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SHORT COMMUNICATION

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Butterflies of the Kole Wetlands, a Ramsar Site in Kerala, India

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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.

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.

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 13,632ha, 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 $10^0$20'–$10^0$40'N & $75^0$58'–$76^0$11'E (Fig. 1).

Physical features

Physiographyically, 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

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Competing interests: The authors declare no competing interests.

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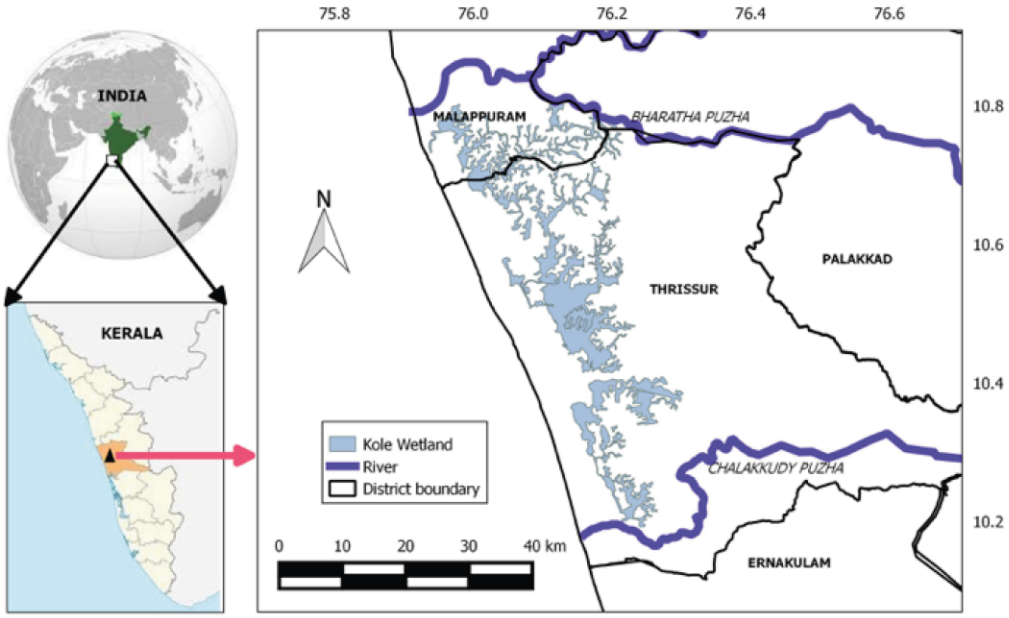

Figure 1. Kole Wetlands - study area

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

Karuvannur 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 Karuvannur River has two tributaries, namely, Manali and Kurumali. Kurumali is formed of two tributaries, Chimmoni 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 Chettuva 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 Chettuva 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 Vettikkadavu-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, Trikkanapuram 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 Biyyam dam salinity has been controlled in the Kole area. The Ponnani Kole was filled with salt water till the construction of Biyyam 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, Kanjany, 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 method-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 Sahyadri 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

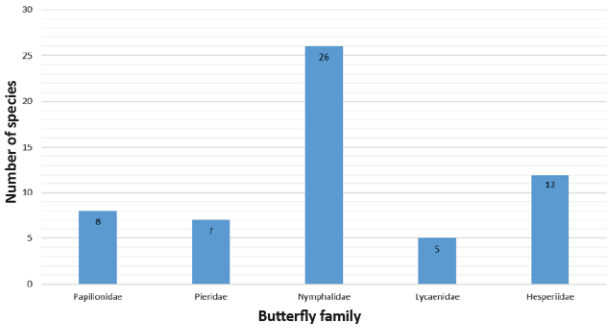

Figure 2. The number species of butterflies observed in each family at the Kole Wetlands

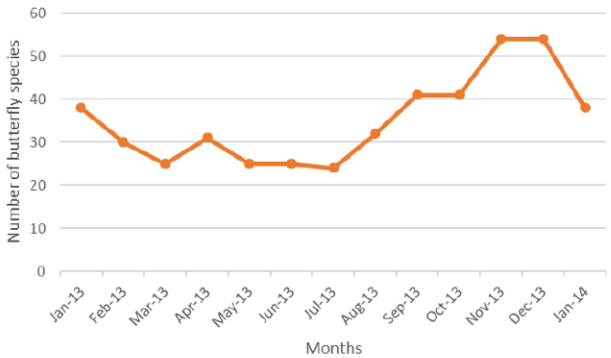

Figure 3. Number of species observed in Kole Wetlands during January 2013 to January 2014

Table 1. Checklist of butterflies of Kole Wetlands, Kerala

Sno	Common Name/Family	Scientific Name	Authority (Species)	Image Number	WPA 1972 status	IUCN status	Abundance
	Family Papilionidae						
1	Sahyadri Birdwing*	*Troides minos*	Cramer, 1779	1			R
2	Common Rose	*Pachliopta aristolochiae*	Fabricius, 1775	2			O
3	Crimson Rose	*Pachliopta hector*	Linnaeus, 1758	3	Sch I		C
4	Tailed Jay	*Graphium agamemnon*	Linnaeus, 1758	4			C
5	Lime Swallowtail	*Papilio demoleus*	Linnaeus, 1758	5			C
6	Red Helen	*Papilio helenus*	Linnaeus, 1758	6			VC
7	Common Mormon	*Papilio polytes*	Linnaeus, 1758	7			VC
8	Blue Mormon	*Papilio polymnestor*	Cramer, 1775	8			VR
	Family Pieridae						
9	Lemon Emigrant	*Catopsilia pomona*	Fabricius, 1775	9			VC
10	Common Grass Yellow	*Eurema hecabe*	Linnaeus, 1758	10			O
11	Three-Spot Grass Yellow	*Eurema blanda*	Boisduval, 1836	11			C
12	Small Grass Yellow	*Eurema brigitta*	Stoll, 1780	12		LC	VC
13	Indian Jezebel	*Delias eucharis*	Drury, 1773	13			C
14	Psyche	*Leptosia nina*	Fabricius, 1793	14			VR
15	Chocolate Albatross	*Appias lyncida*	Cramer, 1777	15	Sch II		O
	Family Nymphalidae						
16	Common Evening Brown	*Melanitis leda*	Linnaeus, 1758	16			VC
17	Common Bushbrown	*Mycalesis perseus*	Fabricius, 1775	17			C
18	Medus Brown	*Orsotriaena medus*	Fabricius, 1775	18			VC
19	Common Four-ring	*Ypthima huebneri*	Kirby, 1871	19			C
20	Common Five-ring	*Ypthima baldus*	Fabricius, 1775	20			VC
21	Tawny Coster	*Acraea terpsicore*	Linnaeus, 1758	21			VC
22	Rustic	*Cupha erymanthis*	Drury, 1773	22			C
23	Common Leopard	*Phalanta phalantha*	Drury, 1773	23			C
24	Common Sailer	*Neptis hylas*	Linnaeus, 1758	24			C
25	Grey Count	*Tanaecia lepidea*	Butler, 1868	25	Sch II		VC
26	Baron	*Euthalia aconthea*	Cramer, 1777	26			VC
27	Gaudy baron	*Euthalia lubentina*	Cramer, 1777	27			C
28	Angled Castor	*Ariadne ariadne*	Linnaeus, 1763	28			R
29	Common Castor	*Ariadne merione*	Cramer, 1777	29			VC
30	Lemon Pansy	*Junonia lemonias*	Linnaeus, 1758	30			VC
31	Peacock Pansy	*Junonia almana*	Linnaeus, 1758	31		LC	VC
32	Grey Pansy	*Junonia atlites*	Linnaeus, 1763	32			VC
33	Chocolate Pansy	*Junonia iphita*	Cramer, 1779	33			VC
34	Danaid Eggfly	*Hypolimnas misippus*	Linnaeus, 1764	34	Sch I		VC
35	Great Eggfly	*Hypolimnas bolina*	Linnaeus, 1758	35			C
36	Glassy Tiger	*Parantica aglea*	Stoll, 1782	36			C
37	Blue Tiger	*Tirumala limniace*	Cramer, 1775	37			C
38	Plain Tiger	*Danaus chrysippus*	Linnaeus, 1758	38			R
39	Striped Tiger	*Danaus genutia*	Cramer 1779	39			VR
40	Common Crow	*Euploea core*	Cramer, 1780	40	Sch V	LC	R

Sno	Common Name/Family	Scientific Name	Authority (Species)	Image Number	WPA 1972 status	IUCN status	Abundance
	Family Lycaenidae						
41	Common Pierrot	*Castalius rosimon*	Fabricius, 1775	41			VR
42	Lesser Grass Blue	*Zizina otis*	Fabricius, 1787	42			VC
43	Common Cerulean	*Jamides celeno*	Cramer, 1775	43			VC
44	Lime Blue	*Chilades lajus*	Stoll, 1780	44			VC
45	Monkey Puzzle	*Rathinda amor*	Fabricius, 1775	45			VC
	Family Hesperiidae						
46	Common Awl	*Hasora badra*	Moore, 1857	46			VR
47	Pygmy Scrub Hopper	*Aeromachus pygmaeus*	Fabricius, 1775	47			R
48	Bush Hopper	*Ampittia dioscorides*	Fabricius, 1793	48			O
49	Chestnut Bob	*Iambrix salsala*	Moore, 1865	49			VR
50	Restricted Demon	*Notocrypta curvifascia*	Felder & Felder, 1862	50			VR
51	Oriental Palm Bob	*Suastus gremius*	Fabricius, 1798	51			VR
52	Dark Palm-Dart	*Telicota bambusae*	Moore, 1878	52			R
53	Lesser Rice Swift	*Borbo bevani*	Moore, 1878	53			VR
54	Rice Swift	*Borbo cinnara*	Wallace, 1866	54			VR
55	Small Branded Swift	*Pelopidas mathias*	Fabricius, 1798				VR
56	Conjoined Swift	*Pelopidas conjuncta*	Herrich-Schäffer, 1869				R
57	African Straight Swift	*Parnara bada*	Moore, 1878	55			VC
58	Indian Grizzled Skipper	*Spialia galba*	Fabricius, 1793	56			VR

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

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

Aneesh, K.S., C.K. Adarsh & P.O. Nameer (2013). Butterflies of Kerala Agricultural University (KAU) campus, Thrissur, Kerala, India. *Journal of Threatened Taxa* 5(9): 4422–4440; http://dx.doi.org/10.11609/JoTT.o2870.4422-40

Johnkutty, I & V.K. Venugopal (1993). *Kole Lands of Kerala*. Kerala Agricultural University, Vellanikkara, Thrissur.

Islam, M.Z. & A.R. Rahmani (2004). *Important Bird Areas in India. Priority Sites for Conservation*. Indian Bird Conservation Network: Bombay Natural History Society, BirdLife International, xviii+1133pp.

Islam, M.Z. & A.R. Rahmani (2008). *Potential and Existing Ramsar Sites in India*. Indian Bird Conservation Network: Bombay Natural History Society, BirdLife International and Royal Society for the Protection of Birds. Oxford University Press, 592pp.

Kunte, K. (2000). *Butterflies of Peninsular India*. Universities Press (Hyderabad) and Indian Academy of Sciences (Bengaluru), 270pp.

Kunte, K., P. Roy, S. Kalesh & U. Kodandaramaiah (eds.) (2016). Butterflies of India, v. 2.24. Indian Foundation for Butterflies. http://www.ifoundbutterflies.org/home. (Accessed: 29 December 2016)

MoEF (2009). *Integrated Development of Wildlife Habitats*. Ministry of Environment & Forests, New Delhi, 83pp.

Nameer, P.O. & P.V. Balachandran (2010). *Biodiversity Conservation Plan for Kole Wetlands High Value Biodiversity Area*. Kerala Agricultural University and Kerala State Forest Department, 112pp.

Soniya, V.P. & M.J. Palot (2002). On a collection of butterflies from paddy field ecosystem of Palakkad District, Kerala. *Zoos' Print Journal* 17(7): 829; http://dx.doi.org/10.11609/JoTT.ZPJ.17.7.829

Palot, M.J., V.C. Balakrishnan & S. Kalesh (2012). An updated checklist of butterflies of Kerala, with their Malayalam names. *Malabar Trogon* 9(3): 22–29.

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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*

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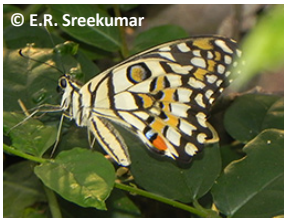
Image 9. Common Emigrant *Catopsilia pomona*

Image 14. Psyche *Leptosia nina*

Image 19. Common Four-ring *Ypthima huebneri*



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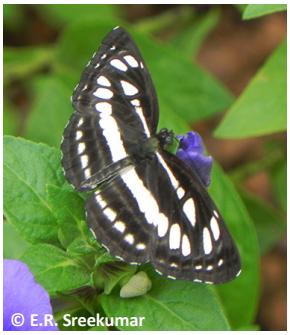

Image 24. Common Sailer *Neptis hylas*

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Image 34. Danaid Eggfly *Hypolimnas misippus*

Image 39. Striped Tiger *Danaus genutia*

Image 25. Grey Count *Tanaceia lepidae*

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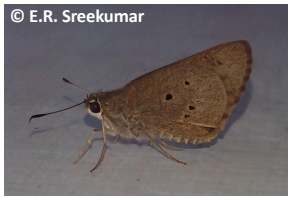

Image 51. Oriental Palm Bob *Suastus gremius*

Image 55. African Straight Swift *Parnara bada*

Image 44. Lime Blue *Chalides lajus*

Image 48. Bush Hopper *Ampittia discorides*

Image 52. Dark Palm Dart *Telicota colon*

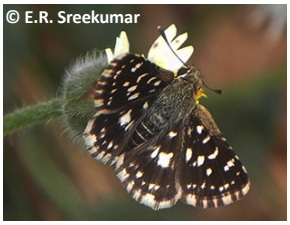

Image 56. African Straight Swift *Parnara bada*

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