data of Ringing and Recovery of Mongolian tagged *Anser indicus* in tabular form.

Sr. No.	Objectives	Ringing	Recovery
1.	Name of peer researcher	Nyambayar Batbayar and Tseveenmyadag, N.	Ashaharraza Khan and Aman Gujar
2.	Date	11th July 2010	9th Dec. 2015
3.	Location	Nogoon Lake, Arkhangai, Mongolia	Kumbhargaon Bird Sanctuary, Maharashtra, India
4.	GPS- coordinates	48°14'75"N 99°58'80"E	18°17'58"N 74°45'16"E
5.	Sex	Female	-
6.	Age	Adult	Adult
7.	Ringing number	V000326	Ring was absent at tarsus region of left leg as shown in fig. 2
8.	Neck Band Number	X15	Neck Band was present
9.	Remark	This bird was captured during an avian influenza survey and was healthy.	The bird seems healthy and comfort with other sympatric species.

on a broad front through northwest Pakistan, Kashmir, Nepal and Sikkim (Gole, 1982). Agriculture is the dominant land use on the *Anser indicus* wintering areas with most lands managed for spring barley, spring wheat and winter wheat production (Bishop et al., 1997). Previously, some tagged specimens were reported from surrounded area of Pune and Satara Districts in Maharashtra (Kasambe et. *al,* 2008 and Bandivadekar et. *al,* 2012).

Results

On 9th Dec. 2015 AK and AG were at Kumbhargaon, taluka Indapur, district Pune, Maharashtra (18°17'58"N 74°45'16"E) for biodiversity assessment program accompanying by Aniket Marathe, Dhruv Phadke, Er Kaushal Ayyer and Tejas Gajapolu. While taking bird flock count, AG was counting individuals from a flock of *Anser indicus*. During taking some photographs he noticed one unusual bird with a green collar on neck, initialled with label "X15". AG took photograph of that marked bird (Fig.1) and showed to AK at the research base station. After getting recovery data from NB, it was confirmed that that the female *Anser indicus* was a part of his research study in Mongolia.

The bird was captured during an avian influenza survey led by Wildlife Science and Conservation Centre, Mongolia and was ringed at Nogoon Lake, Mongolia (48°14'75"N 99°58'80"E) and was ringed at tarsus region with ringing no. V000326 and neck band initialled 'X15' (fig.2). According to NB, the bird wasn't tracked for almost five years, since it was tagged and current record is the first recovery record of the specimen 'X15' from the Indian Subcontinent. Distance travelled by the 'X15" *Anser indicus* by crow's flight was 4002 km to reach Kumbhargaon. The elapsed time between the date of ringing and recovery of the specimen was 1978 days i.e. five years four months twenty nine days. Presuming that the bird visited nearby areas for five years of its life, it had travelled a minimum of 40,020 km distance during this period. The bird travelled in an angle of 214° to reach Kumbhargaon. Ringing details are presented below in a tabular form **(Table 1)**:

Neck collared 'X15' was observed among the flock of *Anser indicus* with aflock sixe of 107 birds. The bird was foraging with this flock, which was grazing on the grass bed near the shore. Other prominent species observed in the area were *Vanellus indicus, Mycteria leucocephala, Plegadis falcinellus, Ichthyaetus ichthyaetus,* etc.

Discussion

Locality of Bhigwan around Kubhargaon includes riverine, wetland and backwater ecosystem of Ujani Dam including mudflats and grassy beds on the shore. Local farmers use water for irrigating their *rabbi* crops viz. *Cicer arietinum, Triticum durum, Zee maize, Sorghum bicolour,* etc. Wetlands converted into agro-ecosystem cause habitat loss of wintering grounds of migratory waterfowl species; commercial fishing introduces a competition for food between humans and wildlife. Industries around the sanctuary area, negetively affect the ecosystem by the deposition of chemical residues in water flow which is a major biohazard for the biodiversity in this region.

Acknowledgement

AK is thankful to Asad Rahmani (former Director, Bombay Natural History Society) for his valuable guidance and support in tracking specimen though several ringing agencies NB thanks Tseveenmyadag, N. and all his research colleagues from Science and Conservation Centre, Mongolia. AK is thankful to Mandeep Kaur and Manish Joshi, Ph.D. Scholars from University School of Environment Management, Guru Gobind Singh Indraprastha University, New Delhi, for their generous technical support in map illustration. AG extends his gratitude to Aniket Marathe, Dhruv Phadke, Er Kaushal Ayyer and Tejas Gajapolu for accompanying in field survey.

Fig. 3. Map illustrating wintering ground of Anser indicus, depicting ringing and recovery localities.

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Range extension of Indian Chat *Cercomela fusca* in Solapur, Maharashtra

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Citation: Vanjari, Raghvendra, Rahul Vanjari, Bharat Chedda, Shivanand Hiremath (2016). Range extension of Indian Chat *Cercomela fusca* in Solapur, Maharashtra. *Ela Journal of Forestry and Wildlife* 5(4):141-143

Date of Publication: 31-3-2016

ISSN 2319-4361

Referee: Dr. Vaibhav Deshmukh

Indian Chat *Cercomela fusca* (Blyth, 1851) is restricted to the Indian subcontinent. Survey of the available literature reveals that there are very few old records on the distribution of *C. fusca* from our region. Hence, we report the occurrence and extended range of the Indian Chat in Solapur, Maharashtra, India.

The Indian Chat prefers open sparse habitats with old buildings but also occurs in well wooded areas. Indian Chat is known to be distributed in North India and Pakistan (Ali and Ripley, 1983; Sibley and Monroe, 1990; Grimmett *et. al.,* 1998 and Kazmierczak, 2000). Population trend of this species is stable and it is scarce in Nepal (del Hoyo *et. al.,* (2005). It is categorized as least concern by BirdLife International (2015). It is a resident species recorded from extreme north western Maharashtra (Prasad 2003), as well as from Dhule (Vyavhare 1992) and Nanded (Kulkarni *et. al.,* 2005). In India it was reported from various sectors such as west Gujarat (Khacher, 2000; Singh, 2007) and Thar Desert, Bikaner. White (1919), Mathews (1919) and Sethi (2010) recorded its breeding from Darjeeling and Haridwar respectively. Jayapal *et. al.,* (2005) also reported the Indian Chat along the Narmada River in central India.

Random data collected by us during the ornithological observations from 2012 to 2015 in the Solapur region are summarized in Table 1. We recorded a total of 20 Indian Chats during this period. Flocks of Indian Chat composed of adults and sub-adults. In the immature phase the birds were dull brown with a buff belly and pale eye ring. The birds were also sighted collecting nesting material (Fig. A, B, C) but we did not make any attempt to locate the nests. It is locally called *Dongerdas* in Marathi.

There are several checklists of birds of Solapur during the past century (Davidson & Wenden, 1878); Gavhane, 2013, Kulkarni, 1993), Kshirsagar, 2012; and

Table 1: Our records of Indian Chat *C. fusca* in Solapur, Maharashtra.

Sr. no.	Date	Site	Co ordinates	Individuals	Activity
1	18/7/2012	Settlement area	17°38”53’N 75°52”59’E	02	Foraging
2	10/4/2013	Degaon	17°40”11’N 75°52”04’E	01	Sighting
3	6/5/2013	Smurti udyan	17°38”39’N 75°54”27’E	01	Collecting nesting material
4	10/6/2014	Hiraj	17°42”28’N 75°49”11’E	02	Calling
5	30/7/2014	Dongaon Road	17°39”13’N 75°52”45’E	02	Foraging
6	24/4/2015	Mulegaon	17°40”53’N 75°58”21’E	02	Sighting
7	14/6/2015	Kumbhari	17°39”48’N 75°58”09’E	6+2 juv.	Foraging
8	2/8/2015	Kumbhari	17°39”40’N 75°58”06’E	02	Foraging

Patil, 2013). However, these checklists do not include the Indian Chat. Two sightings of Indian Chat were reported from Solapur by Gaikwad *et. al.,* (1997) from Nannaj Bustard Sanctuary, occasionally and Hippargi *et. al.,* (2012) reported its location as one sq. km area of unprotected grassland, 7 km south of Solapur city, (17°36’5.14”N 75°53’01.32”E). Our communication further supports these observations regarding the presence of *C. fusca* in Solapur, Maharashtra and warrants a systematic status survey and study of this species. We suggest that the Indian Chat regularly occurs in Solapur and its range should be extended up to Solapur district, Maharashtra. (Table 1)

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Fig. A

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Fig. B

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Fig. A pair on an old cupboard
Fig. B- Sub-adult individual
Fig. C- Adult with nesting material

Fig. C

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Golden Eagle *(Aquila chrysaetos)* deterred by Parental-defense of Mongolian Marmot *(Marmota sibirica)*

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Citation: Pande, Satish, Prashant Deshpande, Niranjan Sant and Reuven Yosef (2016). Golden Eagle *(Aquila chrysaetos)* deterred by Parental-defense of Mongolian Marmot (Marmota sibirica) *Ela Journal of Forestry and Wildlife* 5(4):144-147

Date of Publication:
31-3-2016

ISSN 2319-4361

Referee: Prof. dr hab. Piotr Tryjanowski (Institute of Zoology, Poznan University of Life Sciences, Wojska Polskiego 71 C 60-625 Poznań)Poland

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Abstract

During the course of an avian survey in June 2010 in the Hustai National Park in Mongolia we recorded the aggressive behavior of an adult Mongolian Marmot *(Marmota sibirica)* directed at an avian predator, a sub-adult Golden Eagle (*Aquila chrysaetos*), that threatened juvenile marmots at the den. This observation stresses the importance of understanding parental risk and adult experience on the part of an adult marmot vs. the foraging and inexperience of a sub-adult Golden Eagle on predator-prey interactions.

Keywords.

Mongolian Marmot; *Marmota sibirica*; Golden Eagle; *Aquila chrysaetos*; parental defence.

Introduction

Parental investment theory predicts that parents will invest more heavily in larger and older rather than in smaller and younger broods in order to maximize their fitness (Trivers 1972, Winkler 1987). Koskela et al. (2001) suggested that aggression in bank voles (*Clethrionomys glareolus)* was related to the value as well as the vulnerability of the offspring. The personal risk that a parent is ready to take was made evident during a survey of the Hustai National Park, Mongolia, when we observed an adult marmot defend its burrow against an avian predator that had perched at one of the entrances.

Marmots are vocal, non-volant, burrowing, hibernating, small mammals found only in the north hemisphere with 14 species described worldwide (Wilson and Reeder 1993). The Mongolian marmot (*Marmota sibirica;* Order: Rodentia; Family: Sciuridae) is considered an endangered species by IUCN (Batbold et al. 2008). The Mongolian Marmot is a ground squirrel with a distribution in the temperate regions of China, North-west Mongolia, and Siberia, Russia. The marmot

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has a brownish coat, short tail and legs and adults weigh about 8 kg in spring (Adiya 2000). The young and adults look similar except in size. The Mongolian Marmot (a.k.a. Tarbagan or Siberian marmot) is the most common of the marmot species of Mongolia and is identified as a keystone species (Zahler et al. 2004, Murdoch et al. 2009). The only other marmot species that occurs in Mongolia is the Grey Marmot *(Marmota baibacina*).

Mongolian Marmots occupy shrubland and grassland habitats and is considered an important ecosystem engineer that contributes to the health of the habitats (Weiner et al. 1982, Clark et al. 2006). Not only is it and other burrowing rodents (e.g., plateau pika *Ochotona curzoniae*, Smith and Foggin 1999) an important food source for natural predators but due to their burrowing habit create shelters also for other animal species, facilitate nutrient cycling in the soil, alter plant communities and biomass, and serve as a conservation tool for monitoring grassland health (Clark et al. 2006, Murdoch et al. 2009, Yoshihara et al. 2010). In spite of this, little is known about its ecology and ecological roles and how their presence influences the health of the grassland habitats which are home to a great biodiversity of wildlife and plants. Hence, any behavioral information on this important grassland species is important, especially in the form of antipredatory response that is conducive to the survival of the species in the wild. In Mongolia, the population of the Mongolian Marmot was drastically reduced from ca. 40 million to just around five million in the past 60 years (Batbold 2002). The population declines are mostly due to anthropogenic activity - overhunting for their skins, meat, and oil (Clark et al. 2006, Murdoch et al. 2009). Presently, hunting is prohibited and livestock grazing is not allowed in protected areas, but the Mongolian Marmot population continues to decline due to poaching for foreign income (Wingard and Zahler 2006).

The Hustai National Park (HNP), Mongolia, is a protected area and located about 100 km south west of the capital, Ullanbaatar ($47^0$50'N; $10^0$00'E; altitude 1100 to 1840 m a.s.l.). The average annual precipitation is 232 mm and average annual temperature is 0.2^0 C with monthly averages of -23^0 C in January and 20^0 C in July. At HNP there is about 600 km^2 of forest steppe with grassland, shrub land and birch-dominated forests (Wallis de Vries et al. 1996). Mongolian Marmots are common in HNP and dig a burrow complex which is occupied by the family. Marmots usually forage within 20 m of their burrow such that in case of a perceived threat they can quickly retreat to its' safety. Mongolian Marmot population density in HNP in 1998 was estimated to be 1.16 ind/ha^{-1} (Takhi Reintroduction Center 1998). The marmots are vegetarian animals feeding on 60 to 80 species of plant matter consuming shoots, seeds and flower buds, but may take insects and small reptiles (Adiya 2000).

We conducted an avian survey from a vehicle in HNP during 25 to 27 June 2010. On 28 June 2010, at about 0930 hrs we observed two young Mongolian Marmots playing near a burrow entrance. The burrow complex was situated at the beginning of a steep hill slope bordering a shallow ravine cut by an annual stream. The hill slope was strewn with boulders. Two entrances of the burrow complex were visible to us from the jeep. The young marmots intermittently dust-bathed, stretched, licked and preened each other, and

uttered chirping calls during play. We noticed three Steppe Eagles (*Aquila nipalensis*) perched on boulders at a distance of ca. 150 m from the young marmots and a sub-adult Golden Eagle (*A. chrysaetos*) perched closer at a distance of ca. 100 m from the young. The playful young marmots appeared to be oblivious to the presence of the eagles and no adult marmots were evident above ground.

After observing the young marmots at play, the Golden Eagle took flight and approached their location. The marmots immediately noticed the threat, became alert, flicked tails and uttered loud shrill alarm calls in the form of repeated harsh chirps. Before the Golden Eagle could reach them, the young marmots dived into an adjacent burrow entrance and disappeared. The Golden Eagle alighted at the entrance of the burrow with the obvious intention of trying to catch a young marmot. However, almost instantaneously an adult marmot, which we assume to be one of the parents, emerged from an adjacent burrow entrance and stood on hind legs, surveyed the surroundings and took stock of the situation, and perceived the Golden Eagle perched near the burrow entrance. The aggravation this caused was evident in the change in behavior and the adult marmot rapidly wagged its' tail and uttered a shrill, high-pitched whistle. The Golden Eagle looked at the adult, ignored it, and concentrated on the entrance into which it had seen the young disappear. The adult marmot, on the other hand, leaped forward from its upright position and charged the Golden Eagle uttering bark-like sounds (Fig. 1). The eagles upon noticing the threat from the advancing adult marmot took off and flew away with the marmot chasing it for the first few meters. The three Steppe Eagle perched at some distance also took off simultaneously and flew away. Having achieved the safety of the young and its burrow complex, the adult marmot did not remain on the surface and quickly returned to the entrance where, we assume, the young were hiding.

Depending on geographic areas the known natural predators of the Mongolian Marmot are snow leopard (*Panthera uncia*), wolf (*Canis lupus*), Eurasian lynx (*Lynx lynx*), fox (*Vulpes vulpes*), wild/domestic dog (*Canis familiaris*) and Golden Eagle. The latter is a powerful avian hunter and often hunts in pairs and takes large prey like gallinaceous birds, but they also kill small to medium sized mammals, like marmots, and even larger prey like fox, young bharal *Naemorhaedus* sp., fawns of musk deer *Moschus* sp. and adult tahr *Hemitragus* sp. (Ali and Ripley 1969). Golden and Steppe Eagles breed in the HNP and are known to prey on marmots, and skulls of prey species litter the area around and in their nests (RY, pers. obs.).

Our observation is an example of the reversal of the ecological predator-prey roles wherein normally the predator attacks and the prey attempts to defend itself or its young. Usually, the young form the Achilles' heel of prey and predators alike, creating a cascade of predator attack, prey counterattack and predator defence (Magalhães et al, 2005), Though such experiments are reported for arachnid species of thrips *Frankliniella occidentalis* and phytoseiid mites *Iphieius degenerans* (Magalhães et al, 2005) in controlled laboratory conditions, we report an observation of similar behavior in higher vertebrates in a wild population. In extreme cases of repeated counterattacks on predators by the intended prey of equal size to that of the predator, the predators respond by protective parental care (Magalhães et al, 2005). In our observation the adult Mongolian Marmot attacked a known predator, a sub-adult Golden Eagle, in defense of its assumed young causing the predator to flee. We think that this may be because both recognized that although marmots are included in the diet spectrum of the Golden Eagle, the adult marmot, which was larger and more experienced, was a risk to the inexperienced, sub-adult eagle, and therefore, did not run a higher risk when it counterattacked (cf. Bakker & Sabelis 1989). Also, in most cases predators are larger than their prey and the difference in size influences their capture success, such that the smaller the difference in size the lower the probability of prey capture (Hespenheide,1973; Aljetlawi et al., 2004). Further, Sherman (1977) suggested that sudden or erratic changes in prey behavior may startle or temporarily confuse predators and indicate to them that an attack is unlikely to succeed. In our case, the attack by the adult marmot may have confused the inexperienced, sub-adult eagle.

Also, sub-adult Golden Eagles, that weigh 3 to 6 kg, are smaller in mass than adult Mongolian marmots that have a biomass of up to 8 kg in spring. Size overlap of predators and prey due to ontogeny may drive role reversals in predator prey relationships and was reported by Saito (1986) and Barkai and McQuaid (1988). To the best of our knowledge this is the first reported observation of a Mongolian Marmot, a prey species attacking it's potential predator, the Golden Eagle.

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Pollination Mechanisms in family Orchidaceae

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Citation: Pathare, P.S. and Diwakar, P. G.(2016). Pollination Mechanisms in family Orchidaceae *Ela Journal of Forestry and Wildlife* 5(1):148-155

Date of Publication:
31-3-2016

ISSN 2319-4361

Referee: Dr. Mandar Datar, Agharkar Research Institute, Pune

Abstract

Orchidaceae is one of the species-rich, diverse and highly evolved families of higher plants. Successful out crossing through sexual reproduction is mainly responsible for the diversity and wide distribution of this family. Orchid flowers are extremely variable in their structure in order to attract specific pollinator and the family Orchidaceae is renowned for its fascinating pollination mechanisms. An array of events involved in orchid pollination has always received good attention by biologists throughout the tropics. In India, the diversity, status, distribution and morphology of the orchid family are well studied as compared to pollination studies. The floral morphology and complex biology of orchids have been studied by numerous workers for several years. Although less studied scientifically, some evidences from ancient Indian literature as Vedas, Upnishadas and Puranas have touched the topic. The ancient literature shows that ancient Indians had knowledge about sexes, pollination and other sexual events in plant's life. Still, the facts revealed about complex mechanisms of pollination could not answer every question related to the process. Thus an extensive interdisciplinary study is needed to resolve the multifaceted beauty of orchid pollination process.

The present article discusses the events and agencies involved in pollination of members of family Orchidaceae. This review is based on the published literature and it summarizes the specialized pollination mechanisms adapted by orchids in relation to their specific pollinators.

Introduction

Orchidaceae is the second largest family of flowering plants which is known for its attractive and typical flower structure. It is one of the highly evolved, diverse and successful families of flowering plants. The single family constitutes 40% of monocotyledonous taxa (Pande et al. 2010) comprising of about 779 genera and

22,500 species (Mabberley 2008). In India, Orchidaceae is represented by 1,331 species belonging to 186 genera (Misra 2007).

The morphology and structure of orchid flower is unique and highly specialized for sexual reproduction. An ultimate aim of this specialized flower is to ensure the successful pollination by attracting the attention of pollinators. In Orchidaceae pollen transport is achieved mainly with the help of external biotic agencies such as insects, birds and animals. Though an array of pollinators is involved in orchid pollination, majority of species are insect pollinated. The structure of orchid flower is tailor-made for insect pollination (Misra 2007). An enormous diversity of pollination mechanisms is the outstanding feature of orchid family (Jersa´kova´ 2006, Brodmann et al. 2008).

The floral structure in orchids has undergone enormous modifications while co-evolving with their exclusive pollinating agents; as a result they exhibit a unique complex flower structure.

Typical structure of orchid flower

The complex designs of orchid flowers have always fascinated biologists. Orchid flowers show typically zygomorphic symmetry with an outer whorl of three sepals, and an inner whorl of three petals, a characteristic of monocots. Of three, two lower sepals are called 'lateral' and upper one is 'dorsal' or 'medial' sepal. The two lateral petals flank the greatly enlarged modified third medial petal, known as either the 'lip' or 'labellum'. Just before the flower opens, pedicel rotates 180º so that the labellum goes on the lower part of the flower. This unique process is called 'resupination' and is necessary for forming suitable landing platform for pollinators. Another typical feature of an orchid flower is the presence of columnar structure resulting from fusion of stamens and pistils in all their parts. In orchids, there are no stamens with free filaments as in other plants; instead, there is a reduction in the number of floral parts and the male and female reproductive organs are fused into a single structure called 'column' or 'gynostemium', which is located at the centre of the flower. At the top of the column is the anther, and below is the sticky stigma. About 99% of the orchid species consist of single fertile stamen situated opposite the lip (Misra 2007). In most of the orchids pollen grains are held together by glue-like alkaloid viscin forming a waxy mass of pollens called pollinium. Pollinia are connected directly or through a short stalk (stipe or caudicle) to the sticky foot-like viscidium. This structure termed 'pollinarium' is acts as a unit and becomes attached to the pollinator. The rostellum, a beaklike slender extension separates male and female organs and acts as a barrier to prevent self pollination (Cozzalino & Widmer 2005, Pande et al. 2010).

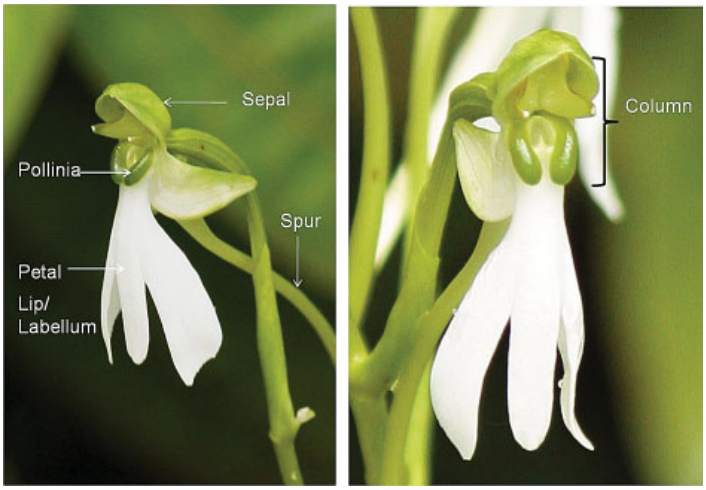

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Fig 1: Structure of orchid flower

Pollination mechanisms in orchids have fascinated biologists for several years. The study of orchid pollination biology has a long history, and is relatively well known compared with other aspects of orchid biology (Roberts 2003). The Orchidaceae is a rapidly evolving, pollinator-orientated sexually reproducing family for its long-term survival. Many orchids have evolved a variety of mechanisms that promote out-crossing. The relationship between an orchid and its pollinators is highly specialized, with the orchid often relying far more on its pollinators than the pollinators on the orchid (Roberts 2003). Pollination in orchids is achieved mainly with the help of insects (entamophily) and birds (ornithophily) and rarely mammals and accordingly the flower structure shows considerable variations for optimally appealing the respective pollinators.

Entomophily in Orchidaceae

Variety of bees, beetles, wasps, ants, butterflies and moths are well known pollination vectors in family Orchidaceae. Insect-pollinated plants generally advertise their flowers with color, shape and scent to attract their pollinators (Salzmann 2007). Some orchids reward their service providers with nectar but many are non-rewarding

(Jersa´kova´ 2006). In case of nectar rewarding orchids the nectar is stored in a specialized tube like projection called 'spur'. The role of spur in relation to pollination was first explained by Darwin in 1862. His theory was based on the study of Angraecoid subtribe from Madagascar. Angraecoid orchids constitutes a large group of epiphytic orchids including about 760 species distributed in the continents and islands in the Indian ocean including Africa, Madagascar, Central and south America and Caribbean Islands (Micheneau et al. 2009). The angraecoid orchids are known for their spectacularly long spurred white colored flowers. Darwin examined some specimens of *Angraecum sesquipedale* having a spur up to 30 cm long (Micheneau et al. 2009). After critical studies of these specimens he predicted that only a moth with considerably long proboscis would pollinate this orchid. In 1903, forty years later after Darwin's prediction, Rothschild & Jordon found a hawkmoth *Xanthopan morganii* with a long proboscis from Madagascar. Further studies have shown that this moth was responsible for the pollination of *A. sesquipedale*. Thus in honor of Darwin's prediction the variety of hawkmoth was named as *Xanthopan morganii* var. *praedicta* (Micheneau et al. 2009). This famous prediction then derived the attentions of evolutionary biologists and since then pollination biology of orchids was studied by many researchers.

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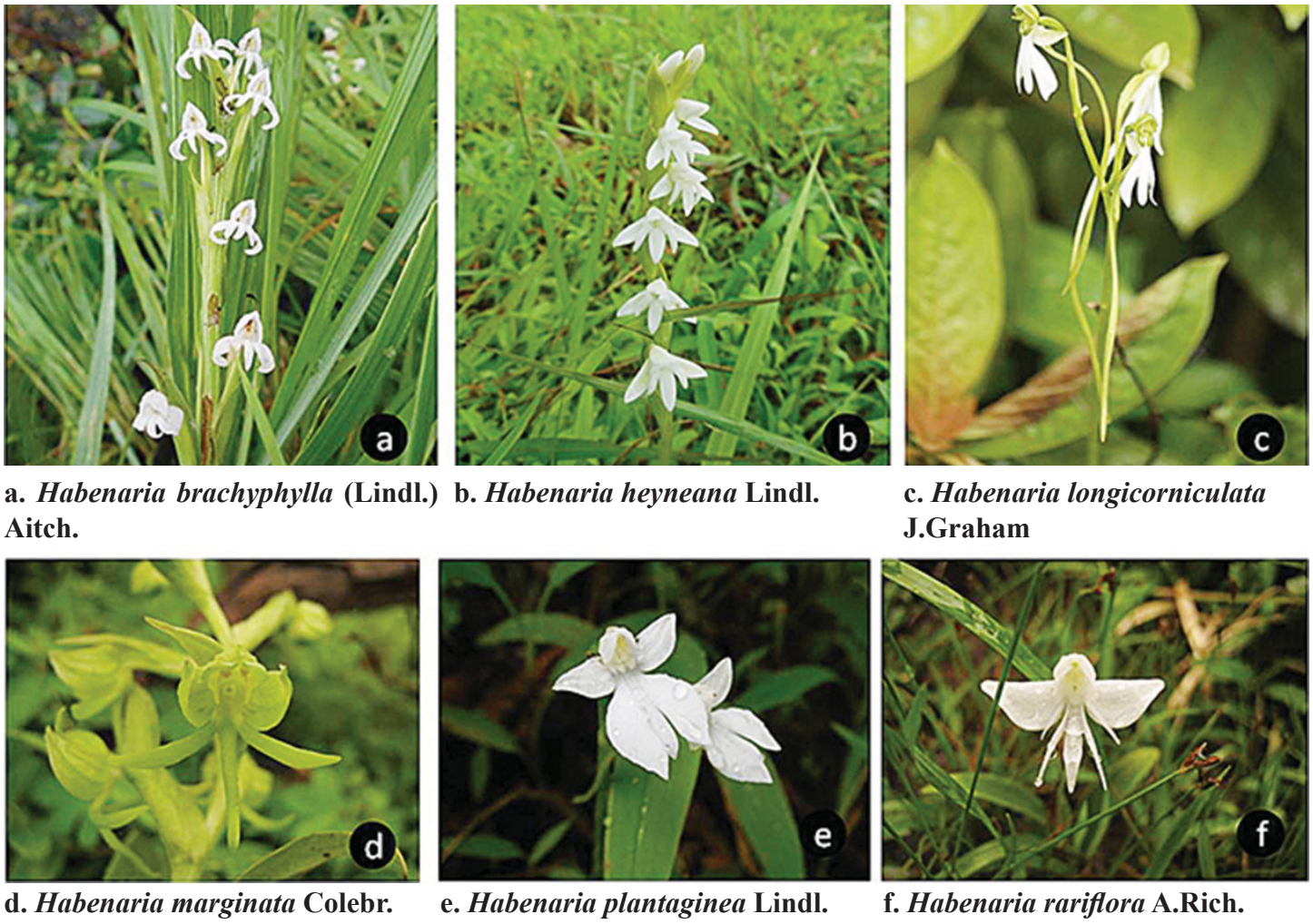
Fig 2: Pollination in *Angraecum sesquipedale*

i) Insect pollination in rewarding flowers

Presence of the nectar tube is found in orchids that are mainly associated with moths for pollination and also gives them a nectar reward. *Habenaria* a widespread pan tropical genus of orchids is specially adapted for moth pollination and produces a long spur as nectar depository. The association of floral signals with nectar reward can lead to flower constancy. Insects restrict their visits to one flower type, even when other rewarding types are available. This behavior of pollinators is favorable for plants, because it reduces inappropriate pollen transfer, and clogging of stigmas with non-compatible pollen .



a. *Habenaria brachyphylla* (Lindl.) Aitch. **b. *Habenaria heyneana* Lindl.** **c. *Habenaria longicorniculata* J.Graham**

d. *Habenaria marginata* Colebr. **e. *Habenaria plantaginea* Lindl.** **f. *Habenaria rariflora* A.Rich.**

Fig 3: Some species of genus *Habenaria* from Northern Western Ghats

Insect pollination in non-rewarding flowers

About one third of the orchid species are non-rewarding and attract their pollinators without offering any reward (Schiestl 2005, Cozzolino & Widmer, 2005, Jersa´kova´2006). This large group of orchids is renowned for pollination mechanism through deception (Schiestl 2005, Cozzolino & Widmer, 2005, Jersa´kova´ 2006). The mechanisms of deception in orchids range from mimicry of floral signals of rewarding plants to mimicry of mating signals of receptive females of concerned pollinators. Generalized food- deception, food deceptive floral mimicry, brood- site imitation, shelter imitation, pseudo-antagonism, rendezvous attraction and sexual deception are the types of deception generally practiced by orchids to enchant pollinators. Among these, generalized food deception is the most common mechanism (reported in 38 genera) followed by sexual deception (reported in 18 genera) (Jersa´kova´ et al. 2006).

Table 1: Classification of deception mechanisms in Family Orchidaceae and their occurrence. The number of genera were estimated according to van der Cingel (2001)

Sr. No.	Mechanism	Exploited insect behavior	No. of genera
1	Generalized food deception	Food foraging	38
2	Batesian floral mimicry	Food foraging	9
3	Brood- site imitation	Oviposition	11
4	Shelter imitation	Sleep/warmth	1
5	Pseudo-antagonism	Territoriality	2
6	Rendezvous attraction	Sexual	4
7	Sexual deception	Sexual	18

(Source: Jersa´kova´ et al., 2006)

Generalized food deception

Orchids adapted for generalized food deception mechanism, in general, abuse specific food foraging behavior of insects (Dafni 1983, Jersa´kova´ et al., 2006).

In numerous unrelated orchid genera such as *Disa, Orchis, Dactylorhiza, Calypso, Cypripedium, Anacamptis, Brassavola, Calopogon, Pogonia, Dipodium* etc. food deception is based on instinctive foraging behavior of pollinators.

For attracting pollen agents orchid flowers promote their qualities such as flower color, shape, scent, nectar guides, spurs and pollens. Few orchid genera achieve food deception by offering pseudo pollens or false anthers in *Polystachya, Maxillaria* and in some species of *Eria* and *Dendrobium.* In addition to visual and tactile attractions some species of *Polystachya, Maxillaria* and *Eria* possesses protein and starch rich labellar papillae and trichomes that are collected by pollinators for nutrition.

Batesian floral mimicry

Deceptive orchids that achieve pollination through the resemblance of their flowers to those of particular rewarding species have been termed 'Batesian mimics' (Jersa´kova´ et al. 2006). In this mechanism non rewarding orchid flower typically mimics the characters of rewarding plant species called 'models'. Floral signals emitted are mainly color, scent, visual and tactile cues. Matching of the model's flower color by the mimic appears to be critical for successful attraction of pollinators. Food-deceptive floral mimicry is associated with pollinators that use mainly color, rather than scent, as their primary foraging cue. Batesian mimicry has been reported in the Australian genera *Diuris* and *Thelymitra* resembling legumes and lilioids respectively (Jersa´kova´ et al. 2006).

Brood- site imitation

This type of mechanism has been employed by plants that make deceitful attraction for insect seeking with an appropriate place to lay their eggs. In this mechanism orchid flowers tend to mimic standard oviposition sites such as carrion (sapromyophily), dung (copromyophily, oprocantharophily), or the fruiting body of fungi (mycetophily). The vectors trapped are mostly the members of Diptera and Coleoptera. Apart from Orchidaceae, this strategy is also employed by some members of Aristolochiaceae, Asclepiadaceae, and Araceae families. The brood site imitation mechanism is mainly confined totropical and subtropical areas and is absent in Europe (Jersa´kova´ et al. 2006).

Various orchid genera such as *Pterostylis, Paphiopedilum, Bulbophyllum, Cirrhopetalum, Megaclinium* (closely related to *Bulbophyllum*), *Anguloa, Masdevalliaand Pleurothalis*are pollinated by flies, attracted by the brownish or dull reddish floral colors and foul odours. These species often have flowers with distinctive trap structure bearing a one-way passage pouch; alternatively they trap the insects by movement of the lip (Jersa´kova´ et al. 2006).

Some orchids show features specially adopted for pollination by fungus-gnat, a group of small, dark, short-lived flies belonging to order Diptera. For e.g. the Australian genus *Corybas* has geoflorous, dark colored flowers that mimic the fruiting bodies of basidiomycetes and get pollinated by ovipositing fungus gnats. Similarly the South American genus *Dracula* has a fungus-like or fishy scent and fungus-shaped lip (Vogel, 1978).

Epipactis veratrifolia is the Afro-Asiatic species that combines oviposition-site mimicry with nectar reward. The species misleads female syrphids in laying eggs on the labellum, bearing a combination of orange and black structures which are probably perceived as aphids (Ivri & Dafni, 1977). In this type of deception, insect egg-laying is triggered by a combination of visual, tactile and olfactory stimuli (Jersa´kova´ et al. 2006).

Shelter imitation

Some flowers attract insects by offering a floral tube to rest or sleep, as a hiding place during adverse weather conditions. Some flowers are also used by insects for thermoregulation, because the temperature in the flower tube may exceed the ambient temperature by up to 3ºC during the morning hours (Jersa´kova´ et al. 2006). In orchids, shelter imitation mechanism appears to be confined to the Mediterranean genus *Serapias*, whose extremely dark red-colored flowers appear to mimic bee nest entrances (Dafni et al., 1981). Given that bees probably obtain real shelter in the flowers of *Serapias* (Dafni et al., 1981). However, the deceptive nature of this system is a point of debate.

Pseudo-antagonism

Some insects of Hymenoptera attack the flowers when they are vibrating in the wind in response to defend their territory. This process is termed as pseudo-antagonism. Some orchid species exploit this behavioral activity of insects and pollinate their flowers. The defensive behaviour of territorial *Centris* spp. bees may be exploited by some *Oncidium* and *Tolumnia* species.

Pollination by pseudo-antagonism mechanism is poorly studied and seems to be extremely rare. Ackerman (1986) suggested that this plant-pollinator interaction may be mutualistic as bees become better territorial defenders

with practice. However, this hypothesis has not yet been supported by evidence.

f. Rendezvous attraction

Some orchids exploit the sexual drive of male bees during mate-seeking flights. Male bees, when inspecting surrounding flowers for females foraging on pollen or nectar, are deceived by orchids with similar color, shape and scent as co-blooming rewarding plants. This mechanism has been reported in the European orchid species, *Cephalanthera rubra* (Nilsson, 1992) and *Orchis papilionacea* (Vogel, 1972), as well as in the African *Disa obtusa* and *Ceratandra grandiflora* species (Johnson & Steiner, 1994; Steiner, 1998).

Sexual deception

Pollination by sexual deception is the most fascinating mechanism that has puzzled biologists for many years. In this strategy flowers attract male insects by mimicking mating signals of receptive female insects. Flower mimics various olfactory, visual and tactile cues that appeal male insects for mating. The strong scent similar to that of female pheromone is emitted by sexually deceptive flowers. Mimicry of floral signals and typically of pheromones plays a key role in attracting the males. The males lured by pheromones tries to copulate with deceptive flowers, a process called 'pseudo-copulation'. During pseudo-copulation the pollinia become attached to the male's head or abdomen and are transferred to a flower of another plant during the next copulation attempt.

Many plants exploit mate seeking behavior of insects through petal ornamentation that resembles insects. But pollination by true sexual deception is found exclusively in orchids (Johnson & Dafni 1998, Jersa´kova´ et al. 2006). Pollination by sexual deception is the most studied among known mechanisms in Orchidaceae and is reported in about 18 genera (Jersa´kova´ et al. 2006). Sexual deception is well known in European genus *Ophrys,* South American *Disa* and 9 Australian genera altogether comprising of about 400 species (Schiestl 2005). In India genus *Cottonia* exhibits sexually deceptive features and are pollinated by male bees (Misra 2007).

Ornithophily in Orchidaceae

Some orchids achieve pollination through various groups of birds. Among these, hummingbirds (Trochilidae) are the predominant avian orchid pollinators. In complex highly evolved pollination systems, birds have come much later and only pollinate three percent of orchids, nonetheless, with a large number of estimated orchid species, there are probably hundreds of orchids that rely on hummingbirds for pollination (Siegel 2011). Most orchids that are hummingbird-pollinated are from high elevation ecosystems in the tropical New World where insects are rare or unable to operate because of the cold. Hummingbirds are distributed only in the America with at least 330 species from Alaska to the tip of South America (Siegel 2011). Hummingbirds visit orchid flowers in search of nectar and insects inside the flowers to fulfill the need of nutrition. While feeding on nectar, orchid pollinia gets attached to head and mouth parts of birds and gets transported to the stigma of other flower where the action is repeated. Orchids that relay on hummingbirds for effective pollination have adopted some distinctive floral features. For vigorous advertising, hummingbird pollinated orchids tend to be brightly colored with red, pink, purple, orange and yellow. Bird pollinators are generally attracted by visual cues as they have a poor sense of smell and the bird pollinated flowers are usually devoid of scent.

Another interesting floral adaptation in bird pollinated orchids is the development of dark colored pollinia. The pollinia in this group of orchids are generally dark blue, gray or brown colored in order to reduce sharp visual contrast with the color of the beak, and the bird would be stimulated to clean his beak (Siegel 2011). In the subtribe *Sobraliinae*, there is a marked contrast between the pollinia of insect pollinated versus hummingbird pollinated flowers. The pollinia in most species of bee pollinated *Sobralia* spp. are cream or pale yellow, but those are blue gray in bird pollinated *Sobralia* spp. (Siegel 2011). In some orchids like *Satyrium carneum*, pollinated by sunbirds, the pollinia have remained yellow but are provided with very large, plate-like, extremely sticky viscidia that prevent the birds from removing the yellow masses that remain adhered to beaks till they get transferred to targets.

One more featured adaptation seen in bird pollinated orchids is the production of high amount of nectar in floral tubes with length compatible to bird's beak length.

In addition to the usual bird pollination mechanism dependent on foraging behavior of birds, an innovative pollination system in orchids is discovered by Johnson & Brown (2004). They made some interesting observations in pollination of two species of *Disa* growing in South Africa. *Disa chrysostachya* Sw. and *Disa satyriopsis*

Kraenzl are African grassland orchids and are pollinated by sunbirds (Johnson & Brown 2004). Birds generally perch on the tall compact, orange colored inflorescences of *Disa* sp. and feed on nectar. While feeding on nectar birds typically perch on lower part of inflorescence and take nectar from flowers from the upper part. During feeding the pollinaria of *Disa* get attached to the birds' toes and are transported to stigma of different flower resulting in cross pollination. On the basis of careful field observations and experimental evidences Johnson & Brown showed that the pollens of *Disa chrysostachya* and *Disa satyriopsis* are effectively transferred to target sites. The efficiency of this newly reported pollination mechanism is checked by calculating pollen transfer efficiency (PTE) and percent fruit setting. They have experimentally proven that *D. chrysostachya* shows remarkably high pollen transfer efficiency and fruit setting occurred in control sample set (Johnson &Brown 2004).

Mouse pollination in Orchidaceae

In addition to many specialized insect and bird pollination mechanisms in Orchidaceae, a new fascinating mechanism of mouse pollination is reported by Yong Wang et al. (2008). This unique pollination mechanism is reported in a Chinese orchid *Cymbidium serratum*. It is a terrestrial orchid found in the mountainous area of central and South China and is pollinated by the wild mountain mouse, *Rattus fulvescens*. The flowers use both odour and color as attractants, and provide labellum as food reward for the pollinators. The mice pollinate the flowers during their endeavor to eat the flower labellum.

The pollination mechanism in *C. serratum* is very unique and different from that in other known rodent pollinated plants, which provides nectar as reward to those rodent pollinators. Rodent pollinating plants tend to have robust flowers with dull coloration, abundant pollen, copious amounts of nectar, exerted styles and stamens, and special structures called mammal guards. Since *C. serratum* provides pollinators with labellum instead of nectar as food reward, its flower is relatively slender and devoid of nectar. The stigmas and pollinia in *C. serratum* are positioned in a way that they can come in contact with the body of the animals only when the pollinators feed on the labellum in a certain posture (Wang et al. 2008).

Self pollination in Orchidaceae

The specialized orchid flower structures show that they are highly modified for cross pollination. Some orchids growing in extreme environmental conditions, where pollinators are rare, are totally dependent on self pollination. In these orchids self pollination is achieved by drying of caudicle which results in the fall of pollinia directly on stigma. In other method the anther rotates and then enters the stigma. Self pollination is particularly observed in species exposed to stress.

Discussion

Pollination systems adapted by plants for effective cross breeding to maintain genetic competence shows considerable variations among diverse plant groups. Family Orchidaceae is structurally evolved for pollination through animal vectors. Plant-pollinator relationships have reached a high level of complexity through species specific adaptive mechanisms in orchid groups. Pollination in orchids by deceptive methods is distinct and species specific. This specificity is achieved by involving combination of many chemical and physical signals such as color, odour and pheromone secretions. Interrelations between plants and their pollinators are not always mutualistic, but many a time, orchids exploit behavior patterns of pollinators. The phenomenon of orchid pollination through sexual deception is well studied in orchids in different groups of researchers independently across the globe. In India, Orchidaceae is well studied mainly for status, diversity, ecology and taxonomical aspects but pollination studies in accordance with species specific pollinator need further attention.

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Recent Sighting of Greylag Goose *(Anser anser)* in Guhagar, Ratnagiri, (Kokan), Maharashtra

Vinayak Joshi
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Citation: Joshi, Vinayak (2016). Recent Sighting of Greylag Goose *Anser anser* in Guhagar, Ratnagiri, (Kokan), Maharashtra *Ela Journal of Forestry and Wildlife* 5(1):156

Date of Publication:
31-3-2016

ISSN 2319-4361

Referee: Ram Mone

- **Name of species:** Greylag Goose *(Anser anser)*
- **Status:** Least Concerned
- **Date of sighting:** 22nd November 2015
- **Time of sighting:** 9.43 AM
- **Weather parameters:** Clear sunny sky
- **Number of times sighted:** 1
- **Number of birds:** 1
- **Gender of bird:** Unknown
- **Locality:** Guhagar Beach, Ratnagiri district, Maharashtra.
- **Habitat description:** Sandy beach
- **Distance from human habitation:** 500 m
- **Any other bird/animal associates:** Black-headed & Brown-headed Gulls
- **Bird behaviour:** Bird was quite at ease even though on a beach & was swimming in shallow sea water & foraging on the sandy beach.
- **Threats:**Tourism. Hunting for meat
- **Previous record:** No previous known record from coastal area from Maharashtra. This is probably the first record of this goose for coastal Maharashtra. This species is known to inhabit coastal regions in the northern parts of its distribution.
- **Reference:** (BirdLife International (2016) Species factsheet: Anser anser. Downloaded from http://www.birdlife.org on 23/04/2016. Recommended citation for factsheets for more than one species: BirdLife International (2016) IUCN Red List for birds. Downloaded from http://www.birdlife.org on 23/04/2016).

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Interesting Sighting of Melanistic Leopard (Panthera pardus) in Maharashtra

Amar Sable*
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Citation: Sable, Amar (2016).Interesting Sighting of Melanistic Leopard ***Panthera pardus*** in Maharashtra *Ela Journal of Forestry and Wildlife* 5(1):157

Date of Publication:
31-3-2016

ISSN 2319-4361

Referee: Sunil Limaye

- **Name of Species:** Leopard
- **Scientific Name:** *Panthera pardus*
- **Status:** Near Threatened; (IUCN Red List, 2015). Population is decreasing.
- **Date of sighting:** 19/12/2013.
- **Time of sighting:** 8.30 AM.
- **Weather parameters:** Sunny cloudless sky. Hot weather.
- **Number of times sighted:** Once.
- **Number of individuals:** Single.
- **Gender of animal:** Male about 2 and half years old.
- **Locality:** Village-Oni near Rajapur, district Ratnagiri, Maharashtra.
- **Habitat description:** It was found in the well belonging to Mr. Akbar Rehman Haju of Village Oni.
- **Distance from human habitation:** 300 meters.
- **Any other bird/animal associates:** None.
- **Behaviour:** In the well the leopard was restless and growling. It probably fell in the well accidentally while searching for water. It was rescued at about 1000 AM and subsequently released by the forest department on the same day.
- **Threats to the habitat:** Nil.
- **Photographs:** Attached.
- **Previous records:** This is the first record of a melanistic leopard from this region.

© Amar Sable

Recent Sighting of Painted Bat *Kerivoula picta* at Taloda, Maharashtra

Rajendra Bharati
(Email: raj.future88@gmail.com)

Citation: Bharati, Rajendra (2016). Recent Sighting of Painted Bat ***Kerivoula picta*** at Taloda, Maharashtra. *Ela Journal of Forestry and Wildlife* 5(1):158

Date of Publication:
31-3-2016

ISSN 2319-4361

Referee: Dr. S. S. Talmale

- **Name of Species:** Painted Bat
- **Scientific Name:** *Kerivoula picta*
- **Status:** Least Concern
- **Date of sighting:** 11th April 2016
- • **Time of sighting:** Around 9:30 am
- **Weather parameters:** Clear sunlight, Temp. around 38^{O}C
- **Number of times sighted:** just once
- **Number of individuals:** 10
- **Gender of species:** Unknown
- **Locality:** Ranzani, At Post Pratappur, Tal Taloda, Dist. Nandurbar (Maharashtra)
- **Habitat description:** Banana farm
- **Distance from human habitation:** 500 m
- **Any other bird/animal associates**: No
- **Behaviour:** Normal, flying very fast
- **Threats to the habitat:** None
- **Photographs:** Attached
- **Previous records**: None reported from this region

Recent Sighting of Pallid Scops Owl (*Otus brucei)* in Guhagar, Ratnagiri, (Kokan) Maharashtra

Akshay Khare
(Email: akshaykhare22@gmail.com)

Citation: Khare, Akshay (2016). Recent Sighting of Pallid Scops Owl ***Otus brucei*** in Guhagar, Ratnagiri, (Kokan) Maharashtra. *Ela Journal of Forestry and Wildlife* 5(1):159

Date of Publication:
31-3-2016

ISSN 2319-4361

Referee: Niranjan Sant

© Akshay Khare

- **Name of species**- Pallid Scops Owl
- **Status**- Least Concern
- **Date of sighting**- 31 Jan 2016
- **Time of sighting**- 17:00 hrs
- **Weather parameters**- Sunny, clear skies
- **Number of times sighted**- 1
- • **Number of birds**- 1
- **Gender of bird**- Unknown
- **Locality**- Guhagar, (500 m from Coast line) Ratnagiri, Maharashtra.
- **Habitat description**- Urban,
- **Distance from human habitation**-Within Guhagar city
- **Any other bird/animal associates**- None
- **Bird behaviour**- This nocturnal predator was observed quietly perched in the coconut tree within the premises of house in the grove.
- **Short description**-Typical grey colour with long dark heavy streaks on crown and short ear tufts.
- **Threats to the habitat**- None presently.
- **Photographs**-.Attached
- **Previous record**- No previous known record from Ratnagiri District

Sighting of a ritulistic Oriental Scops Owl *Otus sunia* in Pune, Maharashtra

M. Y. Bapaye and Jyoti Bapaye
(Email: vijaybapaye@gmail.com)

Citation: Bapaye, M.Y. and Bapaye, J. (2016). Sighting of a ritulistic Oriental Scops Owl *Otus sunia* in Pune, Maharashtra. *Ela Journal of Forestry and Wildlife* 5(1):160

Date of Publication:
31-3-2016

ISSN 2319-4361

Referee: Shivkumar Pednekar

© M. Y. Bapaye

- **Name of Species: -** Oriental Scops Owl
- **Scientific Name:** *Otus sunia*
- **Status: -** Least Concern; (IUCN Red List, 2015). Uncommon.
- **Date of sighting:**-.22 March 2016
- **Time of sighting:-** 0923 PM
- **Weather parameters: -** Clear sky.
- **Number of times sighted: -** Once.
- **Number of birds: -** Single.
- **Gender of bird: -** Unknown.
- **Locality: -** Erandawane, Pune city, Maharashtra.
- **Habitat description: -** Urban area. Residential complex surrounded by rain trees.
- **Distance from human habitation:-**Within densely populated human habitation.
- **Any other bird/animal associates: -** Asian Koel.
- **Bird Behaviour: -** The owl was first noticed by Jyoti Bapaye when she saw the bird perching in the balcony and trying to fly through the glass barricade of the balcony. The owl appeared confused. It flew away after some time on its own initiative.
- **Threats to the habitat: -** None presently.
- **Photographs: -** Attached.
- **Previous records: -** Earlier sighting by Dr. Satish Pande and Shivkymar Pednekar at Kolhapur. (Per. Com.).

Recent Sighting of Swinhoe's Minivet *Pericrocotus cantonensis* in Karnataka

Clement Francis M.
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Citation: Clement Francis M (2016). Recent Sighting of Swinhoe's Minivet *Pericrocotus cantonensis* in Karnataka. *Ela Journal of Forestry and Wildlife* 5(1):161

Date of Publication:
31-3-2016

ISSN 2319-4361

Referee: Swapnil Thatte

- **Name of Species:** Swinhoe's Minivet
- **Scientific Name :** *Pericrocotus cantonensis*
- **Status:** Least Concern
- **Date of sighting:** March 1st, 4th and 12th 2016.
- **Time of sighting:** 8:30AM
- **Weather parameters:** Sunny.
- **Number of times sighted:** Thrice.
- **Number of birds:** 2 individuals.
- **Gender of bird:** Unknown.
- **Locality:** University of Agricultural Sciences, Gandhi Krishi Vignan Kendra (GKVK) Campus, Bellary Road, Bengaluru - 560065, Karnataka http://www.uasbangalore.edu.in/index.php/college-of-agriculture-bangalore
- **Habitat description:** Dry deciduous forest patch. Several trees species from Western Ghats have been planted by the University. Overall one gets a very dry and arid feel without any water source for birds or mammals.
- **Distance from human habitation:** Less than a kilometre
- **Any other bird/animal associates:** The Swinhoe's Minivets were seen with Ashy and Small Minivets and Golden Orioles, Ashy Drongo, Common Hawk Cuckoo, Black-headed Cuckoo Shrikes, White-eyes, Iora, Asian Brown Flycatchers, Paradise Flycatchers, Booted Warblers and Greenish Leaf Warblers.
- **Bird Behaviour:** Minivets were with mixed hunting party of Ashy and Small Minivets. The minivets were feeding on young Praying Mantis. On second sighting on March 12th 2016, we found a single Swinhoe's Minivet along with a single Ashy Minivet. They were comfortably with each other and moved from branch to branch and tree to tree searching for insects for 30 minutes and flew out of the park.
- **Threats to the habitat:** The area is well protected.
- **Photographs :** Attached.
- **Previous records**: The Swinhoes' Minivet was first sighted by my friends Ashwin Viswanathan and Bhanu Sridharan on March 1st 2015 at the same place. No other records previous to this.

Recent Rare Sighting of Tytler's Leaf-Warbler, (*Phylloscopus tytleri*) in Pune

Swapnil Kiran Thatte
(Email: swapnil.thatte@gmail.com)

Citation: Thatte, S.K. (2016). Recent Rare Sighting of Tytler's Leaf-warbler, *Phylloscopus tytleri* in Pune. *Ela Journal of Forestry and Wildlife* 5(1):162

Date of Publication:
31-3-2016

ISSN 2319-4361

Referee: Rajgopal Patil

- **Name of Species-** Tytler's Leaf-warbler
- **Status-** Near Threatened (IUCN Red List).
- **Date of sighting-** 1st November, 2015
- **Time of sighting-** 4.20 PM
- **Weather parameters-** Cloudy sky.
- **Number of times sighted-** Twice on the first occasion and till March 2016.
- **Number of birds-** 1
- **Gender of bird-** Unknown.
- **Locality-** Tamhini (Mulshi Taluka), Pune district, Maharashtra.
- **Habitat description-** Partially dry stream in dense evergreen forest with heavy undergrowth.
- **Distance from human habitation-**4 km.
- **Any other bird/animal associates-** White-bellied Blue Flycatcher, Orange-headed Thrush, Yellow-browed Bulbul, Grey-headed Canary Flycatcher, Malabar Whistling Thrush.
- **Bird Behaviour-** Saw the bird taking bath thrice a day and was feeding.
- **Short Description-** The bird came to my notice due to its typical olive grey colour and absence of wing bar.
- **Threats to the habitat-** Logging, timber extraction, destruction of habitat by development activities.
- **Photographs-** Attached.
- **Previous record-** Several sightings each year during winter by the author. Few, if any, are reported, hence this note.

Recent Sighting of Black-throated Munia (Lonchura kelaarti) in Pune district, Maharashtra

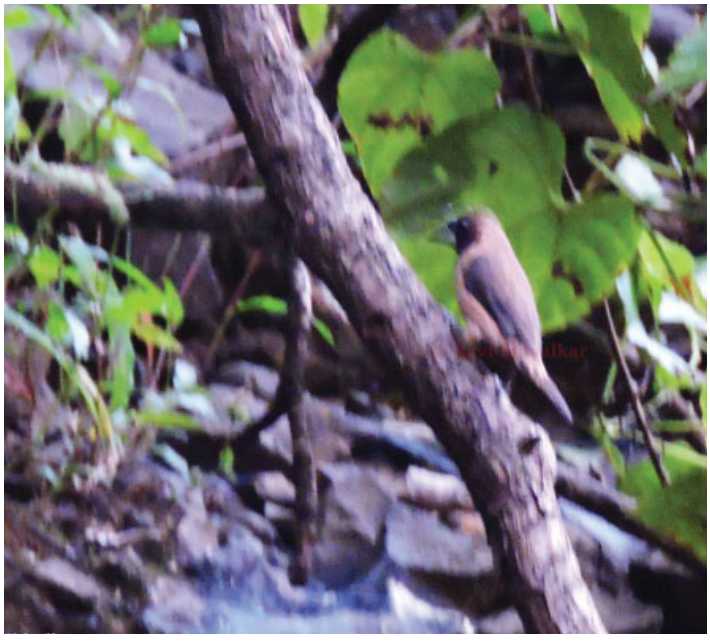
Pallavi Shivalkar and Swapnil K. Thatte
(Email: pallavi.shivalkar@gmail.com) (swapnil.thatte@gmail.com)

Citation: Shivlakar, P and Thatte, S.K. (2016). Recent Sighting of Black-throated Munia *Lonchura kelaarti* in Pune district, Maharashtra *Ela Journal of Forestry and Wildlife* 5(1):163

Date of Publication:
31-3-2016

ISSN 2319-4361

Referee: Pramod Deshpande



© Pallavi Shivalkar

- **Name of species:** Black-throated Munia (Lonchura kelaarti)
- **Status-** Least Concern as per the IUCN Red List
- **Date of sighting-** 08/11/2015
- **Time of sighting-** 05.50 p.m.
- **Weather parameters-** Evening with clear skies.
- **Number of times sighted-** Once
- **Number of birds-** 1
- **Gender of bird-** Unknown
- **Locality-** Tamhini (Mulshi Taluka) , Pune, Maharashtra
- **Habitat description-** The individual was sighted at a partially dried up stream in the dense evergreen forests of Tamhini.
- **Distance from human habitation-** 4 km.
- **Any other bird/animal associates:** A lot of bird activity was concurrently seen at the stream that evening. Other birds sighted were Grey-headed Canary Flycatcher, Sulphur-bellied Warblers, Greenish Warblers, Vigors's Sunbird, Yellow-browed Bulbuls, White-bellied Blue Flycatchers, Brown-cheeked Fulvettas, Indian Paradise Flycatcher and an Orange-headed Thrush.
- **Bird behaviour-** Normally this bird found in a group. In the fading light of the evening, this shy munia was glimpsed behind an Orange-headed Thrush which had come at the stream. Munia had come for a bath alike all other birds & disappeared in the undergrowth within few seconds.
- **Threats to the habitat-** Unchecked development activities are leading to loss of habitat.
- **Photographs-** Attached
- **Previous record-** Sighted by Shruti A. Dudhane in Mulshi in 2015 (Indian Birds, Vol 10 No. 6)

Fish: The Vehicle of Lord Vishnu

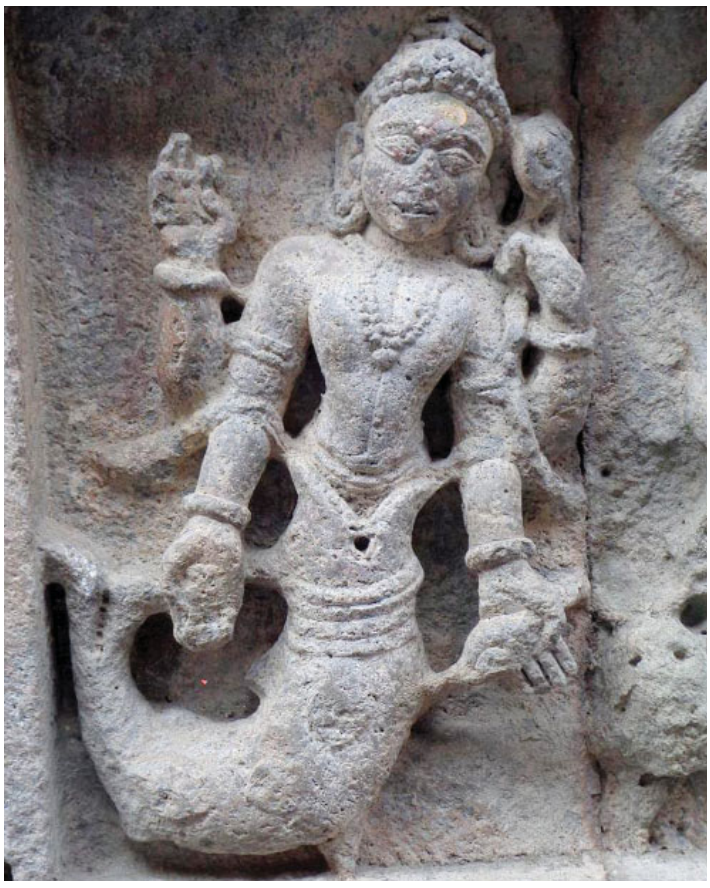
Dr. Suruchi Pande
(Email:suruchipande@gmail.com)

Citation: Pande, Suruchi (2016). Fish: the Vehicle of Lord Vishnu. *Ela Journal of Forestry and Wildlife* 5(1):164-167.

Date of Publication:
31-3-2016

ISSN 2319-4361

Referee: Yashwant Lele



Rahul Lonkar

Fish incarnation of Lord Vishnu - Matsyavatar

Introduction:

The fish is mentioned in Indian literature and cultural context from the Vedic times. The well known mythological reference to '*matsyavatara*' perhaps gives us a clue to the Indian thought on evolution. Here we will try to analyze some interesting references to fishes in Indian culture and literature.

Observations:

The *Shatapatha Brahmana* text (1000 BC) has story of a large '*jhasha*' fish and Manu (Manu is the name of ancient Indian sage who was known as progenitor of mankind and all creatures). According this story, this fish saved all life forms including seeds, when a terrible flood engulfed the world.

From ancient times (from Vedic culture dated approximately 1400 BC but the period also believed to go back) fish was considered as the symbol of prosperity and good luck. In the Mohenjodaro civilization fish was the symbol of early depictions of Shiva. Fish was believed to be the eye of Shiva. The Purana literature (a group of texts belonging to the period starting before 500 BC) contains many references and stories about the connection between fish and Vishnu as well as Shiva.

For example the Matsya Purana which describes the story of god Vishnu in the form of half-human and half-fish. The first incarnation of god Vishnu represented the fish and it was known as '*matsyavatara*'. The *Dashavatara* theory is also interpreted in terms of evolution of life. Since the first incarnation of god was of a fish, it implied that life originated in water.

The deity of *Meenakshi* also means 'one who has eyes shaped like a fish'. The Maharashtrian deity known as Yogeshwari of Ambajogai, which is a goddess of the fishing community also, has fish-like eyes.

The *Kauteeliya Arthashastra* (a text on Statecraft - 350-275 BCE) on agriculture also speak of undried fish as a good fertilizer for crops. (*Bharatiya Sanskruti Kosha,* Pandit Mahadeva

Shastri, Bharatiya Sanskruti Kosha Mandal, Pune, 1972, Reprint 1993, Vol. 2, p 471).

Fish is generally believed as the symbol of

Satish Pande

Sculpture at Konark

Double fish carp of Pandya Kings

Nivedita Pande

Mohenjodaro Seal, National Museum, New Delhi

reproduction. Kaamdeva – the god of love was also known as '*meena ketana*' – fish bannered or one who has fish as his emblem – may be a symbol of unstable mind. Sometimes river goddess *Ganga* is depicted as mounted on a fish.

Fish is the symbol of an instable mind and that is why fish is depicted in the *yogini* and *varahi* sculptures which give the message that mind which is continuously wavering like a fish should be controlled.

Lime container, Raja Dinkar Kelkar Museum

Fish was also the symbol of many dynasties in ancient India. The Pandya kings (13th c) of Madura accepted a pair of fishes as their symbol of kingdom and that is why they were called "*meenavara kona*".

The *Amarakosha* (1.10.17; dated 6th c. AD) – a lexicon in Sanskrit literature gives us eight names for fish and the *Abhidhanachintamani* (tiryak kanda 4. 409, 410; dated 11th c. AD) text gives us 16 names for a fish.

I have made an attempt to analyze the meaning of various Sanskrit names for fish:

- ***Pruthuroman*** – one having large scales.
- ***Jhasha*** – A large fish. (the root verb '*jhash*' means to hurt)
- ***Matsya*** – a fish (*matsa* also means a fish and the word is said to come from '*mada*' – a gay one).
- ***Meena*** – a fish.
- ***Vaisarina*** –one who goes forth in various directions.
- ***Andaja*** – one who is born from an egg.
- ***Visara*** - one who goes forth in various directions.
- ***Shakali*** – one who has scales.
- ***Sanghachari*** – one who wanders in groups.
- ***Sthirajivha*** – one who is firm- tongued.
- ***Aataamshin*** – one who is self-eater, cannibalistic (a habit of a fish eating its own offspring is noted here).
- ***Svakulakshaya*** – one who diminishes its own family (by resorting to cannibalism).
- ***Shalkin*** – one who is scaly.
- ***Sanchara*** – one who continuously roams.
- ***Animisha*** – one who looks steadily or one who does not wink.
- ***Timi*** – one having a luminous appearance.
- There is also a reference (*Amarakosha* 1.10.18) to a fish having many teeth. They are known as *shahasradanshtra* – one having thousand teeth and *paatheena* (a kind of sheath-fish (?) but the root meaning is unclear).
- The *Abhidhanachintamni* (tiryak kanda 4. 411-413) also speaks about various types of fishes as -
- ***Chitravallika*** – the fish – *Silurus boalis*. One meaning of the word '*vallika*' is coral. So this may be a variegated coral fish.
- ***Shakula*** – a gilt-headed fish.
- ***Kalaka*** – one who murmurs.
- ***Gadaka*** – a kind of gold fish.
- ***Shakularbhaka*** – small ones of a gilt-head fish.
- ***Ulupin*** – *Ulupa* is a species of plant, hence one living near these plants?

Boar-faced Varahi Devi holding fish and a bowl; the fish symbolises restlessness which has to be conquered. 9th C. Varahi temple, Odisha (Satish Pande)

Wall painting at Vishrambag Wada; Pune (Suruchi Pande)

- ***Shishuka*** – small fishes.
- ***Proshthin*** – one who stands below; it is likely that these fishes reside in the depths of water.
- ***Shaphara*** – a kind of bright little fish that glistens when darting about in shallow water.
- ***Nalameena*** – a kind of a fish residing in deep waters.
- ***Chilichima*** – Perhaps a version of the word '*chimichimaa*' - one which is prickly.
- ***Matsyaraaja*** – a king of fishes.
- ***Rohita*** – a red fish.
- ***Madgura*** – a diver fish.
- ***Raajashrunga*** – probably *Macropteronatus magur*.
- ***Shrungi*** – horned-one.
- ***Madgurapriyaa*** – may be a female diver fish.

Conclusions:

I have presented various references to fishes from ancient Indian literature with their ethno-biological interpretation. It is interesting to note that in our ancient literature the fish had cultural and philosophical significance, and in addition, our ancestors have also described their characteristic features. Fish was connected with divinity and thereby an appeal for its conservation is put forth. Today, more than ever before, this appeal needs to heeded.

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Container, Raja Dinkar Kelkar Museum

Orienting Using Astronomy (3): Using the Movement of stars

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Citation: Lokhandwala, Mujtaba (2015). Orienting Using Astronomy (3): Using the Movement of stars *Ela Journal of Forestry and Wildlife* 5(1):168.

Date of Publication:
31-3-2016

ISSN 2319-4361

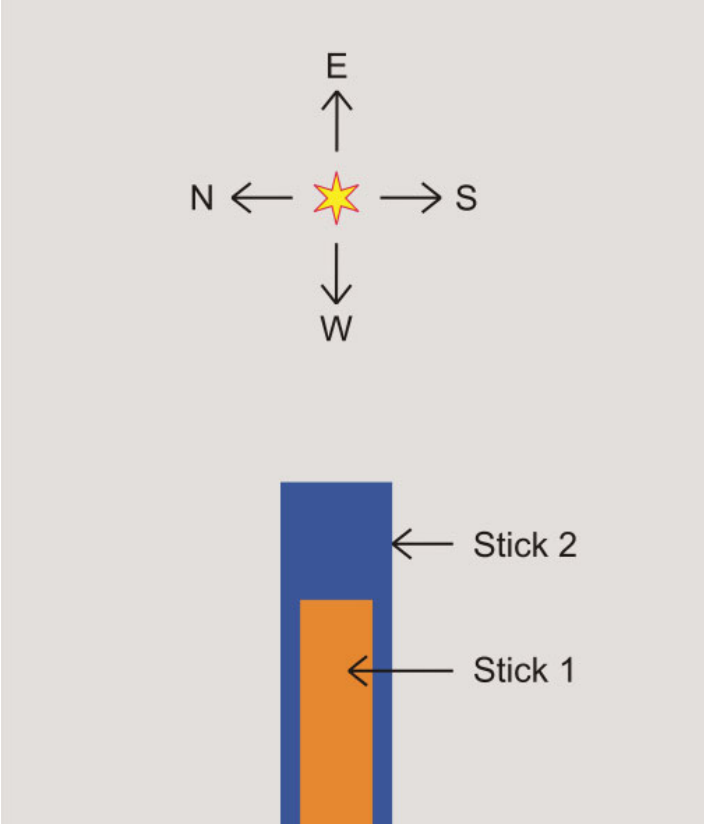
Referee: Nitin Kakodkar

If you are lost and the constellations are not familiar to you or you don't know them or only a part of the sky is seen, here is a simple way to know the direction. Take two sticks of unequal lengths and fix them in the ground, the longer one behind the shorter one in your line of sight. This should be from a place where you can sit and watch comfortably for some time, say at least half an hour. Mark a star in the background and watch its movement over time.

You are facing:

1. East – if the star is seen to rise
2. West – if the star is going down
3. North – if the star is moving towards your left
4. South – if the star is moving towards your right

If the sky near the horizon is not clear, lie down on the ground and watch the movement of the stars overhead. Even the moon or planets will do. Tracking the movement will give you a clear indication of direction. All heavenly bodies move from East to West in the time frame measured in minutes and hours.



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ISSN 2319 - 2461
Journal for Private Circulation only