



To study on lepidopterans (butterfly fauna) in the coastal tourism area (CTA) of ganjam coast, southern Odisha, India

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Abstract

Coastal Sand dunes vegetation of Ganjam supports a large proportion of the butterfly fauna. In a total of 36 butterfly species belongs to 31 genera and 5 families were recorded within 3km from the sea, major butterfly species have the host plants in sand dune vegetation itself. Nymphalidae showed the highest species richness comprising of 16 species (44.5%) whereas Hesperidae and Papilionidae were the lowest 4 species (11.1% each). Most of the back dunes have scrub land which support *Annona sp*, *Acaia sp*, *Cassia sp*, *Calotropis sp*, *Caesalpinia sp* and *Sida sp*. which are also a host plants for butterfly. The nature based ecotourism and biodiversity conservation value of the whole area is highlighted.

Keywords: butterfly, nymphalidae, biodiversity, ganjam coast

Introduction

In the animal planet, butterflies are the lovely and graceful insects provide both economic and ecological benefits to the human society. Having multihued colors on their wings, they enhance the earth's beauty incontestably and add immense aesthetic value to the ambient environment. They accomplish pollination, a key stone ecological process in natural sustainability throughout the world. They are greatly associated with plants and therefore their occurrence depends on the presence of plants. Plants are depend upon water, soil regimes, light, minerals and also respond to certain disturbances such as grazing and fire. Depending on these factors, plants of similar physical appearance and the preference for some abiotic factors and specific nutrients often form distinct vegetation types. As such butterflies provide the best rapid indicators of habit quality and also they are the sensitive indicators of climatic change (Goodden, 1974) [4].

The loss of biodiversity is a worldwide concern in today's perspective and more often it is accompanied with forest destruction and degradation of wild habitat. Although much effort has been put into restoring and preserving tropical ecosystem such as rainforests, mangrove swamps, and coral reefs, preservation of tropical, costal sandy plant communities has been largely ignored (Condit, 1995, Mulkey *et al.*, 1996, Sheil and May, 1996, Kennish 2001) [1, 10, 13, 8]. Dynamics of sand deposition and removal, high levels of salt accumulation along with the geomorphologic processes causing havoc environmental stress condition with seasonal occurrence of soil erosion. Constant flow of winds and solar radiation also play a role in decreasing plant water contents (Jefferies *et al.*, 1979) [6].

Material and Methods

The Bay of Bengal touches the eastern frontier of Ganjam district and its coast extends over 60 kilometres from Prayagi

to Sunpur area (Figure 2). The district is characterized by an equable temperature all through the year, particularly in the coastal regions and by high humidity. The cold season from December to February is followed by hot season from March to May. The period from June to September marks the South West Monsoon.

This study was carried out from April 2012 to September 2013 as a part of Integrated Coastal Zone Management Project under Department of Forest and Environment, Odisha. The survey was conducted seasonal\ Pollard Walk Method (Pollard 1977; Pollard and Yates 1993) [12] was followed for recording the butterflies while walking along fixed paths in the Ganjam Conservation Area. The sightings width was limited to 3m. Butterflies were observed throughout the day from 08:00 h to 04:00 h, quarterly in three seasons. Each record in the field was photographed for reference. Each photograph was then identified with the help of field guides (Wynter Blyth 1957; Gay, Kehimkar and Punetha 1992; Haribal 1992; Kunte 2000; Kehimkar 2008) [14, 3, 5, 9, 7] and butterfly taxonomist. Classification was followed after Evans (1932) [2].

Diversity of butterfly in Odisha is very much patchy and that to in southern Odisha especially in Ganjam district very little is known about the distribution and the status of butterfly. Only one study has being done that to be in the western part of Ganjam district which is a part of Eastern Ghat. Several investigations on distribution patterns of dune vegetation clearly revealed the fact of reduction in vegetation recorded earlier. For revealing the clear knowledge about the status of the colonizer species in the coastal area of Ganjam, the biology of butterfly is documented along with the reasons of destruction of these species at this region.

Results and Discussion

Although Ganjam Coastal Area (GCA) attains primary concern for its rich sand dune vegetation and natural

resources, the area shows a rich assemblage of butterflies. During the study, a total of thirty six species belonging to thirty one genera under five families were collected from the Conservation Area (Table 1). Nymphalidae showed the maximum species richness, comprising of 16 species (44.5%), followed by Pieridae (7 species, 19.4%), Lycaenidae (5 species, 13.9 %) and Hesperidae and Papilionidae (4 species, 11.1% each) in Figure 3. Whereas *Danaus* sp., *Graphium* sp., *Papilio* sp, *Euploea* sp. and *Catopsilia* species have two genera (each). Some images are given photographic proof of our butterfly sightings in GCA on Fig 1.

Sand dunes of Ganjam also support a large proportion of the butterfly fauna. In a total of 36 butterfly species which was recorded within 3km from the sea, 12 butterfly species have the host plants in sand dune vegetation itself. Most of the back dunes are scrub land which support *Annona* sp., *Acaia* sp., *Cassia* sp., *Calotropis* sp., *Caesalpinia* sp., *Sida* sp., etc. which are also a host plants for butterfly.

The preference of butterflies for a particular habitat is often linked with the larval or adult food source. The rich diversity of butterflies, especially the Nymphalids and Pieridae in

Ganjam tourism and coastal area indicates a varied assemblage of floral species, particularly among the forested and sand dune vegetation. Occurrence of these listed butterflies indicates the potential of this conservation area to harbor varied environmental conditions that in turn can support further bioresources.

Lack of preferred nectar source as well as larval host plants in several patches of the GCA indicate degraded site, with low butterfly richness. Several anthropogenic activities including intense encroachment stress from urban expansion, alterations of habitats to agricultural lands, and discharge of untreated waste water effluent from some chemical industries to the recently laid sewers emptying into the eastward flowing city outfall channels, are presently acting as potential threats in GCA. Restoration of habitat for butterflies should concentrate on planting of host plants and propagation of conspicuous patches of the preferred nectar plant.

More detailed studies regarding the role of butterflies in the ecosystem and their mode of assessment of the habitat quality should be carried out for better management and conservation of GCA resources.

Table 1: Butterfly check list of GTA, Ganjam Coast

Family	Scientific Name	Common Name
Hesperidae	<i>Hasora badra</i> (Moore, 1857)	Common Awl
	<i>Spialia galba</i> (Fabricius, 1793)	Indian Skipper
	<i>Telicota ancilla</i> (Moore, 1881)	Indian Dart
	<i>Udaspes folus</i> (Cramer, 1775)	Grass Demon
Lycaenidae	<i>Arhopala atrax</i> (Hewitson, 1862)	Indian Oakblue
	<i>Castalius rosimon</i> (Fabricius, 1775)	Common Pierrot
	<i>Rapala manea</i> (Hewitson, 1863)	Slate Flash
	<i>Spindasis vulcanus</i> (Fabricius, 1775)	Common Silver line
	<i>Acraea violae</i> (Fabricius, 1775)	Twany Coster
Nymphalidae	<i>Athyma perius</i> (Linnaeus, 1758)	Common Sergeant
	<i>Charaxes polyxena</i> (Cramer, 1775)	Twany Rajha
	<i>Danaus chrysippus</i> (Linnaeus, 1758)	Plain Tiger
	<i>Danaus genutia</i> (Cramer, 1779)	Striped Tiger
	<i>Elymnias hypermenstra</i> (Linnaeus, 1763)	Common Palmfly
	<i>Euploea core</i> (Cramer, 1780)	Common Indian Crow
	<i>Euploea midamus</i> (Linnaeus, 1758)	Blue spotted Crow
	<i>Hypolimnas bolina</i> (Linnaeus, 1758)	Great egg Fly
	<i>Junonia atlites</i> (Linnaeus, 1763)	Grey Pansy
	<i>Melanitis leda</i> (Linnaeus, 1758)	Common Evening Brown
	<i>Moduza procris</i> (Cramer, 1777)	Commander
	<i>Mycalesis mineus</i> (Linnaeus, 1758)	Dark Branded Bush brown
	<i>Neptis hylas</i> (Linnaeus, 1758)	Common Sailor
	<i>Parantica aglea</i> (Stoll, 1782)	Glassy Tiger
	<i>Phalanta phalantha</i> (Drury, 1773)	Common Leopard
	<i>Polyura athamas</i> (Drury, 1773)	Common Nawab
Papilionidae	<i>Graphium agamemnon</i> (Linnaeus, 1758)	Tailed Jay
	<i>Graphium doson</i> (C. and R. Felder, 1864)	Common Jay
	<i>Papilio demoleus</i> (Linnaeus, 1758)	Lime Butterfly
	<i>Papilio polytes</i> (Linnaeus, 1758)	Common Mormon
Pieridae	<i>Catopsilia pomona</i> (Fabricius, 1775)	Common Emigrant
	<i>Catopsilia pyranthe</i> (Linnaeus, 1758)	Mottled Emigrant
	<i>Cepora nerissa</i> (Fabricius, 1775)	Common Gull
	<i>Colotis amata</i> (Fabricius, 1775)	Small Salmon Arab
	<i>Eurema hecabe</i> (Linnaeus, 1758)	Common Grass yellow
	<i>Leptosia nina</i> (Fabricius, 1793)	Psyche
	<i>Pieris canidia</i> (Evans, 1932)	Indian Cabbage White



Fig 1: Certain photograph of butterfly sightings in the Ganjam Coastal Area

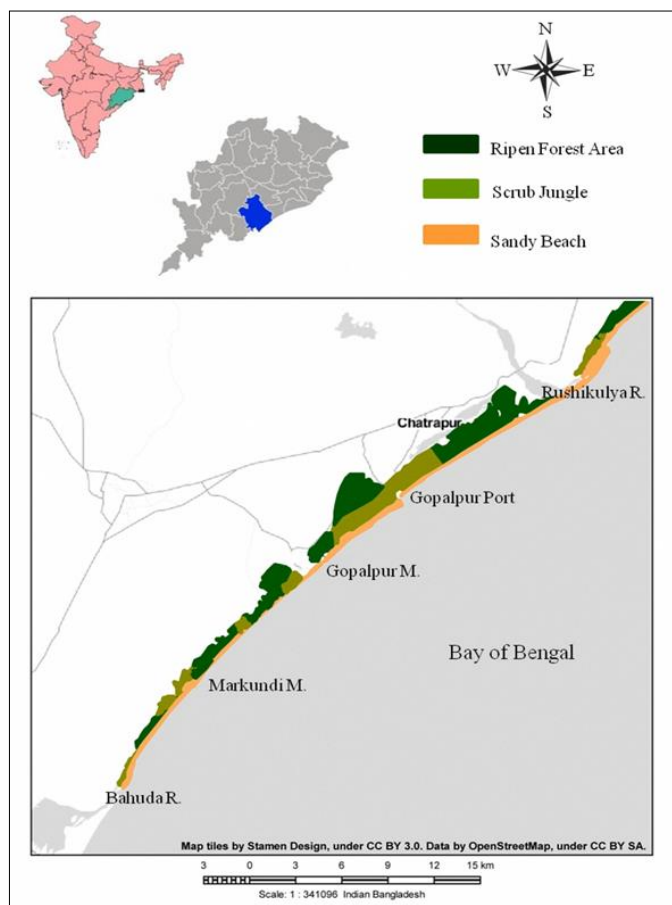


Fig 2: Map Showing the Vegetation Classification of Coastal Ganjam Study Area

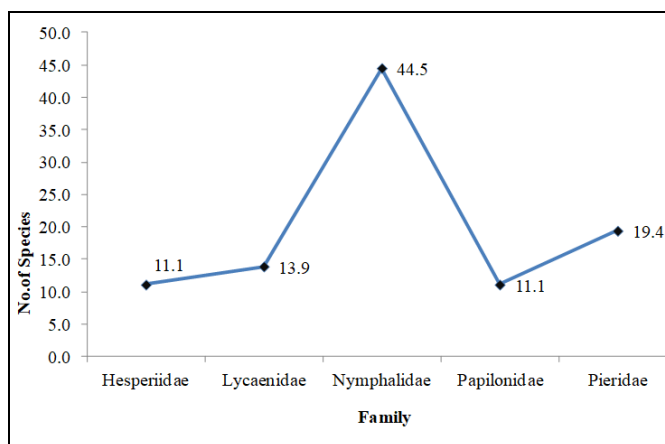


Fig 2: Family wise observed in the study area

Major threats to the biodiversity

- After the preliminary study we can conclude that the sand dune vulnerability at this area is mainly due to human disturbance.
- Various natural forces influencing coastal sand dune vegetation include sea level changes, wind regime, worm wind blow and movement of dunes, storms and climatic changes. Global warming and climatic changes (for example, increase in sea level) has direct impact on coastal sand dune vegetation.
- Several human interferences (industrialization, pollution, waste disposal, harbours, roads, sand mining, sea-facing, commercial or social forestry, construction of resorts and beach tourism) cause destabilization of coastal sand dune and severely influence the dune ecosystem.

- In these places, the vegetation itself is the target of exploitation. It is the source of fuel-wood and charcoal. Some coastal species were once harvested for their valuable woods (*Casuarina equisetifolia*). Wildlife habitats are destroyed as beach ridges and dunes are cleared for planting *casurinas* species.
 - Since 2003, tourist has come to regard in the many other seashore beaches apart from Gopalpur. Summer homes and seaside resorts have had a tremendous impact on the vegetation of beaches and sandy coastal plains at Gopalpur area. Unfortunately, government often provides incentives for developing the areas. The dune vegetation of Aryapalli to Rushikulaya mouth, Golabandha to Gopalpur is completely destroyed and Podumpeta to Prayagi is facing a serious erosion problem every year during the Monsoon time.
 - Stone fencing at different places in Gopalpur port area reduce the input of nutrients to the sand dunes. These construction activities adversely affected sand dune vegetation specifically disturbing the biogeochemical cycle, microbial activities.
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