## **(II)**

## Preliminary Assessment of Butterfly Diversity in a Coal Block Area of Pakur District, Jharkhand, India

The Pakur district, of Jharkhand falls under the Chotonagpur plateau of the Deccan peninsula (Biogeographic zone 6, Province 6B) (Rodgers, 1985). The Pachhwara basin is an integrated part of the Rajmahal Master Basin of Pakurdistrict. The terrain is undulating, with few isolated hillocks in the central and

western parts. The elevation ranges between 150 m to 260 m in the Central and 300 m to 500 m in North-western landscape parts. Most of the region is dry and semi-arid with laterite soil and loose boulders. Bansloi, the primary surface runoff flowing from west to east, along with its tributaries, form the main drainage system of the area. The region experiences a typical dry tropical climate with hot summer and cold winter. The annual rainfall is mainly confined to monsoon months is around 1200 mm. About 75%-85% of the rain occurs from July to September. The area in general, is sparsely vegetated (Fig. 3) with shrubs and herbs and supports primarily northern tropical dry deciduous forest and Northern dry mixed deciduous forests. The entire basin is mainly dominated by dense Sal, Mahua, Palas and Bamboo trees. Besides, there are plantations of Sal and Teak at places in the area.

Only a few studies have been carried out in Jharkhand and Bihar. Previous records of butterflies from Jharkhand were only from the districts of Hazaribagh and Ranchi. (Singh, 2010; Verma, 2009), However, research on insect diversity in the mining area is limited and no previous study on butterfly diversity from Pakur District. Hence, the present study was undertaken to assess the diversity of butterflies in the Pachhwara coal block area (North and Central) of Pakur district, Jharkhand to create baseline information for future management strategies, and also to assess the current potential threats to the insect diversity (Fig. 1). The Pachhwara North coal block (Latitudes 24°32'12.771" N 24°33'53.683" N Longitudes 87°25'18.208" E 87°29'55.417" E and mentioned as WBPDCL Lease boundary in Fig. 1); and Pachhwara central coal block (bounded by latitude 24°31' 17.66399" N and 24°32'



Fig. 1: Map of the study area and sampling locations

41.25028" N and longitude 87°25' 29.85701" N and 87°29' 55.55699" N and mentioned as PPDCL Lease boundary in Fig. 1) is located in the north-western and central-western part of the Rajmahal coalfield area.

A 20-day rapid survey was conducted during November-December 2021 in and around the Pachhwara coal mine (North and Central) area of the Pakur district. The surveys were conducted within and around 1-5 km belt of the mine void area, and 5-10 km, and 10-20 km belts around mine lease area (Fig. 1) in 36 randomly chosen locations to record the butterfly species of this area. The species which were difficult to identify in the field were photographed and later identified to species level wherever possible. Sampling was not consistently possible in all the belts due to Naxalite dominance and inaccessibility.

Thirty-eight species of butterflies (Table 1) were recorded from the study area, which fall into four families

 Table 1
 : Checklist of the butterflies documented in the Pachhwara coal block area, Pakur district, Jharkhand. (\*= IWPA, 1972, schedule-I; \*\*= Schedule-II)

S. no.	Common name	Scientific name	Family
1	Common Mormon	Papilio polytes (Linnaeus, 1758)	Papilionidae
2	Common Mime*	Papilio clytia (Linnaeus, 1758)	Papilionidae
3	Common Banded Peacock	Papilio crino (Fabricius, 1793)	Papilionidae
4	Lime Swallowtail	Papilio demoleus (Linnaeus, 1758)	Papilionidae
5	Lemon emigrant	Catopsilia pomona (Fabricius, 1775)	Pieridae
6	Common Jezebel	Delias eucharis (Drury, 1773)	Pieridae
7	Common Grass Yellow	Eurema hecabe (Linnaeus, 1758)	Pieridae
8	Psyche	Leptosia nina (Fabricius, 1793)	Pieridae
9	Mottled Emigrant	Catopsilia pyranthe (Linnaeus, 1758)	Pieridae
10	Indian Wanderer	Pareronia hippia (Fabricius, 1787)	Pieridae
11	Spotless Grass Yellow	<i>Eurema laeta</i> (Boisduval, 1836)	Pieridae
12	Common Gull**	Cepora nerissa (Fabricius, 1775)	Pieridae
13	Red Pierrot	Talicada nyseus (Guérin-Méneville, 1843)	Lycaenidae
14	Common Hedge Blue	Acytolepis puspa (Horsfield [1828])	Lycaenidae
15	Pale Grass Blue	Pseudozizeeria maha (Kollar [1844])	Lycaenidae
16	Dark Grass Blue	Zizeeria karsandra (Moore, 1865)	Lycaenidae
17	Gram Blue**	Euchrysops cnejus (Fabricius, 1798)	Lycaenidae
18	Tiny Grass Blue	Zizula hylax (Fabricius, 1775)	Lycaenidae
20	Common Sailor	Neptis hylas (Linnaeus, 1758)	Nymphalidae
21	Angled Castor	Ariadne ariadne (Linnaeus, 1763)	Nymphalidae
22	Common Crow	Euploea core (Cramer, [1780])	Nymphalidae
23	Peacock Pansy	<i>Junonia almana</i> (Linnaeus, 1758)	Nymphalidae
24	Plain Tiger	Danaus chrysippus (Linnaeus, 1758)	Nymphalidae
25	Common Evening Brown	<i>Melanitis leda</i> (Linnaeus, 1758)	Nymphalidae
26	Chocolate Pansy	Junonia iphita (Cramer, [1779])	Nymphalidae
27	Baronet	Symphaedra nais (Forster, 1771)	Nymphalidae
28	Tawny Coster	Acraea terpsicore (Linnaeus, 1758)	Nymphalidae
29	Grey Pansy	<i>Junonia atlites</i> (Linnaeus, 1763)	Nymphalidae
30	Common Four-Ring	<i>Ypthima huebneri</i> (Kirby, 1871)	Nymphalidae
31	Common Palmfly	Elymnias hypermnestra (Linnaeus, 1763)	Nymphalidae
32	Dark Evening Brown	Melanitis phedima (Cramer [1780])	Nymphalidae
33	Common Nawab	Charaxes bharata (C. & R. Felder [1867]	Nymphalidae
34	Common Castor	Ariadne merione (Cramer [1777])	Nymphalidae
35	Striped Tiger	Danaus genutia (Cramer [1779])	Nymphalidae
36	Common Leopard	Phalanta phalantha (Drury [1773])	Nymphalidae
37	Lemon Pansy	<i>Junonia lemonias</i> (Linnaeus, 1758)	Nymphalidae
38	Great Eggfly	Hypolimnas bolina (Linnaeus, 1758)	Nymphalidae



and 26 genera. Nymphalidae (19) is the most dominant family, followed by Pieriade (8), Lycaenidae (6), and Papilionidae (4) (Fig. 2). A list of the recorded butterflies is given in Table 1. Among these, two species are listed in Schedule I and II of the Wildlife Protection Act., 1972. During the survey, visible disturbances observed include, habitat fragmentation, vegetation removal, noise and vibration from blasting, dust accumulation on the leaves, pollution of air and water bodies etc. We found that the middle belt (10 km) has more vegetation cover, which was later confirmed by the area's LULC map (Fig. 3). Current study creates a baseline data on butterfly diversity near the Pachhwara Coal mine and Long-term studies in this area are needed to determine the impact of mining on biodiversity.



Fig. 2: Recorded number of species in each family from the study area



Fig. 3: Land-use land cover map of the study area

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