



# Available soil nutrients status at different ecopockets around Similipal Biosphere Reserve (SBR), Odisha, India

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**Abstract-** This experiment designed to know the available soil nutrients status in different ecopockets around Similipal Biosphere Reserve, where the local tribal peoples used to rear silkworm on Host plant for commercial purpose. Soil samples were collected with standard protocol from six ecopockets like Kendujuani, Thakurmunda, Sarat, Jadida, Kuliana and Khadambeda. The status of available organic carbon, phosphorus and potassium ions is analysed. As organic carbon in the soil is decomposed to provide available Nitrogen so preferred to analysed and found highest in Khadambeda 0.683% which is at average range. Next is Kendujuani 0.563 and the lowest availability in Jadida 0.425. Available of Phosphorus in soil is the highest at Kendujuani 6.000 Kg/ha and is in low range at other ecopockets. Potassium availability in soil is the highest at Kendujuani 140.188 Kg/ha and next is Khadambeda 108.425 whereas minimum is at Jadida 43.500. This analysis revealed Khadambeda and Kendujuani ecopockets are preferable for Host plant plantation and silkworm rearing with ERR 51.1% and 46.7% respectively.

**Key words:** Nutrients, soil, organic carbon, potassium, phosphorus, SBR.

## I. INTRODUCTION

Nutrients of soil play an important role in plant growth. Element is directly involved in nutrition of plant and role played by one element cannot be replaced by any other (Aron and Stout, 1939). Nutrition is a factor of paramount importance that regulates growth, development and reproduction of animals. Intake and growth targets are important to reach the functional optima in an insect (Raubenheimer and Simpson, 1999).

Nitrogen makes the plant green, increases the protein content and encourages good quality foliage. It is also an important constituent of chlorophyll. Most of the soil nitrogen occurs in the organic combination. Decomposition of the organic carbon by breakdown of protein provides soil nitrogen in ionic form (Bremner J.M., 1951). Phosphorus stimulates the root formation makes it drought resistant and winter hardy and increases the protein content in the leaf. It effects rapid

growth. Potassium helps in increasing Nitrogen and Potash. It helps in the building of protein, photosynthesis and reduces diseases (Plant Nutrients.mht).

Similipal Biosphere Reserve situated in Mayurbhanj district of Odisha state of India between 21°28'N – 20°08'N Latitude and 86°4'E–86°36'E Longitude (Dey et al, 2010). These are the few ecopockets of SBR like Kendujuani, Thakurmunda, Sarat, Jadida, Kuliana and Khadambeda where the poor tribal local farmers used to rear silkworm on the Host plant Asan.

In this study availability of organic carbon, phosphorus and potassium in the soil of different ecopockets around SBR were analysed to identify for a better seat of Tasar rearing.

## II. MATERIALS AND METHOD:

Soil samples from different ecopockets were collected in every month and brought to the Laboratory. Organic carbon was estimated with colorimetric method (Gupta et al, 1975). Available phosphorus in soil was estimated with Bray's I method (Bray and Kurtz, 1945). Available potassium in soil was analysed by ammonium acetate extraction process with the help of flame photometer.

In each ecopocket freshly hatched 1000 numbers of tasar silkworm in 10 food plants (*T. tomentosa*) were brushed. The ERR was calculated as per recommendation of Dash et al., 1992 to get a collective comparative data for all ecopockets.

## III. RESULTS AND DISCUSSION:

Available organic carbon, phosphorus and potassium in soils of mentioned ecopockets showed specific variation. Organic carbon is the highest at Khadambeda 0.683% followed by Kendujuani 0.563, Thakurmunda 0.509, Sarat 0.463, Kuliana 0.463 and lowest at Jadida 0.425 (Fig.1). Available phosphorus is maximum at Kendujuani 6.000 Kg/ha and minimum at Kuliana 1.32 followed by Sarat 3.838, Jadida 3.800, Khadambeda 2.563, Thakurmunda 1.990 (Fig.2).

Soil samples of Kendujuani 140.188 Kg/ha are also with the highest in available potassium followed by Khadambeda 108.425, Sarat 105.913, Kuliana 100.846, Thakurmunda 69.500 and lowest in Jadida 43.500 (Fig.3).

The tasar silkworm rearing performed on six ecopockets depicted in Fig.4. It reveals that cocoon production is highest at Khadambeda 511 followed by 469 at Kuliana, 467 at Kendujuani, 458 at Sarat, 455 at Thakurmunda and 422 at Jadida.

Table

Ecopockets	Organic Carbon (%)	Phosphorus (Kg/ha)	Potassium (Kg/ha)
	Mean ± SD		
Kendujuani	0.563±0.026	6.0±0.188	140.188±6.392
Thakurmunda	0.509±0.013	1.99±0.111	69.5±2.262
Sarat	0.463±0.022	3.838±0.363	105.913±4.305
Jadida	0.425±0.028	3.8±0.279	43.5±3.87
Kuliana	0.463±0.029	1.32±0.081	100.846±2.557
Khodambeda	0.683±0.038	2.563±0.081	108.425±4.336

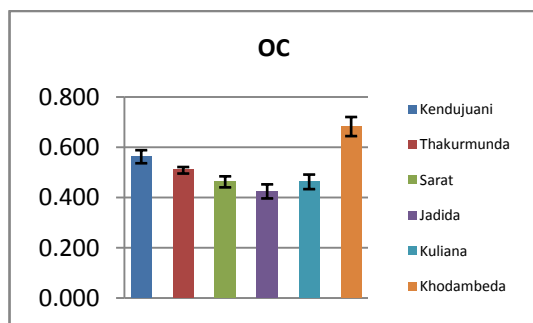


Fig. 1. Available Organic Carbon of soil (in %) collected from different ecopockets of Similipal Biosphere Reserve.

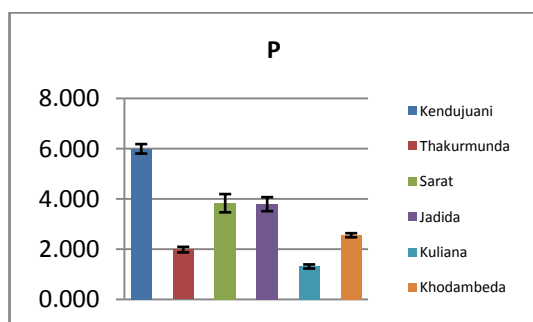


Fig. 2. Available Phosphorus of soil (in Kg/ha) collected from different eco-pockets of Similipal Biosphere Reserve.

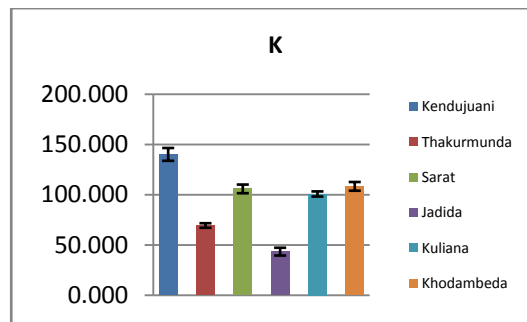


Fig. 3. Available Potassium of soil (in Kg/ha) collected from different eco-pockets of Similipal Biosphere Reserve.

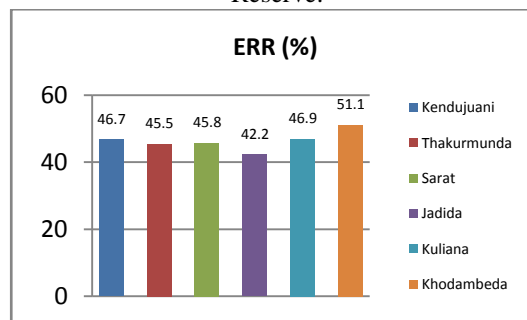


Fig. 4. Cocoon performance ERR (in %) at different eco-pockets of Similipal Biosphere Reserve.

Leaf yield and nutritious value in leaf and growth of plant directly depends on the soil nutrients availability (Sarmah et al., 2013, Priya et al., 2013, Sinha et al., 2009, Sinha & Das, 2010). Tasar food plant leaf quality in terms of nutrition influences the health and growth of larvae and ERR (Yadav et al., 2010, Dash et al., 1992). Determinations of soil fertility have direct impact on quality and yield of host plant leaf as well as on ERR. To achieve uniform production of quality leaves and ERR, the ecopockets around SBR should be supplemented with adequate essential nutrients as and when the soil nutrients uptake proceeds.

#### IV. CONCLUSION:

This study reveals that soil sample of Khadambeda with organic carbon, available phosphorus and available potassium are in medium, less and lower medium range respectively with ERR of 51.1%. Kendujuaniecopocket with medium range organic carbon, less range in available phosphorus, lower medium range in available potassium with ERR of 46.7% are suitable for tasar rearing among the above. So, the tribal farmers of these two ecopockets may be encouraged for plantation of Host plant to rear silkworm for their economical development and follow-up action may be taken for providing them the soil data information.

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