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Faunal Diversity of CSIR-NEERI campus, Nagpur, Maharashtra, India

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ABSTRACT

CSIR-NEERI is a constituent of council of scientific and industrial research and is situated in the center of Nagpur city. CSIR-NEERI is located at coordinate 2107'21'' N and 7904'17'' E and NEERI colony located at coordinate 2107'14'' N and 7903'59'' E. The objectives of this study is to examine the presence of fauna in the protected urban forest of Nagpur city. The study of faunal diversity at CSIR-NEERI campus has been conducted from September 2016 to August 2017. Total 352 Species of lower and higher fauna belonging to 56 orders, 190 families and 305 genera has been documented. The observed fauna was categorized as common (C) 155 species (44%), uncommon (UC) 138 species (39%), occasional (O) 47 species (13%) and rare (R) 12 species (4%).

Key words- Faunal biodiversity, Forest, CSIR-NEERI, Urban forest, Nagpur.

INTRODUCTION

Nagpur city is located at the exact center of the Indian peninsula. The city has the Zero Mile Stone locating the geographical centre of India, which was used by the British to measure all distances within the Indian subcontinent. The city lies on the Deccan plateau of the Indian Peninsula and has a mean altitude of 310.5 meters above sea level. Nagpur is known for its greenery and also as the clean city. Nagpur city is dotted with natural and artificial lakes. The largest lake is Ambazari Lake. Other natural lakes include Gorewada Lake and Telangkhedi Lake. Sonegaon and Gandhisagar Lakes are artificial, created by the city's historical rulers.

Nagpur has tropical savannah climate with dry conditions prevailing for most of the year. It receives about 163 mm of rainfall in the month of June. The amount of rainfall is increased in the month of July to 294 mm. Gradual decrease of rainfall has been observed from July to August (278 mm) and September (160 mm). Summers are extremely hot, lasting from March to

June, with May being the hottest month. Winter lasts from November to January, during which temperatures drop below 10 °C (50 °F). Nagpur is a land of varied fauna; it shows a notable diversity of habitat with significant variations in rainfall, altitude, topography, and latitude. It has a great diversity of natural ecosystems from cold to high temperature. The main natural habitat types are forest, mountains, rivers, and wetlands.

NEERI is the constituent of council of scientific and industrial research (CSIR) is situated in the center of Nagpur. Nagpur city is very well known as second Green City in India. NEERI established in 1958 as a Central Public Health Engineering Research Institute. NEERI covers 48 ha area distributed as a NEERI institute and NEERI colony. NEERI has well protected urban forest having flora and fauna. It comes under dry deciduous and mix deciduous type. The common flora includes tree species like *Azadirachta indica, Albizzia procera, Annona squamosa, Leucaena lecocephala, Ipomoea fistulosa, Lantana camara, Alternanthera sessilis, Ageratum conizoides, Calotropis gigantia, Parthenium hysterophorus. Cyanodon dactylon and Dactyloctenium* (Dhadse et al. 2007). NEERI also supports flowering and fruiting plants and number of climbers and grasses which attract number of insects and birds. NEERI provides an excellent habitat for number of invertebrates and vertebrates like Mollusk, bees, wasp, ants, odonates, moths, butterflies, arachnids, reptiles, amphibians, birds and mammals.

Floristic survey of NEERI premises recorded 135 vascular plants including 16 monocots and 119 dicots, belonging to 115 genera and 53 families. The taxa included 4 types of grasses, 55 herbs, 30 shrubs and 46 trees. The large number of species within very small area (43 ha) indicates rich biodiversity in this forest area. It is also observed that this forest patch has tall trees, with good density and rich cover of shrubs and herbs on forest floor indicating well knit plant community. These characteristics have given immense ecological importance to this urban forest area. Detailed vegetation study revealed that positive co-operation in the plant communities can significantly maintain species diversity in the environment (Gupta, 2008).

MATERIAL AND METHODS

The study area is divided into two parts NEERI institute and NEERI colony coordinate are $21^{0}7'21''$ N and $79^{0}4'17''$ E and $21^{0}7'14''$ N and $79^{0}3'59''$ E respectively. NEERI possess a good and healthy climate. The temperature of NEERI is less than 2^{0} C in comparison with the temperature outside of the Institute.In Institute and colony tree types are categorized into dry deciduous and mix deciduous.

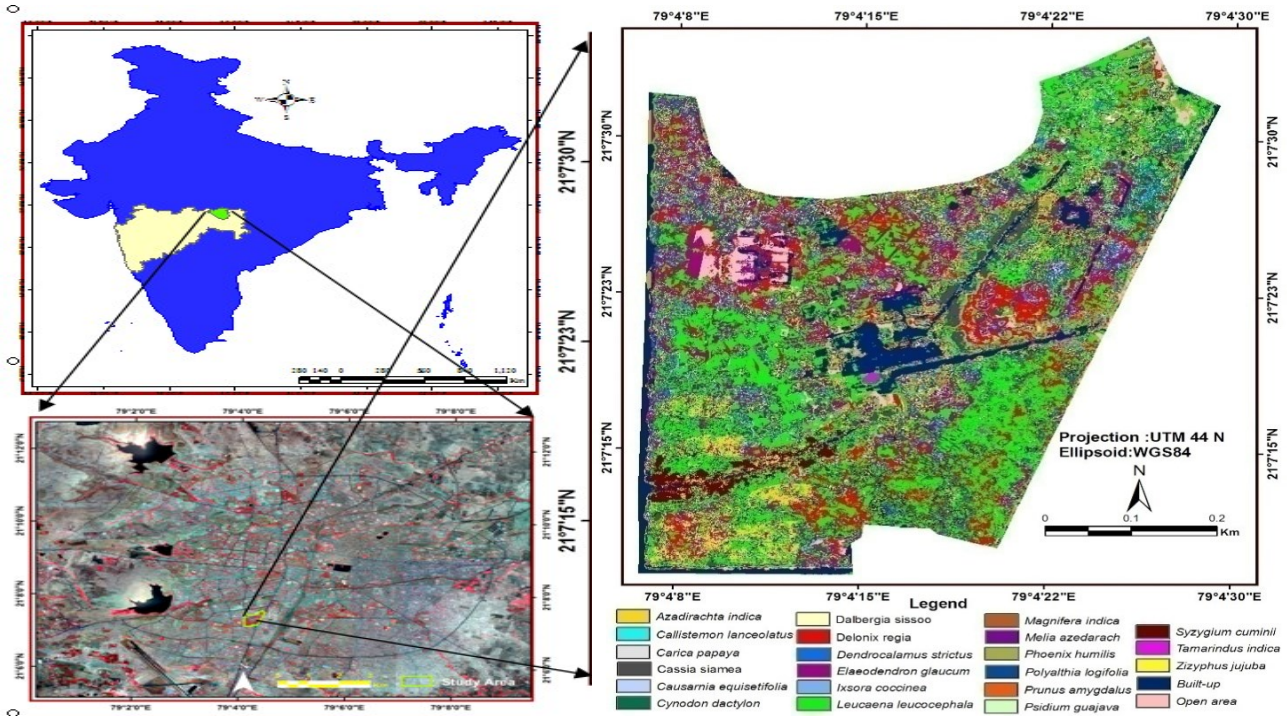

Figure 1: Details of study area and IKONOS imagery supervised classification indicating vegetation types

In present less study of fauna has been known from this area of institute so that to overcome of this study we surveyed randomly during alternative days and nights from April 2016 to April 2017 to find the maximum faunal diversity. We frequently searched randomly in different seasons depending on whether conditions and time. The surveys were done with the help of visual encounter method in the macro and micro habitat of NEERI. The active searching includes turning rocks, pealing barks, cleaning leaf litters, checking burrows, crevices of earth, bushes, grass patches, water storage tanks, and small ponds in NEERI institute. The regular and thoroughly checking using sticks, insects net, torch, measuring tape, digital Vernier caliper, polyethylene bottles, bags etc. the correct identification of fauna was done by referring Fauna of British India.

RESULTS AND DISCUSSION

During the studies 352 species of fauna from 190 families belonging to 56 orders were documented, out of which most dominated order of species like Lepidoptera with 55 species, Arachnida 43 species, Passeriformes 39 species, Hymenoptera and Coleoptera with 22 species each, Diptera 21 species, Hemiptera 20 species, Squamata 19 species, Odonata 14 species and Orthoptera 13 species were recorded. It was observed that maximum numbers of invertebrates sighted during the month of June to November while Aves were observed during early monsoon to late winter.

Table 1: Fauna biodiversity of NEERI campus

SR. No.	ORDERS	FAMILIES	SCIENTIFIC NAMES	COMMON NAMES	STATUS
1	Annelida	Eudriidae	*Eudrilus eugeniae*	Earth worm	C
		Lambricidae	*Eisenia fetida*	Red earth worm	C
	(Mollusca)				
2	Stylommatophora	Achatinidae	*Lissachatina fulica*	Giant african snail	C
3	Sorbeoconcha	Thiaridae	*Melanoides tuberculata*	Red rimmed melania	U
4	Systellommatophora	Veronicellidae	*Laevicaulis alte*	Common garden slug	C
5	Hygrophila	Planorbidae	*Indoplanorbis exustus*	Air breathing freshwater snail	C
	(ARTHROPODA)				
6	Decapoda	Gecarcinucidae	*Barytelphusa sp.*	Fresh water crab	C
7	Isopoda			Wood louse	O
8	Polydesomoidea	Xystodesmidae	*Harpaphe haydeniana*	Yellow spotted millipede	C
9	Spirobolida	Trigoniulidae	*Trigoniulus corallines*	Rusty millipede	C
10	Scutigeromorpha	Scutigeridae	*Scutigera coleoptrata*	House centipede	O
11	Scolopendromorpha	Scolopendridae	*Scolopendra sp.*	Centipede	U
			Rhydida sp.	Centipede	U
12	Scorpiones	Scorpionidae	*Heterometrous sp.*	Giant forest scorpion	R
13	Ixodida	Ixodidae	*Dermacentor sp.*	Dog tick	U
			Rhipicephalus sp.	Brown dog tick	U
14	Arachnida	Aranidae	*Neoscona bengalensis*	Spotted orb weaver	U
			Neoscona mukherji	Common garden spider	C
			Neoscona sp.	Orb weaver spider	C
			Larinia sp.		C
			Zygeilla sp.	Missing sector orb weaver	U
			Cyclosa sp.	Orb weaver spider	C
			Cyclosa sp.	Orb weaver spider	U
			Araneus sp.	Barn orb weaver	U
			Eriovixia sp.	Orb weaver spider	C
			Argiope sp.	Signature spider	O
		Lycosidae	*Arctosa littoralis*	Wolf spider	C
			Hippasa sp.	Wolf spider	C
		Oxyopidae	*Oxyopes birmanicus*	Brown lynxspider	C
			Oxyopes sp.	Lynx spider	U
			Peucetia viridata	Green lynx spider	U

Table 1: Continued…

SR. No.	ORDERS	FAMILIES	SCIENTIFIC NAMES	COMMON NAMES	STATUS
		Tetragnathidae	*Leucage decorata*	Decorative silver orb weaver	C
			Tetragnatha mandibulata	Common big jawed spider	C
		Eracidae	*Stegodyphous sp.*		U
		Thomicidae	*Thomisus sp.*	Crab spider	U
			Xysticus sp.	Ground crab spider	U
			Bomis sp.	Crab spider	R
		Theridiosomatidae	*Theridiosoma sp.*	Ray spider	O
		Clubionidae	*Clubiona sp.*	Leaf curling sac spider	C
		Pholcidae	*Pholcus sp.*	Cellar spider	U
			Crossopriza iyoni	Daddy long legged spider	C
		Hersillidae	*Hersillia sp.*	Two tailed spider	C
		Gnaphosidae	*Gnaphosa sp.*	Ground spider	U
		Uloboridae	*Uloborus sp.*	Garden centre spider	C
		Salticidae	*Phidipus sp.*	Jumping spider	C
			Myrmarachne sp.	Ant mimicking jumping spider	O
			Myrmarachne sp.	Ant mimicking jumping spider	U
			Rhene sp.	Jumping spider	O
			Phintella vittata	Jumping spider	U
			Plexipus paykulli	Pantropical jumping spider	C
			Plexipus petersi	Common housefly catcher spider	U
			Telamonia dimidiata	Two striped jumping spider	C
			Thyne spider	Jumping spider	U
			Asemonea sp.	Jumping spider	U
		Nephilidae	*Nephila pilipes*	Giant wood spider	C
		Sparassidae	*Olios sp.*	Green Huntsman Spider	O
			Oliops sp.	Huntsman spider	O
		Theridiidae	*Theridion sp.*	Cob web spider	C
		Oecobiidae	*Oecobius sp.*	Wall spider	C
15	Ephemeroptera	Baetidae		Mayfly	C
16	Odonata				
	(Anisoptera)	Aeshnidae	*Aeshna multicolor*	Blue darner	U
		Labellulidae	*Orthetrum Sabina*	Green marsh hawk	O
			Bradinopyga geminata	Granite ghost	C
			Diplacodes trivialis	Ground skimmer	C
			Rhyothemis variegata	Common picture wing	O
			Brachythemis contaminata	Ditch jewel	C
			Pantala flavescens	Wandering glider	C
			Trithemis festiva	Black stream glider	U
	(Zygoptera)	Coenagrionidae	*Agriocnemis pygmaea*	Pygmy dartlet	C
			Ischnura senegalensis	Senegal golden dartlet	C
			Ischnura aurora	Golden dartlet	U
			Pseudagrion rubriceps	Saffron faced blue dart	O
17	Orthoptera	Acrididae	*Phlaeola infumata*	Silent slant faced grasshopper	U
			Acrida exaltata	Short horned grasshopper	U
			Trilophidia annulata	Trilophidiaannulata grasshopper	U
			Orthuella pelidna	Slant faced grasshopper	U
			Stenocatantops splendens	Spur throated grasshopper	U
		Tetrigidae	*Tetrix subulata*	Ground hopper	C

Table 1: Continued…

SR. No.	ORDERS	FAMILIES	SCIENTIFIC NAMES	COMMON NAMES	STATUS
		Gryllidae	*Gryllodes sigillatus*	Tropical house cricket	C
			Loxoblemmus sp.	Hump nose cricket	C
		Trigonidiidae	*Dianemobius fascipes*	Dianemobius cricket	C
		Tridactylidae		Pigmy mole cricket	U
		Gryllotopidae	*Gryllotalpa orientalis*	Oriental Mole cricket	O
		Tettigoniidae	*Macroxiphus sp.*	Ant mimic cricket nymph	O
			Scudderia furcata	fork-tailed bush katydid	C
18	Phasmida	Phasmatidae	*Carausius morosus*	Stick insect	R
19	Dermeptera	Anisolabididae	*Euborella sp.*	Ringleggedearwing	U
20	Embioptera	Oligotomidae	*Oligotoma sp.*	Web – spinner	U
21	Isoptera			Alateterite	U
				Wood dwelling termites	U
22	Blattodea	Blattellidae	*Blattella germanica*	German cockroach	C
		Blattidae	*Periplaneta americana*	American cockroach	C
			Blatta orientalis	Oriental cockroach	C
23	Mantodea	Liturgusidae	*Hembertiella sp.*	Indian bark mantis	C
		Mantidae	*Schizocephala bicornis*	Indian grass mantis	O
			Hierodula grandis	Giant Indian mantis	U
		Hymenopodidae	*Creobroter sp.*	Indian flower mantis	O
		Toxotenidae	*Aethalochroa sp.*	Indian stick mantis	O
24	Phthiraptera	Pediculidae	*Pediculus humanus humanus*	Body louse	U
			Pediculus humanus capitis	Head louse	U
25	Siphonaptera	Pulicidae	*Xenopsylla sp.*	Oriental rat flea	O
26	Thysanura	Lepismatidae	*Lepisma sp.*	Silverfish	U
27	Hemiptera	Aphididae	*Sitobion sp.*	Aphids	U
		Pseudococcidae	*Phenacoccus sp.*	Cotton mealy bug	U
		Aphrophoridae		Spittlebug	U
		Cicadidae		Cicada	O
		Flatidae		Flatid hopper	U
		Pentatomidae	*Erthesina fullo*	Yellow spotted Stink bug	U
			Carbula scutellata	Shield bug	C
			Bagradahilaris	Painted bug	U
		Reduviidae	*Acanthaspis sp.*	Assassin bug	C
			Acanthaspis sp.	Assassin bug	C
			Polididus sp.	Assassin bug	C
		Coreidae	*Cletus punctiger*	Leaf footed bug	U
		Membracidae	*Otinotus oneratus*	Horned treehopper	U
		Pyrrhocoridae	*Dysdercus sp.*	Red cotton stainer	U
		Lygacidae	*Graptostethus servus*	Crusader bug	U
		Belostomatidae	*Lethocerus indicus*	Giant water bug	O
		Notonectidae	*Anisops sp.*	Back swimmer	U
		Corixidae	*Corixa sp.*	Lesser water boatman	O
		Gerridae	*Gerris sp.*	Water strider	C
		Fulgoridae	*Dichoptera sp.*	Plant hopper	O
28	Neuroptera	Crysopidae	*Crysoperla sp.*	Green lacewing	U
		Myrmeleontidae	*Palpares sp.*	Antlion	O
29	Coleoptera	Coccinellidae	*Sticholotis sp.*	Lady bird beetle	C
			Cheilomenes sp.	Lady bird beetle	U
		Scarabaeidae	*Heliocopris sp.*	Giant dung beetle	O
			Onthophagus sp.	Dung beetle	U

Table 1: Continued…

SR. No.	ORDERS	FAMILIES	SCIENTIFIC NAMES	COMMON NAMES	STATUS
			Protaeita sp.	Flower chafer	U
			Holotrichia serrata	White grub	U
		Meloidae	*Mylabris pustulata*	Orange Blister beetle	C
		Gyrinidae		Whirligig beetle	U
		Cicindelidae		Tiger beetle	U
		Carabidae		Bombardier beetle	O
			Anthia sexguttata	Six spotted ground beetle	R
		Buprestidae		Jewel beetle	U
		Cerambycidae	*Hoplocerambyx sp.*	Stem borer beetle	O
		Lampyridae	*Luciola praeusta*	Common fire fly	C
		Crysomelidae	*Aspidimorpha sanctaecrucis*	Tortoise beetle	U
			Aulacophora foveicollis	Pumpkin beetle	U
		Elateridae		Click beetle	U
		Staphylinidae	*Paederus sp.*	Rove beetle	U
		Tenebrionidae		Darkling beetle	U
			Tribolium castaneum	Red flour beetle	C
		Curculionidae	*Sitophilus sp.*	Rice weevil	C
30	Siphonaptera		*Xenopsylla sp.*	Oriental rat flea	O
31	Diptera	Muscidae	*Musca domestica*	House fly	C
		Sarcophagidae	*Sarcophaga sp.*	Flesh fly	C
		Calliphoridae	*Chrysomya sp.*	Blue bottle fly	C
		Rhiniidae	*Stomorhina sp.*	Blow fly	U
		Anthomyiidae	*Anthomyia sp.*	Anthomyid fly	U
		Syrphidae	*Episyrphus sp.*	Hover fly	U
			Lathyrophthalmus sp.	Flower fly	U
		Tephritidae	*Bactrocera sp.*	Fruit fly	C
		Dolichopodidae	*Chrysosoma sp.*	Long legged fly	C
		Drosophilidae	*Drosophila sp.*	Common fruit fly	C
		Chironomidae	*Chironomus sp.*	Non biting midge	U
		Asilidae	*Neoitamus sp.*	Robber fly	U
		Cecidomyiidae	*Procontarinia sp.*	Gall midge	C
		Tipulidae		Crane fly	U
		Psychodidae	*Clogmia sp.*	Moth fly	C
		Culicidae	*Culex sp.*	Culex mosquito	C
			Aedes sp.	Aedes mosquito	C
			Anopheles sp.	Anopheles mosquito	O
		Diopsidae	*Teleopsis sp.*	Stalked eye fly	O
		Lauxaniidae		Lauxanid fly	U
		Tabonidae	*Tabanus sp.*	Horse fly	U
32	Lepidoptera	Papilionidae	*Papilio polytes*	Common Mormon	C
			Pachliopta aristolochiae	Common rose	C
			Papilio demoleus	Lime butterfly	C
		Pieridae	*Belenois aurota*	Pioneer	U
			Cepora nerissa phryne	Common gull	U
			Ixias Marianne	White orange tip	U
			Ixias pyrene	Yellow orange tip	U
			Delias eucharis	Common jezebel	U
			Catopsilia pomona	Common emigrant	C
			Eurema hecabe	Common grass yellow	C

Table 1: Continued…

SR. No.	ORDERS	FAMILIES	SCIENTIFIC NAMES	COMMON NAMES	STATUS
		Lycaenidae	*Castalius rosimon*	Common pierrot	U
			Leptotes plinius	Zebra blue	C
			Jamides celeno	Common cerulean	C
			Catochrysops strabo	Forget me not	C
			Pseudo zizeeria maha	Pale grass blue	C
			Chilades trochylus	Grass jewel	C
			Euchrysops cnejus	Gram blue	C
		Nymphalidae	*Tirumala limniace*	Blue tiger	C
			Danaus genutia	Striped tiger	U
			Danaus chrysippus	Plain tiger	C
			Euploea core	Common crow	C
			Melanitis leda	Common evening brown	C
			Acraea terpsicore	Tawny caster	C
			Phalanta phalantha	Common leopard	U
			Neptis hylas	Common sailor	U
			Vanessa cardui	Painted lady	U
			Euthalia nais	Baronet	U
			Junonia orithiya	Blue pansy	C
			Junonia lemonias	Lemon pansy	C
			Hypolimnas bolina	Great eggfly	C
			Ypthima huebneri	Common fourring	U
		Hesperiidae	*Borbo cinnara*	Rice Swift	U
		Sphingidae	*Acherontia styx*	Lesser deaths head hawk moth	U
			Theretra alecto	Levant hunter hawk moth	U
			Daphnis nerii	Oleander hawk moth	U
			Agrius convolvuli	Convolvulus hawk moth	U
		Geometridae	*Ascotis imparata*	Giant looper moth	C
			Synchlora sp.	Emerald moth	C
		Crambidae	*Spoladea recurvalis*	Beetroot webworm moth	C
			Antigastra catalaunnalis	Sesame leaf roller moth	C
			Nymphicula blandialis		U
			Maruca vitrata	Maruca pod borer	U
			Diaphonia indica	Cucumber moth	C
			Cydalima sp.	Box tree moth	U
		Eribidae	*Uthetheisa pulchella*	Crimson speckled flunkey moth	U
			Spirama retorta	Owlet moth	O
			Amata sp.	Tiger moth	C
			Erebus macrops	Walker's Owl	U
			Eudocima materna	Spotted wing moth	U
		Noctuidae	*Chalciope mygdon*	Triangular striped moth	U
		Pyralidae	*Plodia interpunctella*	Indian meal moth	C
		Pterophoridae		Plume moth	C
		Uraniidae	*Micronia aculeata*	Microniaaculeata moth	U
		Saturniidae	*Antheraea mylitta*	Tussar silk moth	R
			Actias selene	Indian luna moth	R
33	Trichoptera			Caddis fly	U
34	Hymenoptera	Formicidae	Camponotus compressus	Giant carpenter ant	C
			Parathrechina longicornis	Long horned crazy ant	C
			Oecophylla smaragdina	Asian weaver ant	C
			Crematogaster subnuda	Acrobat ant	C

Table 1: Continued…

SR. No.	ORDERS	FAMILIES	SCIENTIFIC NAMES	COMMON NAMES	STATUS
			Monomorium pharaonis	Pharash ant	U
			Tetraponera rufonigra	Arboreal bicolor ant	C
			Tapinoma melanocephalum	Ghost ant	U
			Dorylus labiatus	Doryllus ant	U
		Crabronidae		Sand wasp	U
		Tiphiidae	Methocha sp.	Wingless ant wasp	O
		Vespidae	Ropalidia brevita	Paper wasp	C
			Ropalidia marginata	Paper wasp	C
			Delta conoideum	Potter wasp	C
			Ancistrocerus sp.	Potter wasp	U
		Ichneumonidae	Ischnojoppa luteator	Ischnojoppa wasp	U
		Sphecidae	Chalybion sp.	Blue mud dauber wasp	U
		Apidae	Apis dorsata	Giant honey bee	C
			Apis florea	Red dwarf honey bee	C
			Lisotrigona sp.	Stingless bee	U
			Xylocopa latipes	Carpenter bee	C
			Anthophora sp.	Blue banded bee	U
		Chrysididae		Cuckoo wasp	O
35	Cyprinodontiformes	Poeciliidae	Gambusia affinis	Mosquito fish	U
36	Squamata	Agamidae	Calotes versicolor	Oriental garden lizard	C
		Chamaeleonidae	Chamaeleo zeylanicus	Indian chameleon	R
		Gekkonidae	Hemidactylus brookii	Brooks house gecko	C
			Hemidactylus flaviviridis	Yellow bellied house gecko	C
			Hemidactylus leschenaultia	Bark gecko	U
		Scincidae	Eutropis carinata	Golden skink	C
			Eutropis macularia	Common skink	U
			Lygosoma lineata	Lined supple skink	O
			Lygosoma punctata	Punctate supple skink	O
		Varanidae	Varanus bangalensis	Bengal monitor lizard	R
		Typhlopidae	Indotyphlops braminus	Brahminy worm snake	U
		Boidae	Eryxconicus	Common sand boa	O
		Colubridae	Coelognathus helena helena	common trinket snake	O
			Lycodon aulicus	Common wolf snake	O
			Oligodon arnensis	Common kukri snake	O
			Ptyas mucosa	Dhaman	U
			Xenochrophis piscator	Checkerdkeelback water snake	U
		Elapidae	Bangarus caeruleus	Common krait	R
		Viperidae	Daboia russelli	Russell's viper	R
37	Anura	Bufonidae	Duttaphrynus melanostictus	Common Indian toad	C
		Mycrohylidae	Microhyla ornate	Ornate narrow mouthed frog	U
		Dicroglossidae	Euphlyctis cyanophlyctis	Skittering frog	C
			Hoplobatrachus tigerinus	Indian bull frog	U
			Sphaerotheca breviceps	Indian burrowing frog	U
		Rhacophoridae	Polypedates maculatus	Common tree frog	U
38	Pelecaniformes	Ardeidae	Bubulcus ibis	Cattle egret	U
			Ardeola grayii	Pond heron	C
			Nycticorax nicticorax	Black crown night heron	U
39	Accipitriformes	Accipitridae	Milvus migrans	Black kite	U
			Accipiter badius	Shikra	C
			Pernis ptilorhynchus	Oriental honey buzzard	U
		Falconidae	Falco tinnunculus	Common kestrel	O

Table 1: Continued…

SR. No.	ORDERS	FAMILIES	SCIENTIFIC NAMES	COMMON NAMES	STATUS
40	Gruiformes	Rallidae	Amaurornis phoenicurus	White breasted water hen	U
41	Charadriiformes	Charadriidae	Vanellus indicus	Red wattled lapwing	C
42	Columbiformes	Columbidae	Columba livia	Blue rock pigeon	C
			Treron phoenicopterus	Yellow footed green pigeon	C
			Stigmatopelia senegalensis	Laughing dove	C
43	Psittaciformes	Psittacidae	Psittacula krameri	Rose ringed parakeet	C
44	Cuculiformes	Cuculidae	Cuculus micropterus	Indian cuckoo	O
			Eudynamys scolopaceus	Asian koel	C
			Hierococcyx varius	Common hawk cuckoo	C
			Centropus sinensis	Southern coucal	C
			Clamator jacobinus	Jacobin cuckoo	O
45	Caprimulgiformes	Strigidae	Athene brama	Spotted owlet	C
		Tytonidae	Tyto alba	Barn owl	U
46	Apodiformes	Apodidae	Apus affinis	Little swift	C
47	Coraciiformes	Alcedinidae	Halcyon smyrnensis	White throated kingfisher	C
		Coraciidae	Coracias benghalensis	Indian roller	C
		Meropidae	Merops orientalis	Green bee eater	C
48	Bucerotiformes	Bucerotidae	Oxyceros birostris	Indian grey hornbill	C
		Upupidae	Upupa epops	Common hoopoe	C
49	Piciformes	Megalaimidae	Megalaima zeylanicus	Copper smith barbet	C
		Picidae	Dinopium benghalense	Black rumpedflameback	C
50	Passeriformes	Hirundinidae	Ptyonoprogne concolor	Dusky crag martin	U
		Dicruridae	Dicrurus macrocercus	Black drongo	C
		Tephrodornithidae	Tephrodornis pondicerianus	Common woodshrike	U
		Laniidae	Lanius schach	Long tailed shrike	O
		Sturnidae	Sturnia pagodarum	Brahminy starling	C
			Gracupica contra	Asian pied starling	U
			Acridotheres tristis	Common myna	C
		Corvidae	Dendrocitta vagabunda	Rufoustreepie	C
			Corvus splendens	House crow	C
		Oriolidae	Oriolus oriolus	Indian golden oriole	U
		Irenidae	Aegithina tiphia	Common iora	U
			Chloropsis jerdoni	Jerdonsleafbird	O
		Pycnonotidae	Pycnonotus cafer	Red vented bulbul	C
		Timaliidae	Turdoides caudate	Common babler	O
			Turdoides malcolmi	Jungle babler	C
		Campephagidae	Pericrocotus cinnamomeus	Small minivet	U
		Muscicapidae	Ficedula parva	Red breasted flycatcher	U
			Cyornis tickelliae	Tickells blue flycatcher	O
			Eumyias thalassinus	Verditer flycatcher	U
			Muscicapa dauurica	Asian brown flycatcher	U
			Saxicoloides fulicatus	Indian robin	C
			Copsychus saularis	Oriental magpie robin	C
		Monarchidae	Terpsiphone paradise	Indian paradise flycatcher	U
		Rhipiduridae	Rhipidura aureola	White browed fantail	C
		Cisticolidae	Prinia socialis	Ashy prinia	C
			Orthotomus sutorius	Common tailor bird	U
		Sylviidae	Sylvia curruca	Lesser white throat	U
		Phylloscopidae	Phylloscopus collybita	Common chiffchaff	O

Table 1: Continued…

SR. No.	ORDERS	FAMILIES	SCIENTIFIC NAMES	COMMON NAMES	STATUS
		Turdidae	*Geokichla citrine*	Orange headed thrush	C
		Paridae	*Parus cinereus*	Cinereous tit	C
		Motacillidae	*Motacilla cinerea*	Grey wagtail	C
			Motacilla flava	Yellow wagtail	C
			Motacilla citreola	Citrine wagtail	C
			Motacilla alba	White wagtail	U
		Zosteropidae	*Zosterops palpebrosus*	Oriental white eye	C
		Nectariniidae	*Cinnyris asiaticus*	Purple sunbird	C
			Leptocoma zeylonica	Purple rumped sunbird	C
		Passeridae	*Passer domesticus*	House sparrow	C
		Estrildidae	*Euodice malabarica*	Indian silverbill	C
51	Primates	Cercopithecidae	*Semnopithecus dussumieri*	Southern plain gray langur	O
52	Carnivora	Herpestidae	*Herpestese dwardsii*	Indian grey mongoose	C
53	Lagomorpha	Leporidae	*Lepus nigricollis*	Indian here	R
54	Eulipotyphla	Soricidae	*Suncus murinus*	Asian house shrew	C
55	Rodentia	Sciuridae	*Funambulus pennantii*	Northern palm squirrel	C
		Muridae	*Mus musculus*	House mouse	C
			Bandicota indica	Greater bandicoot rat	O
			Bandicota bengalensis	Lesser bandicoot rat	U
			Ratus ratus	Black rat	C
56	Chiroptera	Pteropodidae	*Pteropus giganteus*	Indian flying fox	C
			Cynopterus sphinx	Greater short nosed fruit bat	U
		Vespertilionidae	*Pipistrellus tenuis*	Pipistrelle bat	C

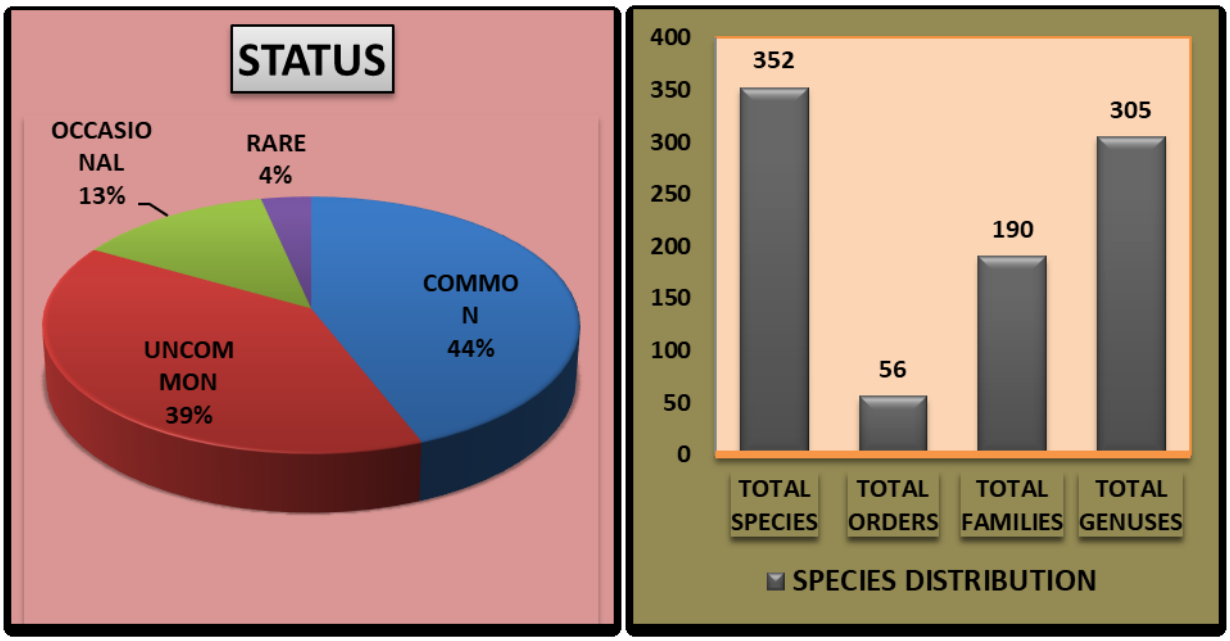

Figure 2: Status and species distribution of fauna in CSIR-NEERI campus Nagpur.

Plate 1: Record shots of faunal diversity in the NEERI Campus 1- 20: *1.Erebus macrops; 2. Spirama retorta; 3. Diphonia indica; 4. Ypthima huebneri; 5 . Belenois aurata; 6. Junonia lemonias; 7. Borbo cinnara; 8. Cletus punctiger; 9. Lepisma sp.; 10. Lisotrigona sp.; 11. Apis florea;* 12. *Chrysomya sp.; 13.* Lauxanid fly; 14. *Clogmia sp.; 15. Tabanus sp.; 16. Cheilomenes sp.* Larva; 17. *Hembertiella; 18. Hierodula grandis 19. Sitobion sp.; 20. Nephila pilipes.*

Plate 2: Record shots of faunal diversity in the NEERI Campus 21-39: *21. Hersillia sp.; 22. Olios sp.; 23. Xenochrophis piscator; 24. Barytelphusa sp.; 25. Diplacodes trivialis; 26. Bactrocera sp.* 27. Spittle bug nymph; 28. *Bomis sp. 29. Anthomyia sp.; 30. Lygosoma punctate; 31. Paederus sp.; 32. Oligotoma sp.* 33. *Dichoptera sp.; 34. Oxyopes birmanicus ; 35. Theridion sp.; 36. Acherontia styx; 37. Anthophora sp.; 38.* Cuckoo wasp; 39. *Methocha sp.*

A total 352 species were found in NEERI out of which 155 species were common (44%), 138 species were uncommon (39%), 47 species were occasional (13%) and 12 species (4%) were rarely sighted. It was observed that NEERI provides a good and healthy environment to nourish and to develop faunal diversity inside the city. The commonly encountered species like Earth worm, Giant African snail, Air breathing freshwater snail, yellow spotted millipede, orb weaver spider, Wolf spider, brown lynx spider, daddy long leg spider, jumping spider, Ground skimmer, Ditch jewel, German cockroach, American cockroach, House fly, Moth fly, Aedes mosquito, lime butterfly, common grass yellow, lemon pansy, Asian weaver ant, yellow bellied house gecko, common Indian toad, blue rock pigeon, red vented bulbul, Indian grey mongoose and black rat.

Some important and rare sightings of fauna were stick insect, six spotted ground beetle, Indian luna moth, Indian chameleon, Bengal monitor lizard and Indian hare. During monsoon mostly sighted species include earth worm, rusty millipede, yellow spotted millipede, fresh water crab, air breathing freshwater snail, Aedes mosquito, giant African snail, common garden slug, common Indian toad and Indian skipper frog. While common species found in the houses of NEERI colonies like house fly, moth fly, Aedes mosquito, tropical house cricket, American cockroach, Daddy long leg spider, Uloborus spider, yellow bellied house gecko and *plexipus paykulli* spider. Among this some poisonous and venomous fauna viz. rove beetle, giant water bug, Bombardier beetles, paper and potter wasps, giant honey bee, centipede, giant forest scorpions, common krait and Russell's viper were found.

In Annelids, earthworm was mostly sighted during rainy and winter seasons. they were found abundantly on the road while in late winter they were also sighted on the road. In Arachnids daddy long leg, *Plexipus paykulli*, Uloborus. Spider, *Phintella vittata*, lynx spider and two tailed spider were sighted every season as common spiders. Giant wood spider was seen beside the road of NEERI institute. Throughout the winter season they prepared huge webs nearly 7 to 10 feet's tall.

Phylum Mollusk consists of red rimmed melania which is a fresh water snail most commonly seen in the river but it was also sighted in the nallah which comes from pump house of NEERI, it was seen that this species came inside NEERI during sand transportation for the construction propose of buildings.

In the order Orthoptera most of species were observed in playing ground of NEERI colony, it provides a good and healthy grassland ecosystem to developed and nourish them. The most common species sighted were ground hopper, humped nosed cricket, tropical house cricket and dianemobius cricket. In Blattodea American cockroach and oriental cockroach were observed near residential area as well in the office premises, while German cockroach was mostly seen on the ground in night prior throughout every part of NEERI. In Hemipterans cicada was seen during summer season on and near teak plants, a spittle bug mostly found on the grasses in the NEERI playground, the nymph of spittle bug sighted during late monsoon to winter and prepared frothy spittle to cover them as a protection on the grass leaf. In Neuropterans green lacewing sighted on small bushes and shrubs sometimes it observed inside the light while a antlion larva mostly seen during summer, it prepares a pit to trap ants sometimes we observed they throw soil to trap ants into the pit after trapping ant antlion goes under ground to eat the trapped ant, their adult found on the small bushes and sometimes comes near light during night. In Coleopterans back swimmer, lesser water boatman and water strider seen in ponds near pump house of NEERI. Rove beetle was commonly seen during rainy season on NEERI playing ground and in summer it was observed in the children's garden.

In Dipterans robber fly sighted woody and dense plantation area inside institute most of the time we observed it feeds on the other fly maximum feeds on house fly. A gall midge larval infection mostly sighted on the *Alstonia scholaris* and *Ficus racemosa* trees. The moth fly is a small fly frequently sighted in each and every bathrooms and toilet in NEERI colony. In Hymenopterans Asian weaver ants mostly observed on the field they frequently visited near big trees, we found that they prepare their nests using leaves of the trees in which they reside and stitches the leaves using a type of saliva secreted from their mouthparts.

In Squamata oriental garden lizard is very commonly visited of all lizards they were sighted to feed on the beetles and flies. Among geckos the yellow bellied house gecko were commonly found in each and every building in NEERI, it was observed that sighting of this species mostly during summer, monsoon to early winter and hibernate during late winter. In the skink a common skink abundantly seen near leaf litters on ground, it was beastly seen during morning hours when they bask. In snake's brahminy worm snake were found during rainy

season, it may be confused with the worm because of their shape and size which is very similar to the structure of the worm. The checkered keel back water snake frequently observed near pump house during every season, Among Anurans common toad were dominant species found every were frequently seen during night time, while common tree frogs sighted most of the time inside a bathrooms on the wall. Among Aves rock pigeon dominantly visited they prepare their nest near to windows of NEERI institute and jungle babler were found to be more dominant species in the groups they search leaf litters and feeds on insect which hides inside it. Orange headed thrush was found to feed on the earth worm which were collected from leaf litters and nallah. Yellow wattled lapwing observed only on the NEERI playing ground. In Carnivore Indian grey mongoose common and dominant species found everywhere inside the NEERI. Indian hare observed on the road very rarely inside NEERI institute during evening and night prior especially in summer season. In Rodent northern palm squirrel abundantly sighted each and every part of NEERI. Some of the record shots are described below (Plate 1).

CONCLUSION

The observation showed that the faunal diversity of NEERI is rich. A total 352 species belongs to 56 orders, 190 families, and 305 genus were recorded. This study and observation creates a base-line data for the faunal diversity in the NEERI. This is a preliminary documentation and a further observations and study is needed to investigate the faunal diversity of NEERI by the addition of some new species of fauna, density, population, threats and conservation strategies to protect the fauna of NEERI.

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