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Current Biodiversity of Telangkhedi Wetland Lake Ecosystem, Nagpur [M.S.]

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Abstract: ***The Telangkhedi lake is a perennial, deep, manmade, polluted lake situated at Bharat nagar, Nagpur. The shallow parts of this lentic habitat is a wetland at least for part of the year and as it dries up the hydrophytes follow the receding shoreline depicting an ecological succession. Eutrophy was visible during end of September with peak at November-January, and a decline during February-March. Lake receives nutrients like nitrogen, phosphorus, sulphur, carbon,etc., by leaching and from the surface run-off rainwater which help in recycling and circulation of nutrients, ground water recharge, support biodiversity and fishery, and is a recreational site for citizens. The aquatic macrophytes of the lake and wetland recycle nutrients via the biotic communities and help in carbon sequestration. Wetland occupy approximately 2% of the earth's surface are designated as " kidneys of landscape". Wetlands all over the globe store approximately 44.6Tg of carbon/year. Insects on surface water of wetland include Gerris floating and submerge anchored hydrophytes were found and instar stages of dragon flies. Hydrophytes like Phragmites(Reed), Eicchornia crassipes (Water hyacinth), Lemna (Duck-weed), Azolla (Water fern), Nymphae(White lily) and Nymphae(Pink lily) Pistia, Hydrilla, Vallisneria, Utricularia, etc. Dragonflies were observed hovering over the lake and in the wetland includes Rhyothemis variegata, Orthetrum prumosum, Truthemis aurora, Pantala flavescens, Brachythemis contaminata, Progomphus obscurus, Ceriagrion coromandelianum, etc. Phytoplanktons like Chlamydomonas, Euglena, Nitszia (Diatoms), etc, were found. Zooplanktons like Cyclops, Diaptomous , naupilus larvae, Moina ,etc. The terrestrial crustacean wood lice degrades the woody vegetation, the white ants(Coptotermes formosanus) feed on tree bark . The green grasshoppers; Acrida cinerea, Gonatista (grizzled mantis) consume the surrounding vegetation and recycle the locked nutritents. Beetle includes Hippodamiatre decimpunctata, Cryptophagus cellaris(Cellar beetle) , Oxycetonia versicolour. Mollusc like Vivipara benghalensis, Lymnea, Indoplanorbis exustus, Unio, etc. Other soil organism found were the annelid, Pheretima posthuma; Scolopendra(Centipede), Millipede(Julus), Collembolan(Springtail), Carcinus(Brachyuran crab), Lassius niger(Black ants), spider, Hognalenta (Indian wolf spider), Nekton fishes like Labeo rohita, Clarius batrachus, Heteropnuestes fossilis, Channa striatus, Puntius, etc; Amphibians like Polypedates maculatus and Hyla (Indian tree frog), Bufo melanostictus (Asian common toad), and Reptiles like Calotes versicolour, and snake Ptyas mucosa (Oriental ratsnake) were recorded. Butterflies include Papillio demoleus, Euploea core, Tirumala hamata, Junonia lemonias, Eurema hecabe contrubrenalis, Catopsilla pyranthe, etc. Birds were photographed in Telangkhedi lake water and its wetland area, which is a feeding, breeding, nesting sites for residential birds like Halcyon smyrnensis (White throated kingfisher), Acrido atthis (Common kingfisher), Ceryle rudis (Pied kingfisher), Pelargopsis capensis(Stork- billed Kingfisher), ,Fulica atra (Eurasian coot), Porphyrio porphyria (Purple swamphen), Vanellus indicus (Red-wattled lapwing), Bubulcus ibis (Cattle-egret), Pycnonotus cafer (Red vented bulbul), Psittacula krameri(Rose-ringed parakeet), Argya striata (Jungle babbler), Merops orientalis (Green-beeeater), Ocyceros birostris (Indian Grey hornbill), Spilopelia chinensis(Spotted dove), Stegmatopelia senegalensis (Laughing dove), Metopidius indicus (Bronze-winged jacana), Ardeola grayii (Indian pond heron), and Phalacrocorax niger (Black cormorant).***

Keywords: Invertebrates, Vertebrates, Telangkhedi, Eutrophy, Polluted, Carbon.

I. INTRODUCTION

Wetlands are ecotones, occupy 6% of earth's surface, are natural or artificial, permanent or temporary (Garg,et.al., 1998), Telangkhedi lake in Nagpur is a manmade wetland, as no work has been done on invertebrate and vertebrate biodiversity the present work was undertaken.

II. METHOD AND MATERIAL

The field survey work was done from 2016 – 2019 through the year in Telangkhedi wetland lake in Nagpur city. (21º 06'N &79º 07'E). Visual observations with eyes and with binocular were done from 6.45am up till 5.15pm. Mobiles and camera (Canon 70x , binocular 20 x 50mm,Samsung galaxy J7,etc) were used to photograph the biodiversity. Various key to identification were utilized to identify the recorded biodiversity.

III. OBSERVATION TABLE

Table no 1. Shows the diverse flora and fauna recorded in the Telangkhedi wetland area. 10 genera of hydrophytes, 4 genera of phytoplankton, 7 genera of zooplankton , 13 genera of arthropods (insects, beetles, grasshopper, yellow crab), 4 genera of mollusc, one annelid, earthworm. 5 species of teleost fish, 3 genera of amphibians (Toad & frog), 2 species of reptiles, 6 species of butterflies, 7 species of dragonflies, 16 species of avifauna were recorded.

Observation Table no 1: Biodiversity of flora and fauna of Telangkhedi wetland.(Nagpur,M.S., India)

Sr.no	Scientific Name	Common Name	Family
1	Phragmites	Reed	Poaceae
2	Eicchornia crassipes	Water hyacinth	Pontederiaceae
3	Lemna	Duck weed	Araceae
4	Azolla	Water fern	Salviniaceae
5	Nymphae white lotus	Water lily white	Nymphaeaceae
6	Nymphae pink lotus	Water lily pink	Nymphaeaceae
7	Pistia	Water cabbage	Araceae
8	Hydrilla	Waterthyme	Hydrocharitaceae
9	Vallisneria	Tape grass	Hydrocharitaceae
10	Utricularia	Bladderworts	Lentibulariaceae
11	Chlamydomonas	Green algae	Chlamydomonadaceae
12	Euglena	Euglena	Euglenaceae
13	Nitzschia	Diatom	Bacillariophyceae
14	Spirogyra	Spirogyra	Zygnemataceae
15	Pheretima posthuma	Earthworm	Megascolecidae
16	Rhyothemis variegate	Common picture wing	Libellulidae
17	Ortherum prumosum	Skimmers	Libellulidae
18	Truthemis aurora	Crimson marsh glider	Libellulidae
19	Orthetrum sabina sabina	Slender skimmer	Libellulidae
20	Pantala flavescens	Skimmers	Libellulidae
21	Brachythemis contaminate	Ditch jewel	Libellulidae
22	Progomphus obscures	Sanddragon	Gomphidae
23	Papillio demoleus	Swallow tail butterfly	Papilionidae
24	Euploea core	Brush footed butterflies	Nymphalidae
25	Tirumala hamata	Blue tiger	Nymphalidae
26	Junonia lemonias	Nymphalid butterfly	Nymphalidae
27	Eurema hecabe contrubrenalis	Common grass yellow	Pieridae
28	Catopsilla pyranthe	Mottled emigrant	Pieridae
29	Ceriagrion coromandelianum	Damselfly	Coenagrionidae
30	Omocestus viridulus	Green grasshoppers	Acrididae
31	Acrida cinerea	Chinese grasshoppers	Acrididae
32	Gonatista	Grizzled mantis	Mantidae
33	Heteronychus arator	Black cellar beetle	Scarabaeidae
34	Oxycetonia versicolor	Flower beetle	Scarabaeidae
35	Scolopendra	Centipede	Scolopendridae
36	Harpaphe	Julus	-

37	Collembola	Spring tail	Entomobryidae
38	Lassiusniger	Black garden ants	Formicidae
39	Coptotermes formosanus	White ants	Rhinotermitidae
40	Hognalenta	Indian wolf spider	Lycosidae
41	Brachyuran crab	Grey swimming crab	-
42	Vivipara bengalensis	Pond snail	Viviparidae
43	Lymnea	Pond snail	Lymnaeidae
44	Indoplanor bisexustus	Air breathing freshwater snail	Planorbidae
45	Unio	Freshwater mussels	Unionidae
46	Cyclops	Freshwater copepods	Cyclopidae
47	Diaptomous	Copepods	Diaptomidae
48	Nauplius larva	Nauplius larva	-
49	Moina	Water fleas	Moinidae
50	Brachionus calyciflorus	Wheel animalcule	Brachionidae
51	Brachionus fulcatus	Wheel animalcule	Brachionidae
52	Brachionus angularis	Wheel animalcule	Brachionidae
53	Brachionus caudatus	Wheel animalcule	Brachionidae
54	Labeo rohita	Rohu	Cyprinidae
55	Clarius batrachus	Air breathing catfishes	Claridae
56	Heteropnuestes fossilis	Singhi	Heteropneustidae
57	Channa striatus	Snakehead fish	Channidae
58	Puntius	Barbus	Cyprinidae
59	Polypedates maculatus	Indian tree frog	Rhacophoridae
60	Bufo melanostictus	Asian common toad	Bufonidae
61	Hyla	Tree frog	Hylidae
62	Calotes versicolor	Oriental garden lizard	Agamidae
63	Ptyas mucosa	Oriental ratsnake	Colubridae
64	Halcyon smyrnensis	White throated kingfisher	Alcedinidae
65	Acedo atthis	Common kingfisher	Alcedinidae
66	Ceryle rudis	Lesser pied kingfisher	Alcedinidae
67	Pelargopsis capensis	Stork billed kingfisher	Alcedinidae
68	Fulica atra	Eurasian coot	Rallidae
69	Porphyrio porphyrio	Purple swamphen	Rallidae
70	Vanellus indicus	Red wattled lapwings	Charadriidae
71	Bubulcus ibis	Cattle egret	Ardeidae
72	Argya striata	Jungle babbler	Leiothrichidae
73	Merops orientalis	Green bea eater	Meropidae
74	Ocyceros birostris	Indian grey hornbill	Bucerotiformes
75	Spitopelia chinensis	Spotted dove	Columbidae
76	Stegmatopelia senegalensis	Laughing dove	Columbidae
77	Metopidius indicus	Bronze winged jacana	Jacanidae
78	Ardeola grayii	Indian pond heron	Ardeidae
79	Phalacrocorax niger	Black cormorant	Phalacrocoracidae

IV. RESULT AND DISCUSSION

The Telangkhedi wetland ecosystem is surrounded by forest of dry deciduous type, trees, like T.grandis, A.nilotica, B. monosperma, D.sisso, etc., along with shrubs and herbs which support diversity of fauna. In 1983 Botanical survey of India had catalogued 140 genera of endemic plants (33%), insects, marine worms, centipedes, mayflies, fresh water sponges and 400 spp.of endemic vertebrates. In the present biodiversity survey invertebrate (39) and vertebrate(26) were observed. Emergent hydrophytes of littoral zone of Telangkhedi lake supports. 7 species of dragonflies like R.variegata, O.promosum, T.aurora, P.flavescens. B.contaminata. P.obscurus; damselfly C. coromandalianum. O.sabina sabina and 6 species of butterfly P.demoleus, E.core, T.hamata, J.lemonias, E.hecabe, C.pyranthe. In (2010) A.D.Tiple and A.M.Khurad recorded 104 species of butterflies in Ambazari garden and surroundings of Nagpur, which include 35 new species.

In (2012) A.D.Tiple catalogued 72 species of Odonates, including 10 new species in Nagpur city. In the Telangkhedi wetland area arthropods Oniscus, C. formosanus , A.cinerea, recycle the locked nutrients, other arthropods Scolopendra, L.niger, Millipede, Collembolan, Cancer(crab)and annelid Pheretima posthuma were recorded. From the four species of mollusc recorded in Teangkhedi lake; vivipara bengalensis is a biological indicator of selenium dioxide toxicity in the aquatic ecosystem (D.R. Saxena and A.N. Lonkar, 1988). In the limnetic zone of Telangkhedi phytoplankton like Euglena, Chlamydomonas, Spirogyra, Nitszia, etc., and Zooplankton like Cyclops, Diaptomous, and B. calyciflorus, B.angularis, B.caudatus, B.fulcatus(rotifers) and Moina were recorded, (refer table no.1).S.S.Sitre (2014) reported, rotifers, copepods, cladocerans, ostracoda, and protozoa, in the Naik lake at Nagpur. In Telangkhedi lake, nekton; include cat fishes, Labeo rohita, Ophio cephalus, etc; three amphibians; and two reptiles; resident birds and winter migratory bird F.atra were recored .Nagpurians must refrain from degrading and polluting, Telangkhedi lake and adopt all conservation measures, because it supports 65 number of animal groups According to Kar et.al.,(2000) marine wetlands harbour 131 species of fishes; Prasad et.,al, (2002) reported 223 endemic fish species, amphibians, reptiles and invertebrates. According to Deepa and Ramchandran(1999) freshwater wetlands are feeding, breeding, nesting, and resting sites for water fowls and waders, he described various roles of the wetlands; Ishwaran, N. Perise , A. and Tri, N.H. (2008) had recognized at international level 26 wetlands and denoted it as Ramsar sites. In the present work, in Telangkhedi lake winter dominating species were lotus, arthropods and birds in comparison to summer season. Vanellus indices, dominated during winter and was present in less number in summer. Telangkhedi lake serve as an ectone or edge effect to support animal biodiversity adapted to survive near the boundary of residential area around this lake. The Jatayu conservation breeding centre at Pinjore (Haryana), Rajabhat Khawa (W.B) and Rani (Assam) has been already established by collaborative action plans of respective state government with Natural History Society, Royal Society of Preservation of Birds, ZSI (London) Avian institutions (Bowden, 2009) on recommendations of the report of the International South Asian Vulture Recovery Plan Workshop (BNHS, 2004).

Multitude of anthropogenic activities such as (1) Deforestation for construction of dams rails, roads, mines, waterways, residential areas, agricultural and animal farms (2) Clearing and converting these farms for activities stated in (1) is the Primary cause forcing the biodiversity in the wild to become fragmented and form (a) Corridors and adapt organisms to survive in these corridors (b) Ecotones are boundary areas for life (b) Ecotones also regarded as an Edge effect are boundary areas formed due to activities (1 and 2) it is a habitat where organism to survive and comprise the Eoctones oe Edge species. Both corridors and ecotone are sites, allow feeding, breeding, dispersion, competition, etc., may have indirectly some role in origin of new species and evolution. To prevent in future inbreeding depression at genetic level in relation to captive breeding in aviary, stocks of same avian species and different one are to be obtained from distant bird populations from various natural remote areas. The same is applicable to non avian species. Similarly male and female healthy, free from diseses, hardy , etc., Such birds must be selected for gene pools for artificial selection. (D.R.Saxena, 2021)

D.R.Saxena advocates some conservation measures to be implemented on a war footing globally

1) Avian Corridor Captive Breeding Rearing Releasing centre must be established in rural and urban areas of India with the help of agricultural and non agricultural universities.
2) Exogenous sex hormone therapy to artificially breed endangered and non- dangered bird species same need to be perfected, for this free- scholarships be provided to research student for project and Ph.D and further work at various universities, private research institutions, etc.
3) Workshop to train for this must be organized for students of veterinary, agriculture, science, etc.
4) A 2-5% rebate levied on ownership land must be provided to one and all related to the above program of establishment of aviary.
5) This program has a socio-economic approach and will aid in preventing extinction of birds and enhance financial status of farmers, agriculturist, animal sellers, and common man.

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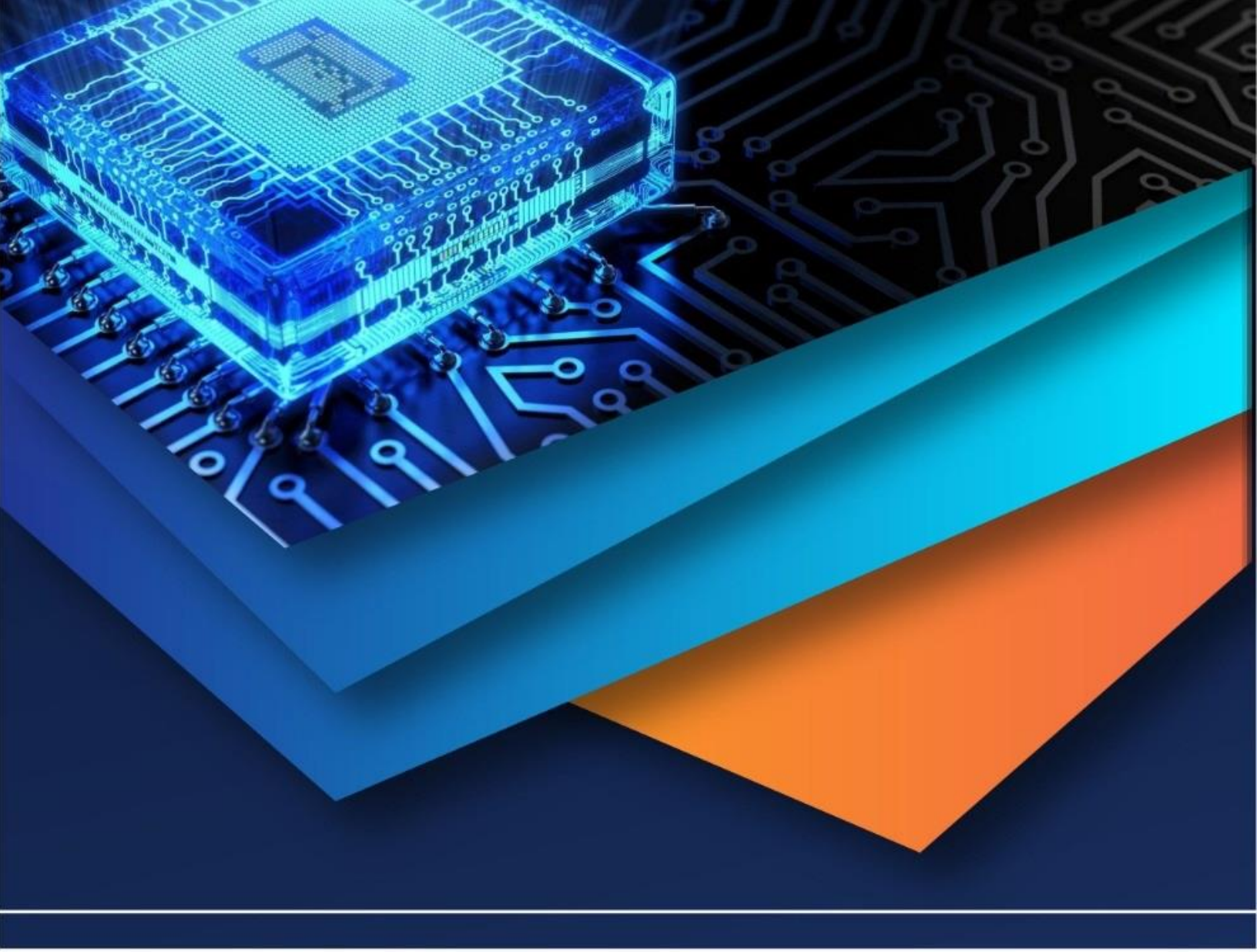
Fig 1. Rhyothemis variegate 2. Orthetrum pruinosum 3. Orthetrum sabinasabina 4. Brachythemis contaminata 5. Euploea core & Tirumala hamata 6. Junonia lemonias 7. Eurema hecabe 8. Ceriagrion coromandelianum 9. Common grasshoppers 10. Acrida cinerea 11. Gonatista 12. Heteronychusartor 13. Oxycetonia versicolor 14. Harpaphe 15. Lessius niger 16. Hogna lenta

17. Vivipara bengalensis 18.Unio 19.Diaptomus 20.Polypedates maculatus 21.Bufo melanostictus 22.Hyla 23.Halcyon smyrnensis 24.Pelargopsis capensis 25.Fulica atra 26. Merops orientalis 27.Ocyceros berostris 28.Metopidius indicus 29.Ardeola grayii 30.Phalacrocorax niger 31.Cancer 32.Oniscus



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