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Butterfly fauna of Sherepalli and Peddagattu, Nalgonda district, Telangana, India

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Abstract

The present study carried out under Biodiversity Impact Assessment survey for the proposed Uranium Mining at Nalgonda district, Telangana, India. The diversity and distribution pattern of butterflies were observed in the study region. A total of 58 species of butterflies belonging to 42 genera and 5 families were recorded. The studies were conducted from April, 2010 to December, 2013. Of the recorded 58 species recorded, Nymphalidae was recorded as the most dominant family represented by 22 species (37.9%) followed by Lycaenidae 14 species (24.1%), Pieridae 13 species (22.4%), Papilionidae 4 species (6.9%), Hesperidae 5 species (8.6%). The role of this tiny creatures in the ecosystem is vital and an urgent attention needed to preserve and conserve the butterfly diversity for long term sustainability.

Keywords: Lepidoptera, Sherepalli, uranium, diversity, habitat, Telangana

Introduction

India has different agro-climate zones from tropical hot deserts to coastal wetlands to cold alpine regions. Butterflies (Lepidoptera: Rhopalocera) are the appealing and elegant insects that bring economic and ecological benefits to human society. Few studies have been conducted on the butterfly diversity in Telangana. Habitat degradation due to the developmental activities and unscientific management of natural resources, take stand for the fast disappearing of butterflies in the native habitats. The present paper primarily gives baseline information about diversity and distribution of butterfly species recorded in Sherepalli and Peddagattu region in Nalgonda district for the proposed uranium mining locations. Butterflies are considered as indicators, often studied to know the effects of climate change. Temperature strongly affects butterflies throughout their life histories, direct or indirect effects of temperature have been observed in choice of oviposition sites, egg-laying rates, larval development and survival rates, and range shifts and expansions (Davies *et al.* 2005) ^[2].

Rao *et al.*, (2004) ^[10] reported 89 butterfly species from Nagarjunasagar Srisailem Tiger Reserve (NSTR), Andhra Pradesh. Raju *et al.*, (2003) ^[8] recorded 68 species from Visakhapatnam. Venkataramana (2010) ^[12] studied 70 species from Visakhapatnam, Ananthagiri and Ratnagiri hills of Eastern Ghats. Ramamurthy *et al.* (2013) ^[9] described 78 species from Visakhapatnam. Goswami *et al.* (2018) ^[4] recorded 102 species of butterflies from northern Eastern Ghats of Andhra Pradesh. 106 species of butterflies were recorded from Nallamala Hills, Eastern Ghats, Amrabad Tiger Reserve (Jaiswal *et al.*, 2021) ^[5].

Need for the biodiversity survey in study locations of Nalgonda district

Uranium Corporation of India Limited (UCIL) is undertaking mining and processing of Uranium ore on large scale and proposed to expand its operation in Nalgonda District of Telangana state. It is essential and prime requisite to generate baseline data on entire biodiversity of the region to mitigate the impacts due to biological environment. A team of experts involved to study the impacts of proposed mining operations in Sherepalli, Lambapur and Peddagattu area.

Study Area

Sherepalli, Lambapur and Peddagattu

These villages are the main core zone habitat for mining activities. The study area was divided into three zones based on the impact magnitude and dimensions of the proposed mine lease

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area namely 0-5 Km (core zone), 5-15 km (Buffer zone-I) and 15-30 km (Buffer zone-II). The study area was lying between 16°53' to 17°50' N latitude and 78°45' to 78° 60' E longitude and having an area of 4,781.35 sq.km. The forest area forms 9% of the study area. The study area was spread in Nalgonda District and Mahaboobnagar District (Fig.1). The NSTR and Krishna River associated habitats are the part of the study area. Topography of the study area consists of flat-topped hills composed of Proterozoic sediments. A large portion of the region was under cultivation. The general drainage pattern is dendritic; indicating homogenous nature of formation. The study area as a whole has a gentle slope from West and North West to South East. The ground flora in the dry deciduous forests in conspicuous only during and after monsoon months and consists of various herbs and under shrubs. The common herbs are *Corchorus cortusifolius*, *Melhanian incana*, *Pavonia zeylanica*, *P. odorata*, *Acalypha alnifolia*, *Aerva lanata*, *Plumbago zeylanica*, *Andrographis paniculata*, *Sida acuta*, *Evolvulus alsinoides*, *Phyllanthus virgatus*, *Pulicaria*

wightiana, *Vernonia albicans*, *Rhynchosia capitata*, *Waltheria indica*, species of *Indigofera* and *Crotalaria*.

Methodology

The study was carried out from April, 2010 to December, 2013 for all three seasons covering various habitats. The study area was divided into Core (0-5 km radius), Buffer zones- I (5-15 km) & Buffer zone-II (15-30 km) from the proposed project location. Data collection was made by following the line transect method. The sampling surveys were conducted from 0700–0900 hrs at least to cover 5 km of every sampling station, and randomised sampling from 0900-1100 hrs and 1600-1800 hrs during the study period. Butterflies were observed and photo documented by using a DSLR camera. The density of each species was assigned based on sighting frequency percent; abundant (70 to 100%), common (50 to 70%), frequent (20 to 50%) and rare (0 to 20%) (Amarnath Reddy *et al.*, 2013) ^[1].

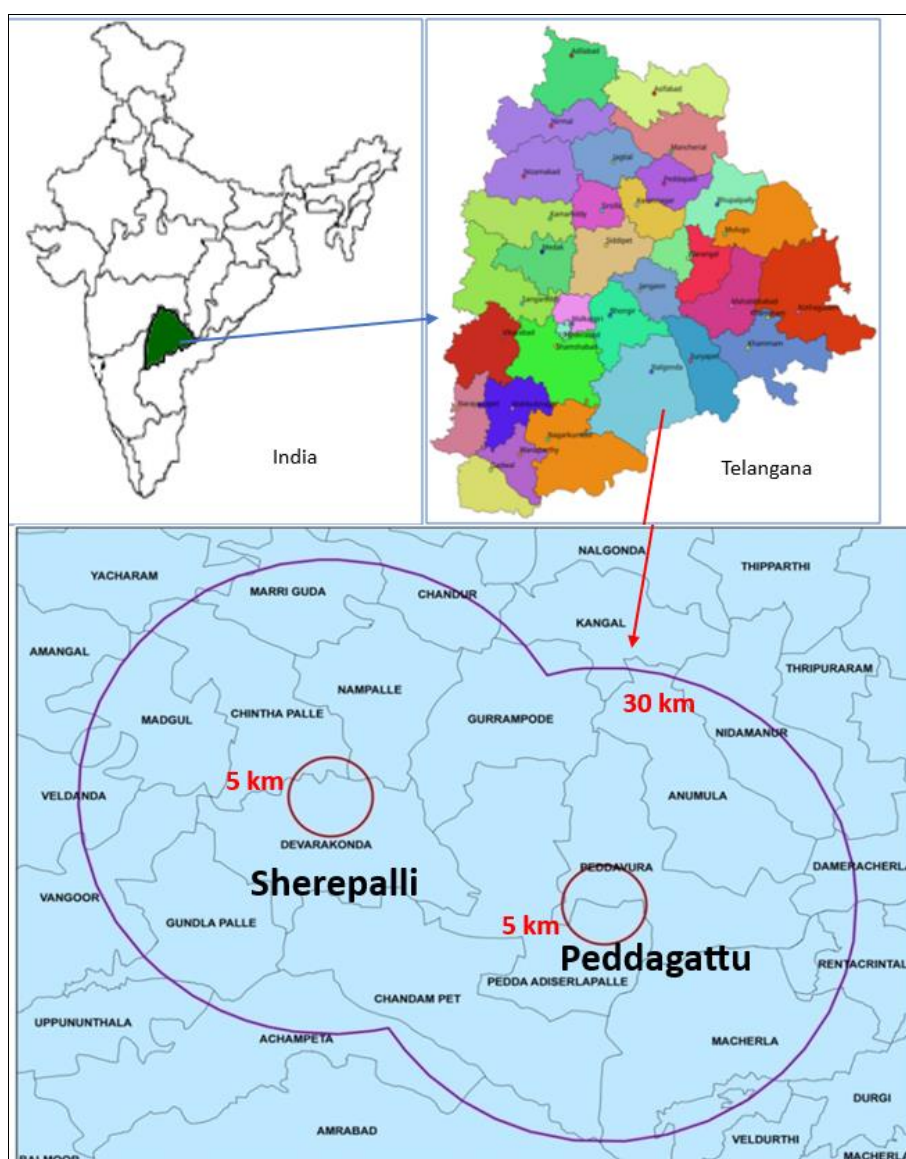


Fig 1: The core and buffer zones of the study area of Sherepalli and Peddagattu sites

Results and Discussion

The present study has recorded 58 species of butterflies belonging to 42 genera and 5 families during the study period. Of the 58 species recorded, Nymphalidae was recorded as the

most dominant family represented by 22 species (37.9%) followed by Lycaenidae with 14 species (24.1%), Pieridae with 13 species (22.4%), Papilionidae with 4 species (6.9%), Hesperidae with 5 species (8.6%) (Table 1) and none of the

species studied are comes under Schedule-I as per Indian Wildlife (Protection) Act, 1972 amended in 2022.

Among the 58 species of butterflies recorded, Tawny castor (*Acraea violae*), Plain tiger (*Danaus chrysippus*), Danaid eggfly (*Hypolimnas misippus*), Lemon pansy (*Junonia lemonias*), Common Indian crow (*Euploea core*) had occurred very common throughout the year.

A total of 27 species of butterflies belonging to 5 families

were recorded in the Core zone. Among these, Nymphalidae was predominantly recorded with 10 species followed by Lycaenidae (7 species). In Buffer zone-I, a total of 40 species belonging to 5 families were recorded with Nymphalidae 17 species followed by Pieridae (9 species). In Buffer zone-II, 44 species were recorded with Nymphalidae 21 species followed by Pieridae (10 species) (Fig.2).

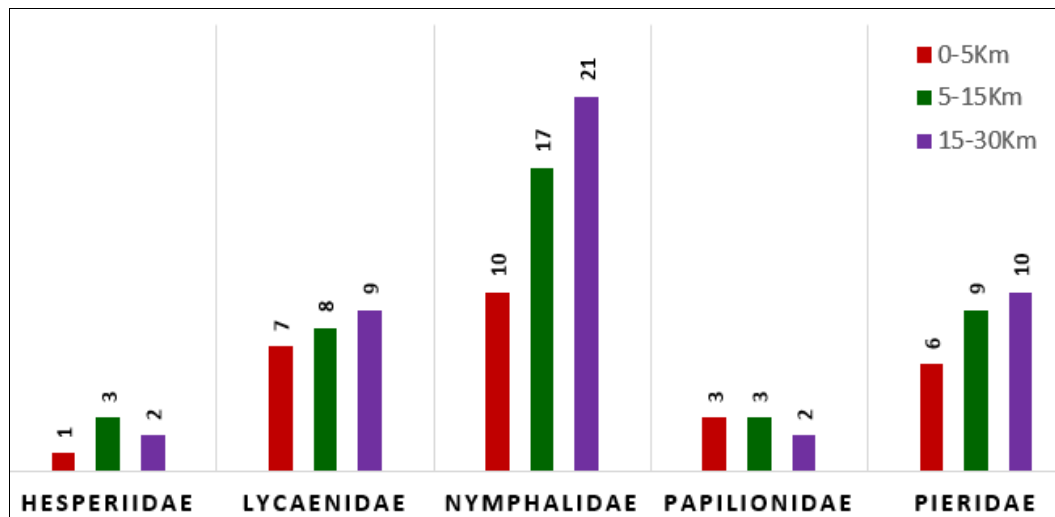


Fig 2: Family wise distribution of butterflies in the core and buffer zones

Among top 10 species of butterflies maximum percent abundance was recorded for Plain tiger (*Danaus chrysippus*) (17.7%) followed by Tawny castor (*Acraea violae*) (13.4%) Mottled emigrant (*Catopsilia pyranthe*) (12.4%) Lemon fancy (*Junonia lemonias*) 11%, Plains cupid (*Chilades pandava*) (10.6%), Crimson rose (*Atrophaneura hector*) 9.3%, White Orange tip (*Ixias marianne*) 7.1%, Striped tiger (*Danaus genutia genutia*) 6.5%, Common emigrant (*Catopsilia pomona*) 6.2% and Great eggfly (*Hypolimnas bolina*) 5.8%.

Nymphalidae members are polyphagous in nature and thus able to survive in all habitats and hence are dominant in the tropical region. Furthermore, several species in this family have powerful, active wings that enable them to search for supplies over wide distances (Easwaran & Pramod 2005; Krishnakumar *et al.* 2008) [3, 6]. The dominance of

Nymphalidae over other butterfly groups in the Western Ghats has earlier been reported by (Kunte 1997; Easwaran & Pramod 2005) [7, 3]. The study area has mixed vegetation supporting rich species diversity. Availability of more and wide host plants, favourable climatic conditions, and vegetation with herbs, shrubs, and trees for butterflies to nectar may all be contributing factors to the increase in butterfly diversity (Tiple 2009) [11]. Since, the study area hosts very common butterfly species, there will be no impact on the proposed mining activity. However, the need for conservation and management of butterfly species is an urgent need of the hour due to they play vital role in ecosystem balancing. The further studies on host plants and its association gives the larval and nectar host plants of the region, which will play key role in conservation of butterfly species.

Table 1: Table showing butterfly species recorded in core and buffer zones of the study area

S. No	Family	Species name	Common name	IUCN Status	WPA Status	0-5km	5-15 km	15-30km
1	Hesperiidae	<i>Borbo cinnara</i> (Wallace, 1866)	Rice Swift			-	+	-
2	Hesperiidae	<i>Spialia galba</i> (Fabricius, 1793)	Indian Skipper			-	-	+
3	Hesperiidae	<i>Borbo bevani</i> (Moore, 1878)	Bevan's swift			+	+	-
4	Hesperiidae	<i>Pelopidas mathias</i> (Fabricius, 1798)	Small-branded swift			-	+	-
5	Hesperiidae	<i>Taractrocerma maevius</i> (Fabricius, 1793)	Common Grass dart			-	-	+
6	Lycaenidae	<i>Castalius rosomon</i> (Fabricius, 1775)	Common Pierrot			-	+	+
7	Lycaenidae	<i>Chilades lajus</i> (Stoll, 1780)	Indian Lime blue			+	+	-
8	Lycaenidae	<i>Chilades trochylus</i> (Freyer, 1845)	Grass Jewel			-	-	+
9	Lycaenidae	<i>Jamides celeno</i> (Cramer 1775)	Common Cerulean			-	+	+
10	Lycaenidae	<i>Lampides boeticus</i> (Linnaeus, 1767)	Pea Blue			+	-	+
11	Lycaenidae	<i>Leptotes plinius</i> (Fabricius, 1793)	Zebra Blue			+	+	-
12	Lycaenidae	<i>Loxura atymnus</i> (Stoll, 1780)	Common yamfly			-	-	+
13	Lycaenidae	<i>Prosotas nora</i> (C.Felder, 1860)	Common Line Blue			-	+	+
14	Lycaenidae	<i>Pseudozizeeria maha</i> (Kollar, 1844)	Pale grass blue			+	-	+
15	Lycaenidae	<i>Spindasis vulcanus</i> (Fabricius, 1775)	Common Silverline			+	+	-
16	Lycaenidae	<i>Tarucus nara</i> (Kollar, 1848)	Rounded Pierrot			+	-	+
17	Lycaenidae	<i>Zizeeria karsandra</i> (Moore, 1865)	Dark Grass Blue	LC		+	+	-
18	Lycaenidae	<i>Zizina otis</i> (Fabricius, 1787)	Lesser Grass Blue			-	-	+
19	Lycaenidae	<i>Zizula hylax</i> (Fabricius, 1775)	Tiny Grass Blue			-	+	-
20	Nymphalidae	<i>Acraea terpsicore</i> (Linnaeus, 1758)	Tawny Coster			+	+	+

21	Nymphalidae	<i>Ariadne merione</i> (Cramer, 1777)	Common Castor			+	-	+
22	Nymphalidae	<i>Athyma perius</i> (Linnaeus, 1758)	Common sergeant			-	-	+
23	Nymphalidae	<i>Danaus chrysippus</i> (Linnaeus, 1758)	Plain Tiger			+	+	+
24	Nymphalidae	<i>Danaus genutia</i> (Cramer, 1779)	Striped Tiger			+	+	+
25	Nymphalidae	<i>Elymnias hypermnestra</i> (Linnaeus, 1763)	Common palmfly			-	+	-
26	Nymphalidae	<i>Euploea core</i> (Cramer, 1780)	Common Crow			+	+	+
27	Nymphalidae	<i>Hypolimnas bolina</i> (Linnaeus, 1758)	Great Eggfly			-	+	+
28	Nymphalidae	<i>Hypolimnas misippus</i> (Linnaeus, 1764)	Danaid Eggfly		Sch-II	+	+	+
29	Nymphalidae	<i>Junonia almana</i> (Linnaeus, 1758)	Peacock Pansy			-	+	+
30	Nymphalidae	<i>Junonia hierta</i> (Fabricius, 1798)	Yellow Pansy	LC		+	+	+
31	Nymphalidae	<i>Junonia lemonias</i> (Linnaeus, 1758)	Lemon Pansy			-	+	+
32	Nymphalidae	<i>Junonia orithya</i> (Linnaeus, 1758)	Blue Pansy			-	-	+
33	Nymphalidae	<i>Melanitis leda</i> (Linnaeus, 1758)	Common Evening Brown			+	+	+
34	Nymphalidae	<i>Mycalasis perseus</i> (Fabricius, 1775)	Common Bush brown			-	-	+
35	Nymphalidae	<i>Parantica aglea</i> (Stoll, 1782)	Glassy Tiger			-	+	+
36	Nymphalidae	<i>Phalanta phalantha</i> (Drury, 1773)	Common Leopard			+	+	+
37	Nymphalidae	<i>Symphaedra nais</i> (Forster, 1771)	Baronet			+	+	+
38	Nymphalidae	<i>Tirumala limniace</i> (Cramer, 1775)	Blue Tiger			-	+	+
39	Nymphalidae	<i>Tirumala septentrionis</i> (Butler, 1874)	Dark Blue tiger			-	+	+
40	Nymphalidae	<i>Vanessa cardui</i> (Linnaeus, 1758)	Painted Lady			-	+	+
41	Nymphalidae	<i>Ypthima huebneri</i> (Kirby, 1871)	Common four ring			-	-	+
42	Papilionidae	<i>Pachliopta aristolochiae</i> (Fabricius, 1775)	Common rose			-	+	+
43	Papilionidae	<i>Pachliopta hector</i> (Linnaeus, 1758)	Crimson Rose		Sch-II	+	+	-
44	Papilionidae	<i>Papilio demoleus</i> (Linnaeus, 1758)	Lime Butterfly			+	-	+
45	Papilionidae	<i>Papilio polytes</i> (Linnaeus, 1758)	Common Mormon			+	+	-
46	Pieridae	<i>Catopsilia pyranthe</i> (Linnaeus, 1758)	Mottled Emigrant			-	+	+
47	Pieridae	<i>Catopsilia pomona</i> (Fabricius, 1775)	Common Emigrant			-	+	+
48	Pieridae	<i>Cepora nerissa</i> (Fabricius, 1775)	Common Gull			-	-	+
49	Pieridae	<i>Colotis aurora</i> (Cramer, 1780)	Plain Orange Tip			+	+	+
50	Pieridae	<i>Colotis danae</i> (Fabricius, 1775)	Crimson Tip			+	+	-
51	Pieridae	<i>Colotis etrida</i> (Boisduval, 1836)	Little Orange Tip			-	-	+
52	Pieridae	<i>Delias eucharis</i> (Drury, 1773)	Common Jezebel			+	-	+
53	Pieridae	<i>Eurema hecabe</i> (Linnaeus, 1758)	Common Grass Yellow			-	+	+
54	Pieridae	<i>Ixias marianne</i> (Cramer, 1779)	White Orange Tip			+	-	+
55	Pieridae	<i>Ixias pyrene</i> (Linnaeus, 1764)	Yellow Orange Tip			+	+	-
56	Pieridae	<i>Pareronia hippia</i> (Fabricius, 1787)	Common Wanderer			-	+	+
57	Pieridae	<i>Colias dimera</i> (Doubleday, 1847)	Common clouded yellow			+	+	-
58	Pieridae	<i>Pieris canidia</i> (Sparrman 1768)	Indian cabbage white			-	+	+

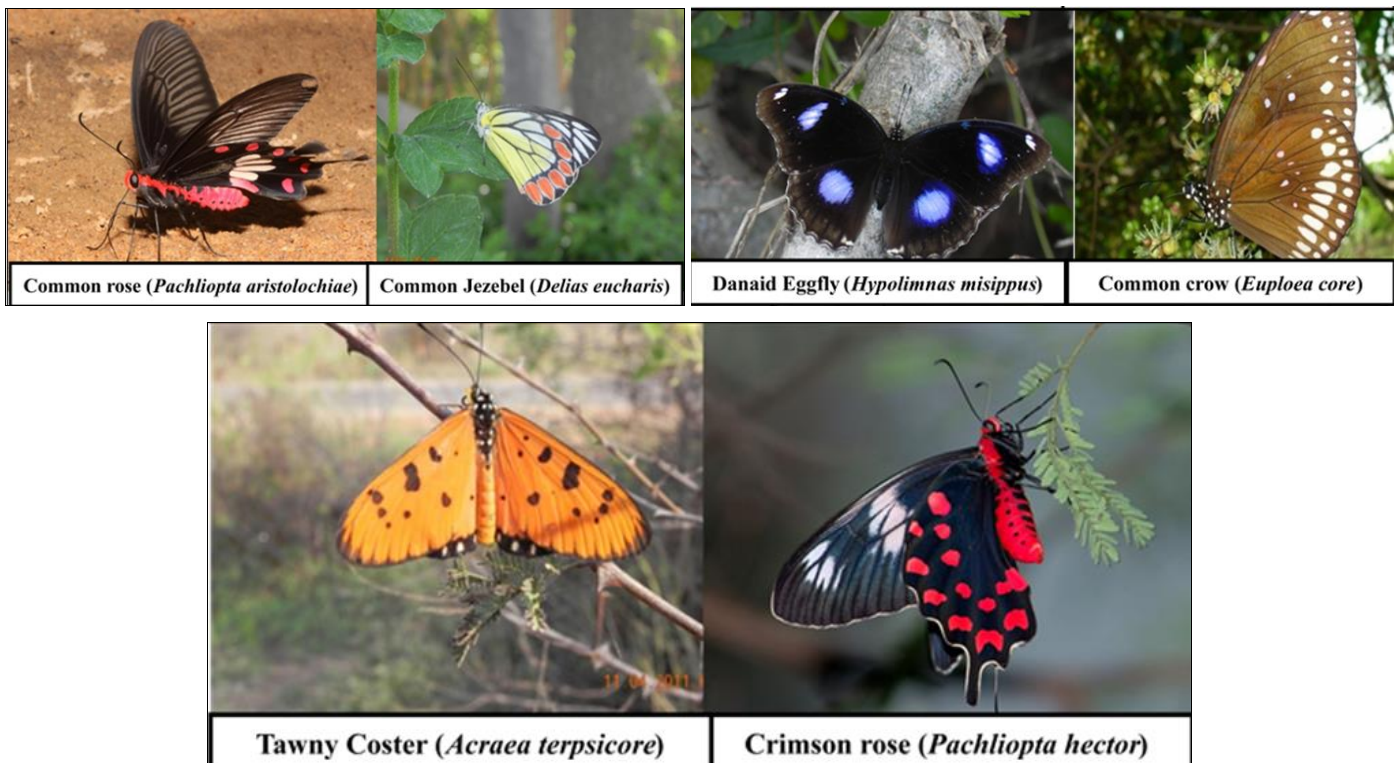


Plate 1: Diversity of Butterflies recorded in the study area



Plate 2: Diversity of Butterflies recorded in the study area

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