SHORT COMMUNICATION

BUTTERFLIES OF THE KOLE WETLANDS, A RAMSAR SITE IN KERALA, INDIA

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India has approximately 1,800 species and subspecies of butterflies and in these 15–20 % are endemic to the Indian region (Kunte et al. 2016) and 316 species have been reported from Kerala (Palot et al. 2012). Very little documentation has been done on butterfly fauna of the wetlands of Kerala. The only available work on the butterflies from a wetland in Kerala was by Soniya & Palot (2002), who reported 43 species of butterflies from a paddy field in Palakkad District, Kerala. In the present study, an attempt has been made to document the butterfly diversity and the relative abundance of the butterfly species across the months, in the Kole Wetlands of Kerala.

Abstract: A study was conducted to understand the diversity and abundance of butterflies of Kole Wetlands. Fifty-eight species in five families were identified. The relative abundance and seasonal variation in the abundance across the year have been discussed. The endemism as well as the butterflies listed in the schedules of the Wildlife (Protection) Act, 1972 have also been discussed.

Keywords: Abundance, diversity, endemism, Thrissur District.

Study Area

Kole Wetlands is a Ramsar site since 2002 (Islam & Rahmani 2008), an important bird area since 2004 (Islam & Rahmani 2004), and a high value biodiversity area since 2009 (MoEF 2009). The Kole Wetlands, covering an area of 13,632 ha, are spread over the Thrissur and Malappuram districts in Kerala, southern India. Extending from the northern bank of Chalakudy River in the south to the southern bank of Bharathapuzha River in the north (Johnkutty & Venugopal 1993), this area lies between 10°20’–10°40’N & 75°58’–76°11’E (Fig. 1).

Physical features

Physiographically, the area is quite unique. The entire tract is a product of fluvial estuarine agencies modified by human activities. The area is devoid of any significant relief features and consists of extensive flat land surface interspersed with uplands. The area is saucer-shaped with lowlands at the centre with elevation gradually increasing towards the fringes. The land around the rice fields have steep slopes which are terraced and put under perennials like areca nut and coconut and annuals like banana, yams, etc. The slopes...
merge with fairly level plateau lands. The dry lands of the Kole region adjoining the coastal belt have level topography and are under coconut plantation (Johnkutty & Venugopal 1993).

The Kole fields are low-lying tracts located 0.5–1 m below the mean sea level. In a major portion of the area the land is flat and it remains submerged for about six months in a year. This area extends from the low lands in the bank of Chalakudy River in the south to Thavannur in the north, lying parallel to the Arabian Sea. These lands were formerly shallow lagoons which gradually got silted up. The flood waters in the Kole areas are mainly brought by two rivers Kechery and Karuvannur which finally drain into the Arabian Sea.

A network of main and cross canals connects the different regions of the Kole to the rivers. These canals also provide good external drainage. The earthen bunds separate the canals from the Kole fields. Being a flood plain, water level may rise as high as 5.5m during peak south-west monsoon.

**Rivers and Streams in Kole Wetlands**

Karuvarunnur and Kechery are the two major rivers in Thrissur Kole region. These rivers discharge the flood waters into the low lying Kole area and raise water level to more than three meters. The Kole area functions as the flood basin for both the rivers.

The Karuvarunnur River has two tributaries, namely, Manali and Kurumali. Kurumali is formed of two tributaries, Chimmonni and Mupli. All these streams start from the Western Ghats and flow along steep slopes till they reach the plains where they take very meandering courses and join to form the main river in the plains. Even though there is high flood during monsoons, the river practically dries up during summer. When it reaches the west the river branches into two, one going directly to north joins the Chettuvu Lake and the other flowing south joins the Manakodi Lake (Johnkutty & Venugopal 1993).

The Kecheri River flows down from Machad Hills, traverses west and then turns south and joins the Kole wetlands on the northern side draining finally into Enamakkal Lake, which is connected to Chettuvu Lake. The river though small, has flash floods during monsoon.

The Ponnani Kole lies in the Kanjiramukku River basin. The tributaries that join the Kanjiramukku River are Vettiikkadavu-thodu, Anjoor-thodu, Othallur-thodu, Pallikkara-thodu, Panthavoor-thodu, Manoor-thodu and Pottannur-thodu. All these dry up during summer. The Kanjiramukku River serves as the main drainage source of the area. The Pottannur thodu drains the area south of Bharathapuzha namely Thavannur, Trikkannapuram and Pottannur villages and joins the upstream of Biyyam Dam.

The Biyyam Dam is situated at the downstream end of Kole wetlands. This regulator prevents ingress of salt water and also stores a large quantity of water. The Kanjiramukku river directly falls into the sea at Veliyamkode barrage which is closed during the summer. The Kanoli canal connects the river to Bharathapuzha.
at Ponnani and hence to the sea throughout the year. After the construction of Bilyam dam salinity has been controlled in the Kole area. The Ponnani Kole was filled with salt water till the construction of Bilyam dam and has residual salt content in the soil which is being considerably reduced by annual dewatering and irrigation (Johnkutty & Venugopal 1993).

**Climate**

The mean minimum temperature is 23.3°C and the mean maximum of 31.8°C. The area receives both south-west and north-east monsoons. The mean annual rainfall is 2,763mm. The mean number of rainy days per year is 110 days (Kerala Agricultural University weather station, Thrissur).

**Vegetation types**

The major vegetation type at Kole Wetlands is wetland dependant herbs and shrubs. Apart from the truly aquatic marshy forms like *Hydrilla*, *Eichornia*, water ferns and algae, it also comprises of many bund species including small trees that can withstand inundation with water over long duration. Numerous herbaceous submerged or free floating, rooted floating hydophytes occupy different niches in wetlands. Nameer & Balachandran (2010) recorded 114 species of plants in 41 families including four aquatic ferns. The plants predominantly belonged to the family Cyperaceae (15 species) followed by Poaceae (14 species), the other dominant families include Asteraceae, Convolvulaceae and Euphorbiaceae (8 species each).

**METHODS**

The study was conducted from January 2013 to January 2014, during which time monthly field visits were made to the following locations within Kole Wetlands namely Thommana, Adat, Puzhakal, Kanjary, Uppungal and Marancheri of Thrissur and Malappuram districts. During every month a two hour transect was walked in the morning from 08:00–10:00 hr, similar transects were done in all the six locations, every month in the Kole Wetlands. During this transect, the butterfly species encountered were identified and the number of individuals were counted. Attempt was also made to photo-document the species of butterflies. The butterflies were identified using the field guides of Kunte (2000) and taxonomy and the nomenclature followed is that of Kunte et al. (2016). The abundance of the butterflies were calculated using the following methods: species observed 80–100 % of the survey days were categorized as very common (VC), 60–80 % as common (C), 40–60 % as occasional (O), 20–40% as rare (R) and below 20% as very rare (VR) (after Aneesh et al. 2013).

**RESULTS**

A total of 58 species of butterflies belonging to five families were identified from the Kole Wetlands, including one species Sahyadi Birdwing *Troides minos* that is endemic to the Western Ghats. Five species of the butterflies seen in the Kole Wetlands have been listed in the schedules of the Wildlife Protection Act, 1972. Of these the Crimson Rose *Pachliopta hector* and Danaid Eggfly *Hypolimnas misippus* are included in the Schedule I of the Act.

Family Nymphalidae (brush-footed butterflies) dominated the butterfly fauna of Kole Wetlands with 26 species, followed by Hesperiidae (skippers) with 12 species, Pieridae (whites and yellows) with seven species, Papilionidae (swallow-tails) with eight species and Lycaenidae (blues) having five species (Fig. 2). High species diversity was observed during the months of November and December and the month of July was found have low species diversity (Fig. 3). The lower
Table 1. Checklist of butterflies of Kole Wetlands, Kerala

<table>
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<tr>
<th>Sno</th>
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<th>Scientific Name</th>
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<th>Image Number</th>
<th>WPA 1972 status</th>
<th>IUCN status</th>
<th>Abundance</th>
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Species diversity during the month of June–July could be the effect of the heavy rains.

The current study that reports 58 species of butterflies from Kole Wetlands, reveals the biodiversity significance of the Kole Wetlands, which is a Ramsar Site in Kerala.

### References


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**Table: Butterflies of Kole Wetlands**

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* Endemic to Western Ghats; VC - Very common; C - Common; O - Occasional; R - Rare; VR - Very rare
Butterflies of Kole Wetlands

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Image 1. Sahyadri Birdwing
Troides minos

Image 6. Red Helen
Papilio helenus

Image 11. Three Spotted Grass
Yellow Eurema blanda

Image 16. Common Evening
Brown Melanitis leda

Image 2. Common Rose
Pachliopta aristolochiae

Image 7. Common Mormon
Papilio polytes

Image 12. Small Grass Yellow
Eurema brigitta

Image 17. Common Bushbrown
Mycalesis perseus

Image 3. Crimson Rose
Pachliopta hector

Image 8. Blue Mormon
Papilio polymnestor

Image 13. Common Jezebel
Delias eucharis

Image 18. Medus Brown
Orstotrioena medus

Image 4. Tailed Jay
Graphium agamemnon

Image 9. Common Emigrant
Catopsilia pomona

Image 14. Psyche Leptosia nina

Image 19. Common Four-ring
Ypthima huebneri

Image 5. Lime Swallowtail
Papilio demoleus

Image 10. Common Grass
Yellow Eurema hecabe

Image 15. Chocolate Albatross
Appias lyncida

Image 20. Common Five-ring
Ypthima baldus

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Image 41. Common Pierrot
Castalius rosimon

Image 42. Lesser Grass Blue
Zizina otis

Image 43. Common Cerulean
Jamides celeno

Image 44. Lime Blue
Chalides laius

Image 45. Monkey Puzzle
Rathinda amor

Image 46. Common Awl
Hasora badra

Image 47. Pygmy Scrub Hopper
Aeromachus pygmaeus

Image 48. Bush Hopper
Ampittia discorides

Image 49. Chestnut Bob
Lambrix salsala

Image 50. Restricted Demon
Notocrypta curvifascia

Image 51. Oriental Palm Bob
Suastus gremius

Image 52. Dark Palm Dart
Telicota colon

Image 53. Lesser Rice Swift
Borbo bevani

Image 54. Rice Swift
Borbo cinnara

Image 55. African Straight Swift
Parnara bada

Image 56. African Straight Swift
Parnara bada

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