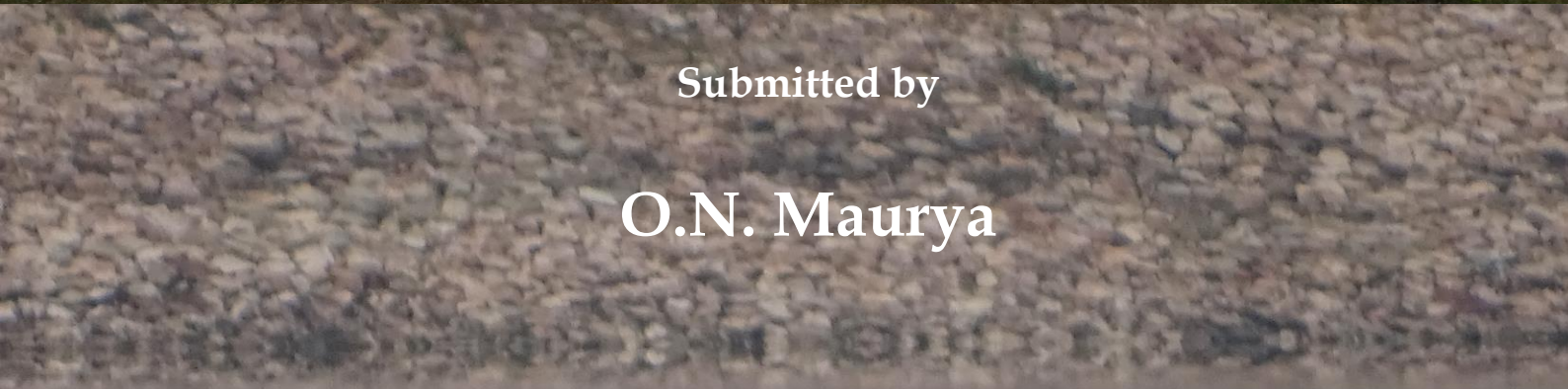




# Indicative Flora of Eco-Sensitive Zone of Nagi Dam Bird Sanctuary, Jamui district, Bihar

Submitted by

**O.N. Maurya**



Central National Herbarium  
Botanical Survey of India, Howrah



2019

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OF NAGI DAM BIRD SANCTUARY,  
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**O.N. Maurya**

## 1. INTRODUCTION

### *1.1 Nagi Dam Bird Sanctuary*

The Nagi Dam Bird Sanctuary situated in the Jamui district of Bihar and lies in between latitude N 24.49' and longitude E 86.23' & E 86.24' (**Map 1**). A dam was built on the river Nagi for the storage of flowing water caused by Nagi River and its tributaries during rainy season. The dam is spread over an area of 2.0957 square kilometres. The main purpose of the dam was to conserve and sustain the use of water resource and provide irrigation in surrounding area. It is also conserving soil in catchment areas. This sanctuary with the water body of the reservoir and surrounding tract is the habitat of many important migratory and resident bird species including the Bar-headed goose, Lalsar, Brahmny duck, Snake bird, Cormorant, Open Bill Stork, Hoopoe, White breasted kingfisher, Pied kingfisher, Red-vented bulbul and Grey horn bill, Barn owl, Falcon, Ibis.

### *1.2 The Eco-sensitive Zone*

It is necessary to conserve and protect the area around the protected area of the Nagi Dam Bird Sanctuary. Keeping this point in view, an Eco-sensitive Zone from ecological and environmental point of view was declared under sub-section and clauses (v) and (xiv) of sub-section (2) and sub-section (3) of section 3 of the Environment (Protection) Act, 1986 (29 of 1986) read with sub-rule (3) of rule 5 of the Environment (Protection) Rules, 1986, the Central Government hereby notified an area with an extent up to 500 meter around the boundary of Nagi Dam Bird Sanctuary in the State of Bihar as the Nagi Dam Bird Sanctuary Eco-sensitive Zone (herein after referred to as the Eco-sensitive Zone). Further, The National Wildlife Action Plan, 2002-2016 indicates that "Area outside the protected area network are often vital ecological corridor links and must be protected to prevent isolation of fragments of biodiversity which will not survive in the long run. Land and water use policies will need

to accept the imperative of strictly protecting ecologically fragile habitats and regulating use elsewhere" (<http://www.moef.gov.in>).

### 1.3 The Boundary of Eco-Sensitive Zone and Villages

The Eco-Sensitive Zone is about 21.40 square kilometres around the boundary of the Nagi Dam Bird Sanctuary with an extent up to 500 meter. A total of 4 villages are situated inside the Eco-sensitive Zone: Tola Barajor (Area of village 1401 Ha), Tola Karma (Area of village 206 Ha), Tola Tarakura (Area of village 379 Ha), Tola Harhanja (Area of village 364 Ha).

**Table 1: Locations of marked points on periphery of Eco-sensitive Zone  
MAP of Nagi Dam Bird Sanctuary**

<b>Id</b>	<b>GPS</b>	<b>Id</b>	<b>GPS</b>
1.	24° 50' 0.773" N 86° 24' 46.312" E	22.	24° 47' 10.188" N 86° 22' 26.900" E
2.	24° 49' 20.404" N 86° 25' 0.989" E	23.	24° 47' 18.857" N 86° 22' 4.368" E
3.	24° 49' 29.938" N 86° 25' 15.949" E	24.	24° 47' 17.264" N 86° 21' 48.063" E
4.	24° 49' 41.097" N 86° 25' 31.124" E	25.	24° 47' 34.050" N 86° 21' 39.535" E
5.	24° 49' 32.400" N 86° 25' 41.394" E	26.	24° 47' 54.508" N 86° 21' 32.572" E
6.	24° 49' 29.175" N 86° 26' 1.638" E	27.	24° 47' 58.880" N 86° 21' 46.938" E
7.	24° 49' 13.795" N 86° 25' 57.791" E	28.	24° 48' 32.665" N 86° 21' 49.837" E
8.	24° 49' 0.220" N 86° 25' 55.232" E	29.	24° 48' 43.389" N 86° 21' 45.901" E
9.	24° 48' 33.736" N 86° 25' 43.380" E	30.	24° 48' 43.389" N 86° 21' 45.901" E
10.	24° 48' 28.937" N 86° 25' 11.262" E	31.	24° 48' 42.416" N 86° 22' 31.710" E
11.	24° 48' 40.318" N 86° 24' 51.771" E	32.	24° 48' 50.020" N 86° 22' 58.149" E
12.	24° 48' 13.176" N 86° 25' 6.253" E	33.	24° 48' 55.398" N 86° 23' 17.734" E
13.	24° 47' 39.726" N 86° 25' 28.529" E	34.	24° 49' 12.232" N 86° 23' 25.339" E
14.	24° 47' 5.817" N 86° 25' 15.058" E	35.	24° 49' 19.984" N 86° 23' 12.591" E
15.	24° 47' 14.015" N 86° 24' 44.712" E	36.	24° 49' 31.244" N 86° 23' 29.027" E
16.	24° 47' 19.748" N 86° 24' 55.856" E	37.	24° 49' 29.700" N 86° 23' 37.217" E
17.	24° 46' 48.463" N 86° 24' 1.060" E	38.	24° 49' 37.206" N 86° 23' 45.427" E
18.	24° 47' 7.068" N 86° 24' 9.715" E	39.	24° 49' 46.712" N 86° 23' 45.001" E
19.	24° 47' 16.840" N 86° 23' 24.594" E	40.	24° 49' 47.685" N 86° 23' 59.211" E
20.	24° 47' 3.956" N 86° 23' 0.847" E	41.	24° 49' 52.623" N 86° 24' 8.827" E
21.	24° 47' 12.553" N 86° 22' 45.825" E	42.	24° 49' 54.244" N 86° 24' 30.089" E

### 1.4 Geography

The study area is the part of Chotanagpur plateau. The small foot hills are found at some places. Some of the sources claim that the hills around the dam are the extension of Vindhya range (<https://jamui.nic.in/about-district/>). The soil is reddish and full of gravels and pebbles and found on the slopes and around river beds. At some places soil are mixture of sand and clay and such areas are under cultivation. The year can be divided in to 4 seasons, i.e. winter from middle of November to middle of March, summer from middle of March to June, and monsoon from July to September and October to middle of November are transitional months (autumn season). The hottest month is May (33°C average temperature) and coldest month is January (16°C average temperature) and the annual rainfall is 660.4 mm per year. The relative humidity varies 80%-20% depending on the season. Except monsoon, the area face less humidity and the average humidity is 48%. (<https://www.timeanddate.com/weather/india/jamui/climate>). The vegetation of the area is Tropical dry deciduous (Champion & Seth, 1968). The natural vegetation is present at few places with presence of *Boswellia serrata*, *Anogeissus latifolia*, *Madhuca longifolia*, *Ipomoea* spp., *Ziziphus jujuba*, *Datura metel*, *Achyrothrus aspera*, *Mikania micrantha*, *Lantana camara*, etc.

## 2. REVIEW OF LITERATURE

Hooker (1848) was the first botanist who had collected plants in Bihar. He was followed by Anderson (1863), who had worked on the flora of Bihar and the mountains of Parasnath. Ball (1866, 1867a, b) studied the flora of Manbhum and Hazaribagh with focused on edible plant resources of the indigenous population. Wood (1906) has published plants of Chotanagpur. Most remarkable publication was "Botany of Bihar and Orissa" by Haines (1921–1925). Mooney (1941, 1944, 1947, 1950) has explored many part of the state published many literature on addition to the flora of Bihar and Orissa,

supplement to Haines flora and collections from Chotanagpur plateau. The next milestone work was done by Singh et al. (2001) in form of 'Flora of Bihar Analysis'. There are several publications are available on the state. However, significant contributions on the flora of the surrounding areas are made by Clarke (1884), Thomson (1917), Biswas & Sampathkumaran (1949), Mukherjee (1947, 1956), Bressers (1951), Ara (1954, 1960), Bharadwaja (1958), Srivastava (1958, 1959, 1961, 1964), Panigrahi (1966), Meher-Homji (1971), Majumdar & Biswas (1971), Biswas & Maheshwari (1980), Paul (1990), Paul & Prasad (1978), Paria & Chattopadhyay (2000, 2005), Sharma and Sarkar (2001) and Ranjan (2014). However, the flora of Jamui district has been not published yet. This was the reason, the present study has been undertaken to generate a baseline data from the sanctuary and its surrounding area.

### 3. METHODOLOGY

A field tour was conducted from 15<sup>th</sup> November, 2017 to 18<sup>th</sup> November, 2017 in the the eco-sensitive zone of the Nagi Dam Bird Sanctuary (**Table 1; Map 2**). The specimens were collected from different localities to cover almost all the areas (**Map 3**). Wide range of habitats including small forest patch, degraded land, cultivated lands, orchards, ponds, and range land were explored and plants were collected in flowering and fruiting stages. The GPS locations were recorded as per provided in Gazette of India notifications and provided in **Table 1**. The plant materials were collected with the help of secateurs and the key morphological characters were documented in the field-book. All the specimens were dried inside the blotting sheets and pressed under herbarium-press. The plant species were identified with the help of relevant floras: Bentham & Hooker (1862-1883), Prain (1903), Haines (1921-1925) and Mooney (1941). Identification was also cross checked by matching voucher specimens with holdings at Central National Herbarium, Botanical Survey of India,



Howrah (CAL). The botanical names of the plant specimens were updated according to the Plant List (<http://www.theplantlist.org>).

**Table 2: Itinerary (15.11.2017 to 19.11.2017)**

S. No.	Date	Journey & area surveyed
1.	15.11.2017 to 15.11.2017	Journey by office vehicle to reach the Howrah railway station from CNH. Then, travelled by the train to reach the Jhajha railway station and used vehicle to reach Shivraj hotel, Jhajha.
2.	16.11.2017	In the morning, took taxi from Shivraj hotel, Jhajha to reach the Nagi dam and visited with the eco-sensitive zone.
3.	17.11.2017	In the morning, took taxi from Shivraj hotel, Jhajha to reach the Nagi dam and visited villages falls under eco-sensitive zones.
4.	18.11.2017 to 19.11.2017	Returned to Howrah by Train.

#### 4. FLORISTIC ANALYSIS

A total of 194 species documented in the eco-sensitive zone of Nagi Dam Bird Sanctuary (Table 2). These species are distributed in 154 genera and 57 families (Table 3; Fig. 1, 2). Out of them, 46 families, 111 genera and 153 species belong to dicotyledons and 11 families, 43 genera and 41 species belong to monocotyledons. Among the monocotyledons 85.71% are grasses and 9.5% are sedges, rests of the monocotyledons are poorly represented by members of Hydrocharitaceae (*Ottelia alismoides*), Orchidaceae (*Vanda tessellata*), Asparagaceae (*Asparagus racemosus*), Arecaceae (*Borassus flabellifer*, *Phoenix sylvestris*) and Commelinaceae (*Commelina benghalensis*, *Cyanotis axillaris*, *Murdannia spirata*), Typhaceae (*Typha angustifolia*). As for habit, it was found that 124 species were herbaceous (64%), 42 (22%) trees, 20 (10%) shrub and 8 (4%) climbers. The dominance of herbs are also observed in the Gangetic plains (Duthie, 1960). The *Mikania micrantha* and *Lantana camara* are serious threat to the natural vegetation. *Parthenium hysterophorus* is present in the area but it is not aggressive like the above two species. It may be due to *Mikania micrantha* and *Lantana camara* was introduced before *Parthenium hysterophorus* in the area therefore, given stiff competition to *Parthenium hysterophorus*.

The proportion of monocotyledons to the dicotyledons is 1:3.7 and in the Flora of Palamu district is about 1:4. The total genus to species ratio is 1:1.25. The genus-species ratio for upper Gangetic Plain is 1:2.2; 1:6 for India and 1:7 for Flora of British India (Hooker, 1904; Sharma & Sarkar, 2001) which is in conformity with the upper Gangetic plain but less than the country ratio. *Vanda tessellata* is the only orchid species recorded in the present investigation.

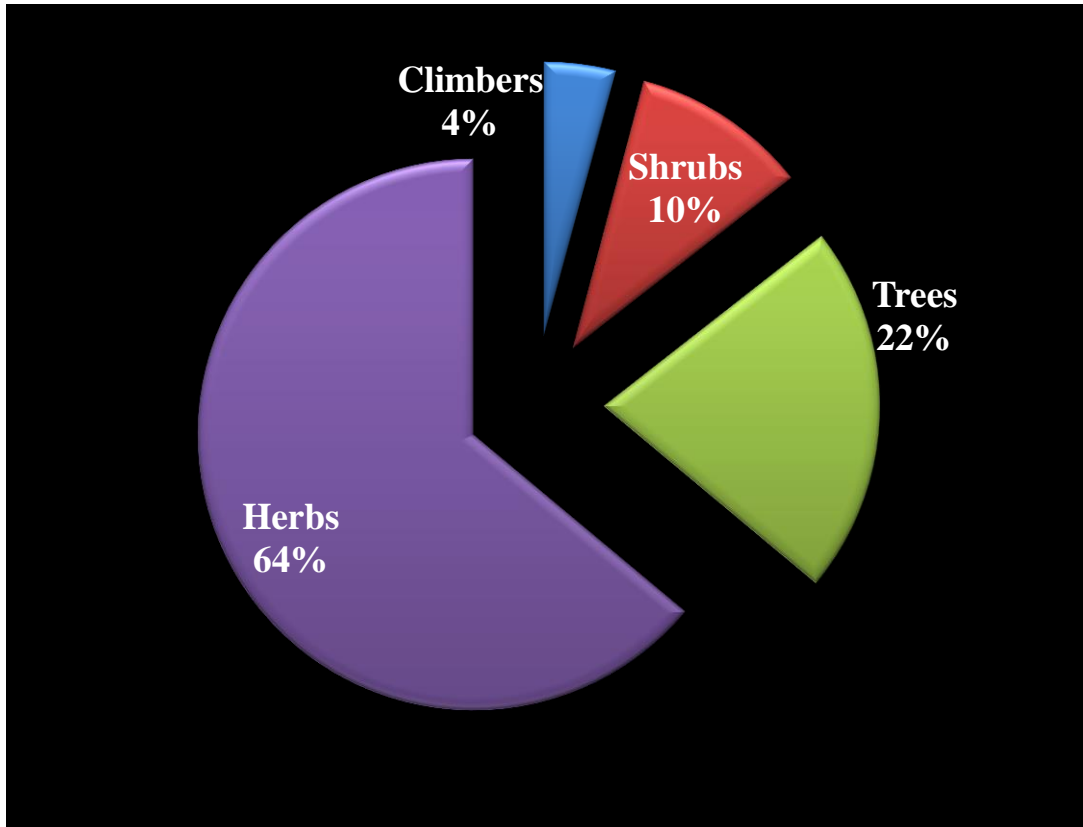


Fig. 1: Distribution in different life-forms

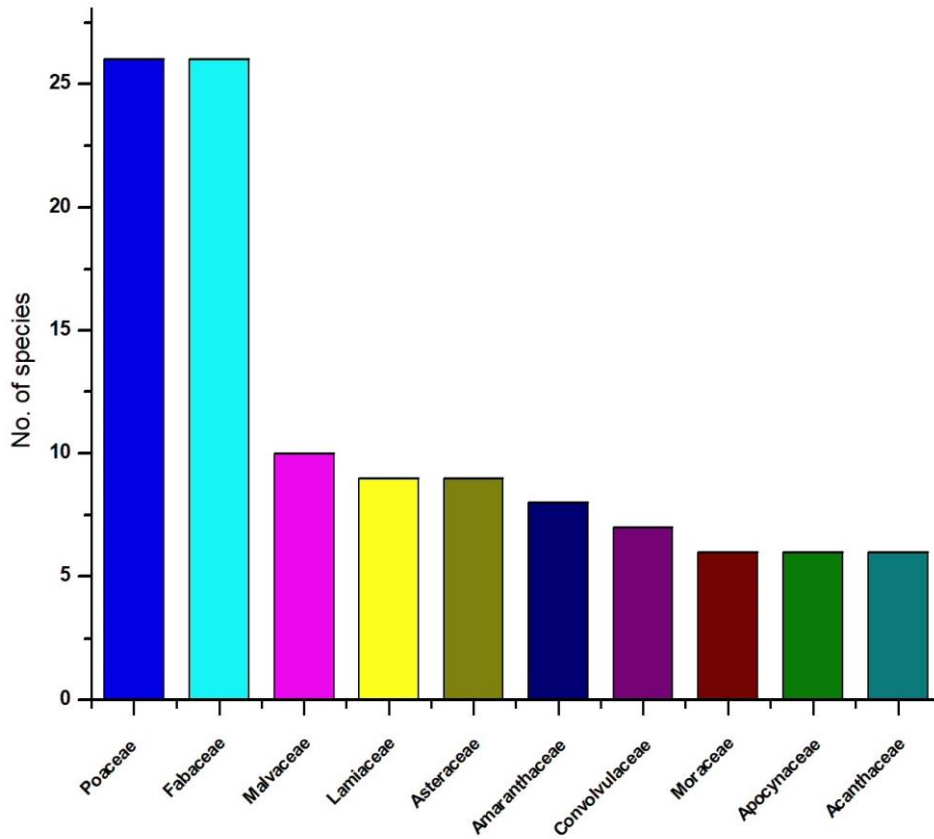


Fig 2: Family-wise distribution of species in the study area

In present survey, 13 families are represented by 5 or more members: Fabaceae & Poaceae (26 spp. each), Malvaceae (10 spp.), Lamiaceae & Asteraceae (9 spp. each), Amaranthaceae (8 spp.), Convolvulaceae (7 spp.), Moraceae, Acanthaceae & Apocynaceae (6 spp. each), Euphorbiaceae, Rubiaceae & Solanaceae (5 spp. each) (**Table 3; Fig. 1**). All together these 13 families shares 65.9% of the species diversity of the study area. Thirty three families are represented by one species, 3 families are represented by two species each, 5 families are represented by three species each and 3 families are represented by four species each. A total of 26 genus were represented by more than one species. It has been observed that the most dominating genus is *Ficus*, represented by 5 species, followed by *Ziziphus* (4 spp.), followed by 3 species each of *Euphorbia*, *Cyperus*, *Acacia*, *Indigofera*, *Ipomoea*, *Phyllanthus*, *Senna*, and *Solanum*, 16 genus are represented by 2 species each and rest of the 128 genera are represented by one species each (**Fig. 2**).

#### 4.1 Enlisting of Species

A total of 194 species of angiosperms were documented in the study area and the names of the species are enlisted as per the Angiosperm Phylogeny Group (APG IV) classifications for the orders and families of flowering plants (Chase & al., 2016):

**Table 3: Enumeration of angiosperms of eco-sensitive zone of Nagi dam Bird Sanctuary**

*APG IV family No.	Family		Species
4	Nymphaeaceae	1.	<i>Nymphaea nouchali</i> Burm.f.
28	Araceae	2.	<i>Pistia stratiotes</i> L.
32	Hydrocharitaceae	3.	<i>Ottelia alismoides</i> (L.) Pers.
45	Dioscoreaceae	4.	<i>Dioscorea alata</i> L.
61	Orchidaceae	5.	<i>Vanda tessellata</i> (Roxb.) Hook. ex G.Don
74	Asparagaceae	6.	<i>Asparagus racemosus</i> Willd.

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76	Arecaceae	7.	<i>Borassus flabellifer</i> L.
		8.	<i>Phoenix sylvestris</i> (L.) Roxb.
78	Commelinaceae	9.	<i>Commelina benghalensis</i> L.
		10.	<i>Cyanotis axillaris</i> (L.) D.Don ex Sweet
		11.	<i>Murdannia spirata</i> (L.) G.Brückn.
90	Typhaceae	12.	<i>Typha angustifolia</i> L.
94	Eriocaulaceae	13.	<i>Eriocaulon quinquangulare</i> L.
98	Cyperaceae	14.	<i>Cyperus difformis</i> L.
		15.	<i>Cyperus iria</i> L.
		16.	<i>Cyperus rotundus</i> L.
		17.	<i>Kyllinga brevifolia</i> Rottb.
103	Poaceae	18.	<i>Alloteropsis cimicina</i> (L.) Stapf
		19.	<i>Apluda mutica</i> L.
		20.	<i>Aristida adscensionis</i> L.
		21.	<i>Arthraxon lancifolius</i> (Trin.) Hochst.
		22.	<i>Arthraxon microphyllus</i> (Trin.) Hochst.
		23.	<i>Arundo donax</i> L.
		24.	<i>Bothriochloa bladhii</i> (Retz.) S.T.Blake
		25.	<i>Brachiaria reptans</i> (L.) C.A.Gardner & C.E.Hubb.
		26.	<i>Chloris virgata</i> Sw.
		27.	<i>Chrysopogon zizanioides</i> (L.) Roberty
		28.	<i>Chrysopogon lancearius</i> (Hook.f.) Haines
		29.	<i>Coix aquatica</i> Roxb.
		30.	<i>Cymbopogon martini</i> (Roxb.) W.Watson
		31.	<i>Cynodon dactylon</i> (L.) Pers.
		32.	<i>Dactyloctenium aegyptium</i> (L.) Willd.
		33.	<i>Desmostachya bipinnata</i> (L.) Stapf
		34.	<i>Digitaria sanguinalis</i> (L.) Scop.
		35.	<i>Echinochloa colona</i> (L.) Link
		36.	<i>Eleusine indica</i> (L.) Gaertn.
		37.	<i>Eragrostis cilianensis</i> (All.) Janch.
		38.	<i>Eragrostis minor</i> Host
		39.	<i>Heteropogon contortus</i> (L.) P.Beauv. ex Roem. & Schult.
		40.	<i>Panicum notatum</i> Retz.
		41.	<i>Pennisetum pedicellatum</i> Trin.
42.	<i>Saccharum spontaneum</i> L.		
43.	<i>Setaria italica</i> (L.) P.Beauv.		
106	Papaveraceae	44.	<i>Argemone mexicana</i> L.
109	Menispermaceae	45.	<i>Tinospora cordifolia</i> (Willd.) Miers

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140	Fabaceae	46.	<i>Acacia auriculiformis</i> Benth.
		47.	<i>Acacia catechu</i> (L.f.) Willd.
		48.	<i>Acacia nilotica</i> (L.) Delile
		49.	<i>Albizia lebbbeck</i> (L.) Benth.
		50.	<i>Alysicarpus monilifer</i> (L.) DC.
		51.	<i>Bauhinia purpurea</i> L.
		52.	<i>Butea monosperma</i> (Lam.) Taub.
		53.	<i>Cajanus scarabaeoides</i> (L.) Thouars
		54.	<i>Cassia fistula</i> L.
		55.	<i>Crotalaria albida</i> Roth
		56.	<i>Dalbergia lanceolaria</i> L.f.
		57.	<i>Dalbergia sissoo</i> DC.
		58.	<i>Indigofera cordifolia</i> Roth
		59.	<i>Indigofera linifolia</i> (L.f.) Retz.
		60.	<i>Indigofera tinctoria</i> L.
		61.	<i>Leucaena leucocephala</i> (Lam.) de Wit
		62.	<i>Melilotus indicus</i> (L.) All.
		63.	<i>Mimosa himalayana</i> Gamble
		64.	<i>Pithecellobium dulce</i> (Roxb.) Benth.
		65.	<i>Pongamia pinnata</i> (L.) Pierre
		66.	<i>Senna alata</i> (L.) Roxb.
67.	<i>Senna occidentalis</i> (L.) Link		
68.	<i>Senna siamea</i> (Lam.) H.S.Irwin & Barneby		
69.	<i>Senna tora</i> (L.) Roxb.		
70.	<i>Tamarindus indica</i> L.		
71.	<i>Zornia diphylla</i> (L.) Pers.		
147	Rhamnaceae	72.	<i>Ziziphus jujuba</i> Mill.
		73.	<i>Ziziphus oenopolia</i> (L.) Mill.
		74.	<i>Ziziphus rugosa</i> Lam.
		75.	<i>Ziziphus xylopyrus</i> (Retz.) Willd.
149	Cannabaceae	76.	<i>Cannabis sativa</i> L.
150	Moraceae	77.	<i>Artocarpus heterophyllus</i> Lam.
		78.	<i>Ficus benghalensis</i> L.
		79.	<i>Ficus cupulata</i> Haines
		80.	<i>Ficus racemosa</i> L.
		81.	<i>Ficus religiosa</i> L.
		82.	<i>Ficus virens</i> Aiton
163	Cucurbitaceae	83.	<i>Cephalandra indica</i> (Wight & Arn.) Naudin
		84.	<i>Coccinia grandis</i> (L.) Voigt

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		85.	<i>Cucumis melo</i> L.
171	Oxalidaceae	86.	<i>Oxalis corniculata</i> L.
200	Violaceae	87.	<i>Hybanthus enneaspermus</i> (L.) F.Muell.
207	Euphorbiaceae	88.	<i>Croton sparsiflorus</i> Morong
		89.	<i>Euphorbia hirta</i> L.
		90.	<i>Euphorbia nerifolia</i> L.
		91.	<i>Euphorbia prostrata</i> Aiton
		92.	<i>Ricinus communis</i> L.
211	Phyllanthaceae	93.	<i>Phyllanthus amarus</i> Schumach. & Thonn.
		94.	<i>Phyllanthus emblica</i> L.
		95.	<i>Phyllanthus simplex</i> Retz.
214	Combretaceae	96.	<i>Anogeissus latifolia</i> (Roxb. ex DC.) Wall. ex Guillem. & Perr.
		97.	<i>Terminalia arjuna</i> (Roxb. ex DC.) Wight & Arn.
		98.	<i>Terminalia bellirica</i> (Gaertn.) Roxb.
215	Lythraceae	99.	<i>Ammannia baccifera</i> L.
216	Onagraceae	100.	<i>Ludwigia hyssopifolia</i> (G.Don) Exell
218	Myrtaceae	101.	<i>Eucalyptus tereticornis</i> Sm.
		102.	<i>Psidium guajava</i> L.
		103.	<i>Syzygium cumini</i> (L.) Skeels
		104.	<i>Syzygium salicifolium</i> (Wight) J.Graham
238	Burseraceae	105.	<i>Boswellia serrata</i> Roxb. ex Colebr.
239	Anacardiaceae	106.	<i>Buchanania cochinchinensis</i> (Lour.) M.R.Almeida
		107.	<i>Mangifera indica</i> L.
241	Rutaceae	108.	<i>Aegle marmelos</i> (L.) Corrêa
		109.	<i>Limonia acidissima</i> Groff
		110.	<i>Murraya paniculata</i> (L.) Jack
243	Meliaceae	111.	<i>Azadirachta indica</i> A.Juss.
247	Malvaceae	112.	<i>Abutilon indicum</i> (L.) Sweet
		113.	<i>Corchorus aestuans</i> L.
		114.	<i>Corchorus capsularis</i> L.
		115.	<i>Hibiscus lobatus</i> (Murray) Kuntze
		116.	<i>Hibiscus vitifolius</i> L.
		117.	<i>Malva neglecta</i> Wallr.
		118.	<i>Sida acuta</i> Burm.f.
		119.	<i>Sida alba</i> L.
		120.	<i>Sterculia urens</i> Roxb.

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		121.	<i>Urena lobata</i> L.
253	Dipterocarpaceae	122.	<i>Shorea robusta</i> Gaertn.
256	Moringaceae	123.	<i>Moringa oleifera</i> Lam.
269	Cleomaceae	124.	<i>Cleome viscosa</i> L.
283	Polygonaceae	125.	<i>Polygonum plebeium</i> R.Br.
297	Amaranthaceae	126.	<i>Achyranthes aspera</i> L.
		127.	<i>Aerva lanata</i> (L.) Juss.
		128.	<i>Alternanthera sessilis</i> (L.) R.Br. ex DC.
		129.	<i>Amaranthus spinosus</i> L.
		130.	<i>Amaranthus viridis</i> L.
		131.	<i>Celosia argentea</i> L.
		132.	<i>Chenopodium album</i> L.
		133.	<i>Gomphrena celosioides</i> Mart.
304	Aizoaceae	134.	<i>Trianthema portulacastrum</i> L.
308	Nyctaginaceae	135.	<i>Boerhavia diffusa</i> L.
309	Molluginaceae	136.	<i>Glinus oppositifolius</i> (L.) Aug.DC.
312	Basellaceae	137.	<i>Basella alba</i> L.
333	Sapotaceae	138.	<i>Madhuca longifolia</i> (J.Koenig ex L.) J.F.Macbr.
334	Ebenaceae	139.	<i>Diospyros melanoxylon</i> Roxb.
335	Primulaceae	140.	<i>Anagallis arvensis</i> L.
352	Rubiaceae	141.	<i>Mitragyna parvifolia</i> (Roxb.) Korth.
		142.	<i>Neolamarckia cadamba</i> (Roxb.) Bosser
		143.	<i>Oldenlandia herbacea</i> (L.) Roxb.
		144.	<i>Spermacoce articularis</i> L.f.
		145.	<i>Spermacoce hispida</i> L.
356	Apocynaceae	146.	<i>Calotropis gigantea</i> (L.) Dryand.
		147.	<i>Calotropis procera</i> (Aiton) Dryand.
		148.	<i>Carissa carandas</i> L.
		149.	<i>Carissa spinarum</i> L.
		150.	<i>Hemidesmus indicus</i> (L.) R. Br. ex Schult.
		151.	<i>Holarrhena pubescens</i> Wall. ex G.Don
357	Boraginaceae	152.	<i>Cynoglossum wallichii</i> G.Don
359	Convolvulaceae	153.	<i>Cuscuta reflexa</i> Roxb.
		154.	<i>Evolvulus alsinoides</i> (L.) L.
		155.	<i>Evolvulus nummularius</i> (L.) L.
		156.	<i>Ipomoea aquatica</i> Forssk.
		157.	<i>Ipomoea carnea</i> Jacq.
		158.	<i>Ipomoea eriocarpa</i> R. Br.
		159.	<i>Merremia tridentata</i> (L.) Hallier f.



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360	Solanaceae	160.	<i>Datura metel</i> L.
		161.	<i>Physalis minima</i> L.
		162.	<i>Solanum americanum</i> Mill.
		163.	<i>Solanum sisymbriifolium</i> Lam.
		164.	<i>Solanum virginianum</i> L.
370	Plantaginaceae	165.	<i>Limnophila indica</i> (L.) Druce
373	Linderniaceae	166.	<i>Lindernia crustacea</i> (L.) F.Muell.
376	Pedaliaceae	167.	<i>Sesamum indicum</i> L.
377	Acanthaceae	168.	<i>Andrographis paniculata</i> (Burm.f.) Nees
		169.	<i>Barleria prionitis</i> L.
		170.	<i>Barleria strigosa</i> Willd.
		171.	<i>Dicliptera paniculata</i> (Forssk.) I.Darbysh.
		172.	<i>Justicia adhatoda</i> L.
		173.	<i>Justicia diffusa</i> Willd.
382	Verbenaceae	174.	<i>Lantana camara</i> L.
		175.	<i>Lippia alba</i> (Mill.) N.E.Br. ex Britton & P.Wilson
383	Lamiaceae	176.	<i>Anisomeles indica</i> (L.) Kuntze
		177.	<i>Clerodendrum viscosum</i> Vent.
		178.	<i>Gmelina arborea</i> Roxb.
		179.	<i>Hyptis suaveolens</i> (L.) Poit.
		180.	<i>Leonotis nepetifolia</i> (L.) R.Br.
		181.	<i>Leucas cephalotes</i> (Roth) Spreng.
		182.	<i>Ocimum americanum</i> L.
		183.	<i>Tectona grandis</i> L.f.
		184.	<i>Vitex negundo</i> L.
403	Asteraceae	185.	<i>Ageratum conyzoides</i> (L.) L.
		186.	<i>Caesulia axillaris</i> Roxb.
		187.	<i>Eupatorium odoratum</i> L.
		188.	<i>Laphangium luteoalbum</i> (L.) Tzvelev
		189.	<i>Mikania micrantha</i> Kunth
		190.	<i>Pentanema indicum</i> (L.) Ling
		191.	<i>Spilanthes acmella</i> (L.) L.
		192.	<i>Tridax procumbens</i> (L.) L.
		193.	<i>Vernonia cinerea</i> (L.) Less.
416	Apiaceae	194.	<i>Centella asiatica</i> (L.) Urb.

\* Angiosperm Phylogeny Group IV classification (Chase & al., 2016)

*4.2. Distribution of species in the families***Table 4: Distribution of species in the families**

<b>Sl. No.</b>	<b>Family</b>	<b>Species</b>
103	Poaceae	26
140	Fabaceae	26
247	Malvaceae	10
383	Lamiaceae	9
403	Asteraceae	9
297	Amaranthaceae	8
359	Convolvulaceae	7
150	Moraceae	6
356	Apocynaceae	6
377	Acanthaceae	6
207	Euphorbiaceae	5
352	Rubiaceae	5
360	Solanaceae	5
98	Cyperaceae	4
147	Rhamnaceae	4
218	Myrtaceae	4
78	Commelinaceae	3
163	Cucurbitaceae	3
211	Phyllanthaceae	3
214	Combretaceae	3
241	Rutaceae	3
76	Arecaceae	2
239	Anacardiaceae	2
382	Verbenaceae	2
4	Nymphaeaceae	1
28	Araceae	1
32	Hydrocharitaceae	1
45	Dioscoreaceae	1
61	Orchidaceae	1
74	Asparagaceae	1
90	Typhaceae	1
94	Eriocaulaceae	1
106	Papaveraceae	1
109	Menispermaceae	1
149	Cannabaceae	1
171	Oxalidaceae	1
200	Violaceae	1

Indicative Flora of Eco-Sensitive Zone of Nagi Dam Bird Sanctuary, Jamui District, Bihar

215	Lythraceae	1
216	Onagraceae	1
238	Burseraceae	1
243	Meliaceae	1
253	Dipterocarpaceae	1
256	Moringaceae	1
269	Cleomaceae	1
283	Polygonaceae	1
304	Aizoaceae	1
308	Nyctaginaceae	1
309	Molluginaceae	1
312	Basellaceae	1
333	Sapotaceae	1
334	Ebenaceae	1
335	Primulaceae	1
357	Boraginaceae	1
370	Plantaginaceae	1
373	Linderniaceae	1
376	Pedaliaceae	1
416	Apiaceae	1

4.3. Distribution of species in the genus

Table 5: Distribution of species in the genus

S. No.	Genus	Species
1.	<i>Ficus</i>	5
2.	<i>Ziziphus</i>	4
3.	<i>Acacia</i>	3
4.	<i>Cyperus</i>	3
5.	<i>Euphorbia</i>	3
6.	<i>Indigofera</i>	3
7.	<i>Ipomoea</i>	3
8.	<i>Phyllanthus</i>	3
9.	<i>Senna</i>	3
10.	<i>Solanum</i>	3
11.	<i>Amaranthus</i>	2
12.	<i>Arthraxon</i>	2
13.	<i>Barleria</i>	2
14.	<i>Calotropis</i>	2

Indicative Flora of Eco-Sensitive Zone of Nagi Dam Bird Sanctuary, Jamui District, Bihar

15.	<i>Carissa</i>	2
16.	<i>Chrysopogon</i>	2
17.	<i>Corchorus</i>	2
18.	<i>Dalbergia</i>	2
19.	<i>Eragrostis</i>	2
20.	<i>Evolvulus</i>	2
21.	<i>Hibiscus</i>	2
22.	<i>Justicia</i>	2
23.	<i>Sida</i>	2
24.	<i>Spermacoce</i>	2
25.	<i>Syzygium</i>	2
26.	<i>Terminalia</i>	2
27.	<i>Abutilon</i>	1
28.	<i>Achyranthes</i>	1
29.	<i>Aegle</i>	1
30.	<i>Aerva</i>	1
31.	<i>Ageratum</i>	1
32.	<i>Albizia</i>	1
33.	<i>Alloteropsis</i>	1
34.	<i>Alternanthera</i>	1
35.	<i>Alysicarpus</i>	1
36.	<i>Ammannia</i>	1
37.	<i>Anagallis</i>	1
38.	<i>Andrographis</i>	1
39.	<i>Anisomeles</i>	1
40.	<i>Anogeissus</i>	1
41.	<i>Apluda</i>	1
42.	<i>Argemone</i>	1
43.	<i>Aristida</i>	1
44.	<i>Artocarpus</i>	1
45.	<i>Arundo</i>	1
46.	<i>Asparagus</i>	1
47.	<i>Azadirachta</i>	1
48.	<i>Basella</i>	1
49.	<i>Bauhinia</i>	1
50.	<i>Boerhavia</i>	1

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51.	<i>Borassus</i>	1
52.	<i>Boswellia</i>	1
53.	<i>Bothriochloa</i>	1
54.	<i>Brachiaria</i>	1
55.	<i>Buchanania</i>	1
56.	<i>Butea</i>	1
57.	<i>Caesulia</i>	1
58.	<i>Cajanus</i>	1
59.	<i>Cannabis</i>	1
60.	<i>Cassia</i>	1
61.	<i>Celosia</i>	1
62.	<i>Centella</i>	1
63.	<i>Cephalandra</i>	1
64.	<i>Chenopodium</i>	1
65.	<i>Chloris</i>	1
66.	<i>Cleome</i>	1
67.	<i>Clerodendrum</i>	1
68.	<i>Coccinia</i>	1
69.	<i>Coix</i>	1
70.	<i>Commelina</i>	1
71.	<i>Crotalaria</i>	1
72.	<i>Croton</i>	1
73.	<i>Cucumis</i>	1
74.	<i>Cuscuta</i>	1
75.	<i>Cyanotis</i>	1
76.	<i>Cymbopogon</i>	1
77.	<i>Cynodon</i>	1
78.	<i>Cynoglossum</i>	1
79.	<i>Dactyloctenium</i>	1
80.	<i>Datura</i>	1
81.	<i>Desmostachya</i>	1
82.	<i>Dicliptera</i>	1
83.	<i>Digitaria</i>	1
84.	<i>Dioscorea</i>	1
85.	<i>Diospyros</i>	1
86.	<i>Echinochloa</i>	1

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87.	<i>Eleusine</i>	1
88.	<i>Eriocaulon</i>	1
89.	<i>Eucalyptus</i>	1
90.	<i>Eupatorium</i>	1
91.	<i>Glinus</i>	1
92.	<i>Gmelina</i>	1
93.	<i>Gomphrena</i>	1
94.	<i>Hemidesmus</i>	1
95.	<i>Heteropogon</i>	1
96.	<i>Holarrhena</i>	1
97.	<i>Hybanthus</i>	1
98.	<i>Hyptis</i>	1
99.	<i>Kyllinga</i>	1
100.	<i>Lantana</i>	1
101.	<i>Laphangium</i>	1
102.	<i>Leonotis</i>	1
103.	<i>Leucaena</i>	1
104.	<i>Leucas</i>	1
105.	<i>Limnophila</i>	1
106.	<i>Limonia</i>	1
107.	<i>Lindernia</i>	1
108.	<i>Lippia</i>	1
109.	<i>Ludwigia</i>	1
110.	<i>Madhuca</i>	1
111.	<i>Malva</i>	1
112.	<i>Mangifera</i>	1
113.	<i>Melilotus</i>	1
114.	<i>Merremia</i>	1
115.	<i>Mikania</i>	1
116.	<i>Mimosa</i>	1
117.	<i>Mitragyna</i>	1
118.	<i>Moringa</i>	1
119.	<i>Murdannia</i>	1
120.	<i>Murraya</i>	1
121.	<i>Neolamarckia</i>	1
122.	<i>Nymphaea</i>	1

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123.	<i>Ocimum</i>	1
124.	<i>Oldenlandia</i>	1
125.	<i>Ottelia</i>	1
126.	<i>Oxalis</i>	1
127.	<i>Panicum</i>	1
128.	<i>Pennisetum</i>	1
129.	<i>Pentanema</i>	1
130.	<i>Phoenix</i>	1
131.	<i>Physalis minima</i> L.	1
132.	<i>Pistia stratiotes</i> L.	1
133.	<i>Pithecellobium</i>	1
134.	<i>Polygonum</i>	1
135.	<i>Pongamia</i>	1
136.	<i>Psidium</i>	1
137.	<i>Ricinus</i>	1
138.	<i>Saccharum</i>	1
139.	<i>Sesamum</i>	1
140.	<i>Setaria</i>	1
141.	<i>Shorea</i>	1
142.	<i>Spilanthes</i>	1
143.	<i>Sterculia</i>	1
144.	<i>Tamarindus</i>	1
145.	<i>Tectona</i>	1
146.	<i>Tinospora</i>	1
147.	<i>Trianthema</i>	1
148.	<i>Tridax</i>	1
149.	<i>Typha</i>	1
150.	<i>Urena</i>	1
151.	<i>Vanda</i>	1
152.	<i>Vernonia</i>	1
153.	<i>Vitex</i>	1
154.	<i>Zornia</i>	1

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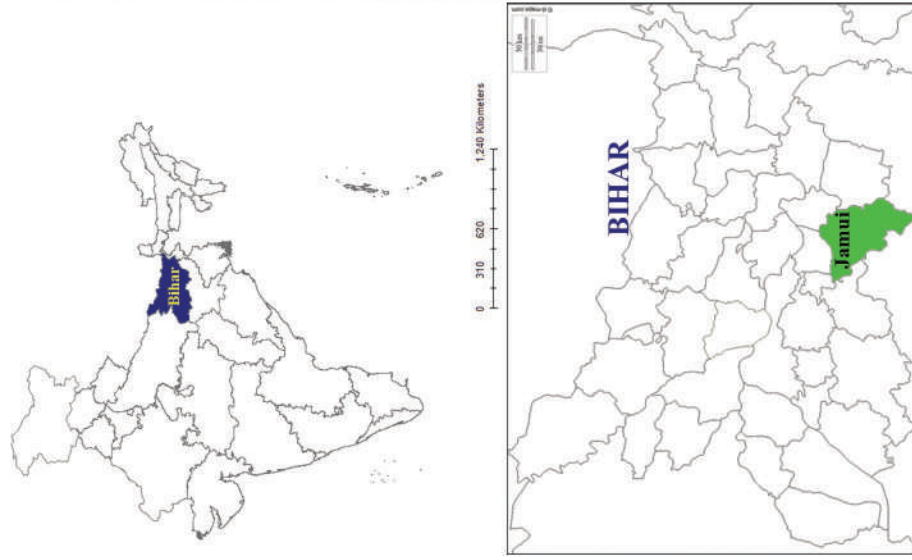
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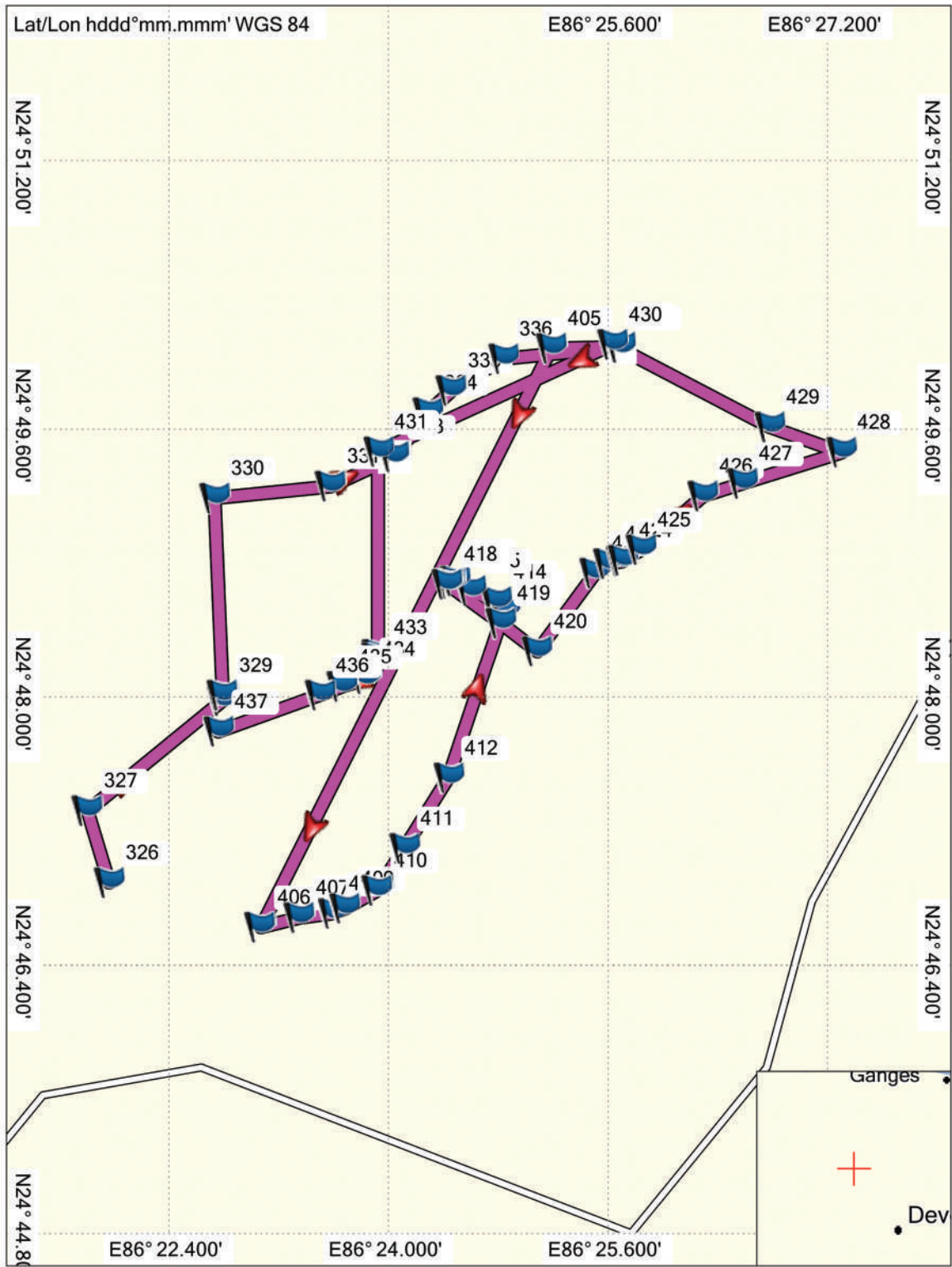
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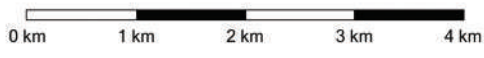


**Map 1:** Location of the Eco-Sensitive Zone (Nagi Dam Bird Sanctuary, Jamui, Bihar)

# ROUTE MAP



Trip and Waypoint Manager v5

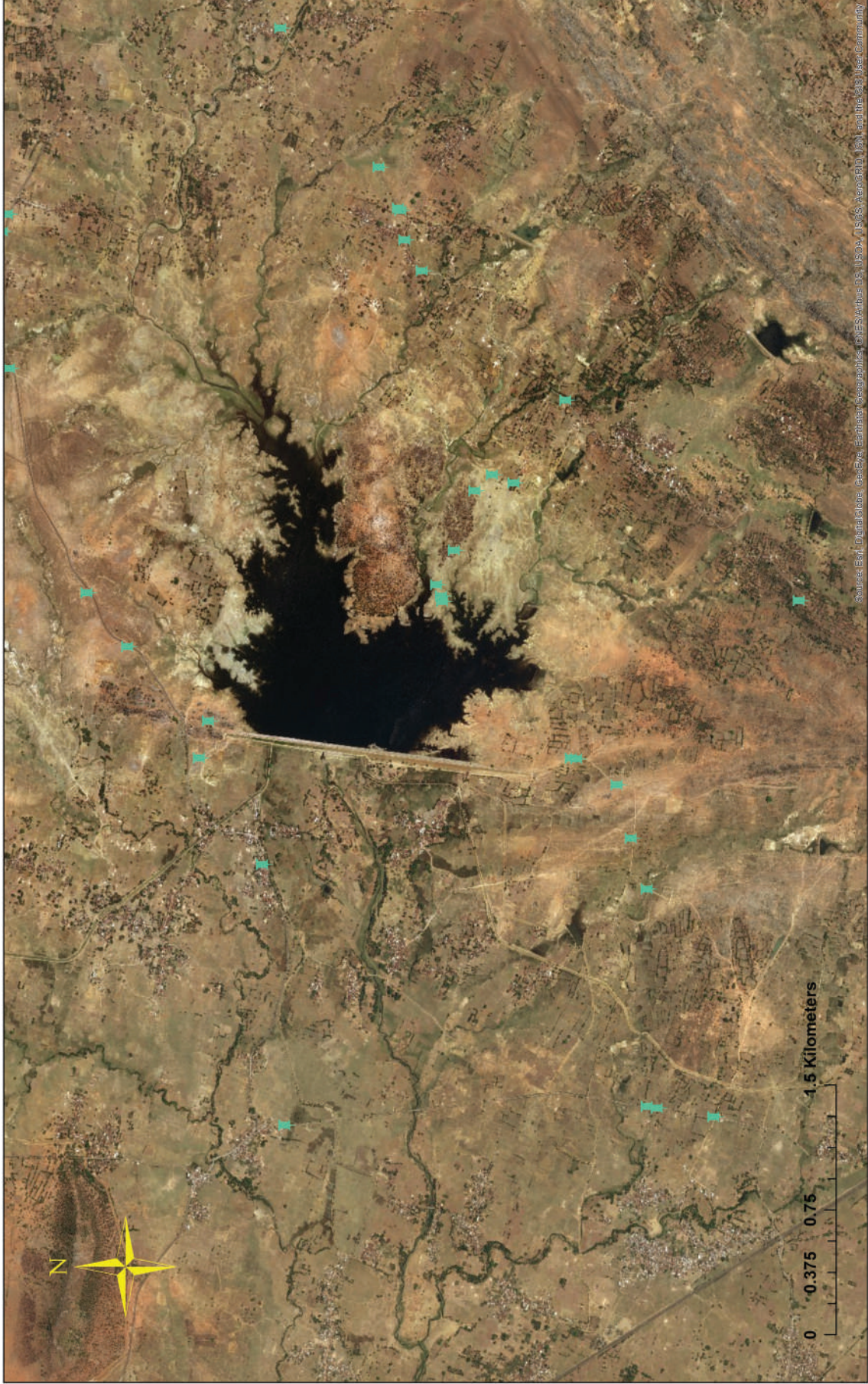


My Collection



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Map 2: Route followed during collection



**Map 3:** Collection localities of the species studied under Nagi dam Bird Sanctuary, Jamui, Bihar



a



b



c



d



e



f



g



h

Plate 1: a - h. Different habitats under the study area



Plate 2: a - h. Different habitats under the study area





Plate 3: a - h. Villages and people in the study area