SHORT COMMUNICATION

FEEDING TRAILS OF DUGONG *Dugong dugon* (Müller, 1776) (Mammalia: Sirenia: Dugongidae) IN THE GULF OF KACHCHH, WESTERN COAST OF INDIA

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FEEDING TRAILS OF DUGONG _DUGONG DUGON_ (MÜLLER, 1776) (MAMMALIA: SIRENIA: DUGONGIDAE) IN THE GULF OF KACCHH, WESTERN COAST OF INDIA

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Abstract: Dugong _Dugong dugon_ (Müller, 1776) is the only herbivorous marine mammal distributed along the tropical and subtropical oceans of the Indo-Pacific regions. The record of the species in India is mainly from the east coast including Andaman and Gulf of Mannar. In this note the authors have recorded feeding trails of Dugong on the Halodule uninervis meadow in the Gulf of Kachchh, i.e., northwestern part of India. Most of the records of this species from this area are stranding records. This is the second record of the trail from this region.

Keywords: Dugong, ecology, _Halodule uninervis_, seagrass, trail.

The Dugong _Dugong dugon_ (Müller, 1776) occurs in the tropical and subtropical sea areas of the Indo-Pacific region (Nishiwaki & Marsh 1985), and is classified as Vulnerable in the IUCN Red List (Thornback & Jenkins 1982). In the Indian subcontinent, this protected species occurs in the Gulf of Mannar, Palk Bay, Gulf of Kachchh (Gok), and Andaman & Nicobar islands.

Sivakumar & Nair (2013) gave comprehensive details on the potential regions for Dugong in all the three regions of India. Tuticorin-Tharuvaikulam and Roachamanagar Dhanushkodi stretches, including the offshore islands, were identified as critical for Dugong in the Gulf of Mannar (Sivakumar & Nair 2013). Areas in Palk Bay include waters off Dhanushkodi, Rameshwaram, Devipattinam, Thirupparaimudi, Morepennai, Mullimunnai, Pudupattinam, Thondi, Mimus, Kottaipattanam, Manamelkudi and Manora. The critical Dugong habitat identified in the Andaman Islands includes the waters off Landfall Island, Reef Island, White-Cliff Island, Smith Island, North Reef Island, Interview Island, Sound Island, Mayabunder, Karmatang, Long Island, North Passage, Ritchie’s Archipelago, M.G. Marine National Park, Sister Islands and Brother Islands, as well as parts of Jarawa Reserve and the eastern and southern coast of Little Andaman (Sivakumar & Nair 2013).

The population of Dugong and its habitats are continuously declining in India with about only 200 surviving individuals (Sivakumar & Nair 2013). Several reasons have been attributed to the decline in the Dugong population, including sea grass habitat loss, gill netting, disease, water pollutants, indigenous use and poaching (Sivakumar & Nair 2013). Reviews of Dugong in Indian waters have consistently treated Gulf of Kachchh as an area of little significance (Frazier & Mundkur 1990).

Dugong were noted by different researches at different locality in Gulf of Kachchh (Moses 1942; Mani 1960; Silas 1961; Mohan 1963; Frazier & Mundkur 1990; and Singh 2003). Frazier & Mundkur (1990) compiled the dugong
observation with the help of fishermen interview and reported 18 animals from the Gulf of Kachchh, particularly in Bet Dwarka, Poshitra and their neighbouring areas. Singh (2003) noted four dead Dugong from this region that includes one skull on Bhaider Island, two dead animals in Bharana and one dead animal on Poshitra coast.

Observation

On 27 May 2017, during the marine invertebrate study, the authors visited Narara reef area in the central region of the Gulf of Kachchh. The area is also a part of Marine National Park and Sanctuary – Jamnagar. The area significantly harbors 7.5ha of *Halodule uninervis* Meadow (22.479°N & 69.718°E to 22.483°N & 69.718°E) (Fig. 1). Peculiar grazing pattern was observed in the meadow, and was considered to be a Dugong feeding trail. The grass was completely uprooted and grazed, and the width of the trail varied from 20–28 cm and length varied from 100–520 cm. The trail was recorded at the low tide where during the high-tide the water rises to 4.5m. Photographs and measurements of all the trails were taken (Image 1). International experts were consulted for confirming the trails, which were confirmed as feeding trails of Dugong.

Discussion

Most of the records of the species are from the western parts of the gulf and majority of the records are stranded, washed off dead animals questioning the status of the population within the GoK (Table 1). Most observations of the species in GoK are stranding records towards Okha, Poshitra and Bhaider, i.e., opening of the gulf, indicating the population as vagrant or non-resident to GoK. Pandey et al. (2010) recorded the first feeding trail for GoK from the seagrass meadows of Pirotan Island. This is the second record of the feeding trail from the central part of the GoK. Narara is an important Dugong habitat in GoK (Sivakumar & Nair 2013). The observation of Dugong feeding trail in this area is an important but indirect evidence of the presence of the species and is of considerable importance as it indicates the presence of live animals in the central areas of the GoK indicating the presence of the species in this area further more towards the east in GoK. Kamboj (2014) provided status of the seagrass in the Marine National Park and Sanctuary, however, the seagrass beds of Narara are not included in the same. All the stranding records are in proximity to the existing seagrass beds (Table 2; Fig 2).

The Dugong population in the Arabian Gulf is believed to be the second largest in the world after Australia. Akab Island (Umm al Qaywayn, UAE) is the oldest site (6000 years) where Dugong remains have been discovered (Jousse 1999). The Arabian Gulf is considered to contain the most important Dugong habitat in the western half of the Dugong’s range (Preen 1989). The population estimate of Dugong in the Arabian Gulf was estimated...
Image 1. a–c - Feeding trails recorded during the study; d - Seagrass *Halodule uninervis* recorded during the study.

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Figure 2. Dugong occurrences and Seagrass beds in the Gulf of Kachchh
Table 1. Dugong stranding records from Gulf of Kachchh

| Year | Location       | No. of Dugon | Source |
|------|----------------|-------------|--------|
| 1877 | Sachana        | 1           | Frazier & Mundkur 1990 |
| 1893 | Mandvi         | 1           | Thurston 1895 |
| 1959 | Kalyan Light House | 1   | Mani, 1960; Silas 1961 |
| 1962 | Pirotan Island | 2           | Mohan 1963 |
| 1962 | Salaya         | 1           | Mohan 1963 |
| 1978 | Bhaider island | 1           | Frazier & Mundkur 1990 |
| 1983 | Bet Dwarka     | 2           | Ved 1983 |
| 1984 | Poshitra       | 1           | Singh 1994 |
| 1987 | Bet Dwarka     | 3           | Frazier & Mundkur 1990 |
| 1987 | Poshitra       | 1           | Frazier & Mundkur 1990 |
| 2000 | Bhaider island | 1           | Singh et al. 2004 |
| 2000 | Noru-Bhaider   | 2           | Singh et al. 2004 |
| 2002 | Poshitra (Shaan) | 1       | Singh et al. 2004 |
| 2003 | Poshitra       | 1           | Singh et al. 2004 |
| 2004 | Poshitra       | 1           | Asari (pers. Comm.) |
| 2007 | Bet Dwarka     | 1           | Pandey et al. 2010 |
| 2010 | Bet Dwarka     | 1           | Forest Department |
| 2013 | Mithapur       | 1           | Yogeshkumar et al. 2013 |

Table 2. Seagrass meadows in the Marine National Park and Sanctuary (Source: Kamboj 2014)

| Location                  | Area (ha) |
|---------------------------|-----------|
| Bhural reef               | 1321.72   |
| Ajad Island               | 8.94      |
| Gandhio Kado Island       | 3.01      |
| Goose reef                | 15.65     |
| Sikka reef                | 198.81    |
| Dedeka Mundeka            | 354.62    |
| Pirotan                   | 504.18    |
| Jindra and Chhaid islands | 25.38     |
| Narara (current study)    | 7.5       |

to be 1861 individuals in summer and 2185 in winter (Al-Ghais & Das 2001). The phenomenon of winter congregation and dispersed population in summer was also reported by Preen (1989). The feeding trail reported by Anand et al. (2012) was in the month of May and the present study also reports the feeding trail in month of May, i.e., in northwestern Asia including Arabian Gulf and Gulf of Kachchh. The presence of the species in summer gives rise to two different possibilities: (a) the species is present in the area in very low number so that it is not recorded live, or (b) the occurrence is accidental and result of population dispersal from the Arabian Gulf during summer. The distance between these two sites, however, is more than 1,500km and this hypothesis needs to be assessed by satellite tagging few animals in the Arabian Gulf.

Observations and frequent monitoring of these seagrass meadows may help in understanding the presence and movements of the Dugong population in the area. This information will be valuable for the better management practice of the species in the region.

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Articles

Distribution of the threatened Assamese Macaque Macaca assamensis (Mammalia: Primates: Cercopithecidae) population in Nepal
– Laxman Khanal, Mukesh Kumar Chalise & Xuelong Jiang, Pp. 13047–13057

Redescription of Leposternon octostegum (Duméril, 1851), with an identification key for Brazilian Leposternon species, remarks on meristic methodology, and a proposal for pholidosis nomenclature (Squamata: Amphisbaenidae)
– José Duarte de Barros-Filho, Marco Antonio de Freitas, Thais Figueiredo Santos Silva, Mariana Fiuza de Castro Loguercio & Maria Celeste Costa Valverde, Pp. 13058–13086

Communications

Annotated checklist and conservation status of mammals of Fars Province, southern Iran
– Fatah Zarei, Sasan Kafaei & Hamid Reza Esmaeili, Pp. 13087–13113

Functional sperm assessments of African Lion Panthera leo (Mammalia: Carnivora: Felidae) in field conditions
– Thiesa Butterby Soler Barbosa, Daniel de Souza Ramos Angrimani, Bruno Rogério Rui, João Diego de Agostini Losano, Luana de Cássia Bicudo, Marcel Henrique Blank, Marcilio Nichi & Cristiane Schilbach Pizzutto, Pp. 13114–13119

Description of a new species of Pseudophilautus (Amphibia: Rhacophoridae) from southern Sri Lanka
– Sudesh Batuwita, Madura De Silva & Sampath Udgampala, Pp. 13120–13131

Marine snakes of Indian coasts: historical resume, systematic checklist, taxonomy, status, and identification key
– S.R. Ganesh, T. Nandhini, V. Deepak Samuel, C.R. Sreeraj, K.R. Abhilash, R. Purvaja & R. Ramesh, Pp. 13132–13150

Short Communications

Feeding trails of Dugong Dugong dugon (Müller, 1776) (Mammalia: Sirenia: Dugongidae) in the Gulf of Kachchh, western coast of India
– Deepak Apte, Dishant Parasharya & Bhavik Patel, Pp. 13151–13154

Population status and floral biology of Trichopus zeylanicus ssp. travancoricus Burkill ex K. Narayanan (Dioscoreaceae), an important ethnomedicinal plant of the southern Western Ghats, India
– Nambi Sasikala & Raju Ramasubbu, Pp. 13156–13161

Taxonomic notes on Grosourdya muriculata (Orchidaceae: Epidendroideae: Vandeae: Aeridinae), a little known endemic orchid from the Andaman & Nicobar Islands, India
– Sanjay Mishra, C.P. Vivek, Gautam Anuj Ekka & Lai Ji Singh, Pp. 13162–13167

Notes

The importance of trans-boundary conservation of the Asiatic Elephant Elephas maximus in Patharia Hills Reserve Forest, northeastern India
– Nazimur Rahman Talukdar, Parthankan Choudhury & Rofik Ahmed Barhuiya, Pp. 13168–13170

Breeding record of Common Hoopoe Upupa epops (Aves: Upupidae) at Satchari National Park in northeastern Bangladesh
– Sabit Hasan, Tanvir Ahmed & Hassan Al-Razi, Pp. 13171–13172

Additional record of the poorly known Argus Paralasa nepalica (Paulus, 1983) (Insecta: Lepidoptera: Nymphalidae) in Nepal
– Sanej Prasad Suwal, Krishna Dev Hengaju & Naresh Kusi, Pp. 13173–13174

First report of the catfish Nilgiri Mystus Hemibagrus punctatus (Jerdon, 1849) (Bagridae) from Stanley Reservoir, Tamil Nadu, India
– Jayasimhan Praveenraj, Nallathambi Moulibharan & M.P. Goutham-Bharathi, Pp. 13175–13179

The easternmost distribution and highest elevation record of the rare Desert Cat Snake Telescopus rhinopoma (Reptilia: Colubridae) in Pakistan
– Daniel Jablonski & Rafaqat Masroor, Pp. 13180–13183

A checklist of spider fauna of Rajasthan, India
– Neisseril Anirudhan Kashmeera & Ambalaparambil Vasu Sudhikumar, Pp. 13184–13187

New records of Chrysomya putoria and C. thanomthini (Diptera: Calliphoridae) from India, with a revised key to the known Indian species
– Meenakshi Bharti, Pp. 13188–13190

Lectotypification of Impatiens duclouxii Hook.f., a new addition to the flora of India from Arunachal Pradesh
– Rajib Gogoi, Umeshkumar L. Tiwari, Souravjyoti Borah & Vladmir Bajur Theodore Tham, Pp. 13191–13194

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