

Forest types of Katarniaghat Wildlife Sanctuary- A biogeographic classification

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Abstract

The rich soils of tarai coupled with an annual precipitation over 1300 mm result in great diversity of vegetation in the WLS. The vegetation varies from dense moist tarai sal forest to large open grassland. The vegetation close to Girwa river and its tributaries is characterized by the presence of dense canebrakes. Some artificial regeneration of exotic and indigenous species has also been done in past. The Katarniaghat WLS represents the tarai-bhabhar, bio-geographic sub-division of upper Gangetic plains. As per Champion and Seth's (1962) classification the following forest types are recognized. (1) The Sal forests: which constitute 3C/C2b Moist Bhabhar Sal; 3C/C2b Moist Bhabhar Sal; 5B/C1b Dry Plains Sal. (2) The miscellaneous forests: which constitute 3/E1 *Terminalia alata* forests; 1/E1 Cane brake; 4D/SS1 Eastern Seasonal Swamp forest; 4D/SS2 *Barringtonia* Swamp Forest; 3/ISI Low Alluvial Savannah Woodland, *Bombax-Albizia*; 5B/C2 Northern Mixed Deciduous Forest; 5/E6 *Aegle* Forest; 5/IS2 Khair-sissoo Forest. (3) Grasslands: which constitute 3/ISI Low Alluvial Savannah Woodland, *Bombax-Albizia*.

Keywords:- Biogeographic classification, Forest types, Katarniaghat Wildlife Sanctuary, Bahraich

Introduction

The Katarniaghat WLS is located in the Nanpara Tehsil of district Bahraich. The Indo-Nepal border constitutes the northern boundary of the WLS. The entire area, totaling 40009.35 ha, is situated between 28°06' N and 28°24' N latitudes and 81°02' E and 81°19' E longitude. Consequent upon Govt. of U.P. notification no. 3388/14-3-32/1976 dated May 31, 1976, these forests came to be constituted as a Wildlife Sanctuary. The Sanctuary, together with the adjoining 15002.75 ha of reserve forests, which serve as buffer, constitutes one ecological unit. It is one of the few remnants of the rich and diverse tarai ecosystems, having connectivity with the Royal Bardia National Park in Nepal which lies to the north, and Dudwa National Park, which lies to the west of the Sanctuary. Katarniaghat Wildlife Sanctuary is one of the most significant representatives of highly rich, diverse and fragile tarai ecosystems, presently under threat if not zealously guarded against anthropogenic pressures. The rich soils of tarai coupled with heavy monsoon downpour result in immense floral diversity, which gives rise to a mosaic of diverse habitats. The forests of the WLS range from dense moist tarai sal forests to large open grasslands and dense canebrakes in the riverine tracts. These forests boast of some of the finest stands of sal in this bio-geographic zone. Many of the species of vegetation are of conservation importance. The whole of the area is subject to the climatic variations typical of the plains of northern India with their extremes of heat and cold. The winter nights are very cold and foggy and heavy dews fall regular, with the result that the vegetation remains damp for most of the day. The days at this time of the year are cool and bright. Frosts occur generally in January. The nights remain cool and dew falls until late in the spring, the hot weather commencing in April and lasting until the rains break towards the end of

June. Heavy monsoon rains fall from then onwards until October and give, with the winter rains, an average annual fall of about 1300 mm. The prevailing winds are from the east, but during the hot weather there are often strong west winds, and mild hurricanes from the north and west accompanied by showers. Since no study was conducted earlier to catalogue the range of biodiversity available in the same sanctuary and to conserve the known range of biodiversity with emphasis on endangered threatened and rare elementary floras the present work was undertaken to study the flora as classify the sanctuary.

Materials and Method

Regular survey was made of the forest area under study and samples were collected in separate polythene bags so as to identify the same at rest home of head quarters with the help of available floras. The herbarium was prepared as recommended by Jain and Rao, 1976 and Rao, 1989.

Results and Discussion

The rich soils of tarai coupled with an annual precipitation of over 1300 mm result in great diversity of vegetation in the WLS. The vegetation varies from dense moist tarai sal forest to large open grassland. The vegetation close to Girwa river and its tributaries is characterized by the presence of dense canebrakes. Some artificial regeneration of exotic and indigenous species has also been done in past. The Katarniaghat WLS represents the tarai-bhabhar bio-geographic sub-division of upper Gangetic plains. As per Champion and Seth's (1962) classification the following forest types are recognized (4) the Sal forests: which constitute 3C/C2b Moist Bhabhar Sal; 3C/C2b Moist Bhabhar Sal/5B/C1b Dry Plains Sal; 5B/C1b Dry Plains Sal. (5) The Miscellaneous forests: which constitute 3/E1 *Terminalia alata* forests; 1E1 Cane brake; 3/ISI Low Alluvial Savannah Woodland, *Bombax-Albizia*; 5B/C2 Northern Mixed Deciduous Forest; 5/E6 *Aegle* Forest; 5/IS2 Khair-sissoo Forest. (6) Grassland: which constitute 3/ISI Low Alluvial Savannah Woodland, *Bombax-Albizia*.

3C/C2b Moist Bhabhar Sal: Forming a fairly extensive block of forests adjoining the Nepal border in the north-east of the WLS, this type includes the best sal forests which occurs on the well drained dammar where the soil is rich and slightly sandy loam of good quality. The stocking is generally good but the crop is irregular with a smaller proportion of younger age classes except in scattered groups. Mature and over mature trees are also scattered all over the area and are more common near grassy depressions. The density varies between 03 to 08 regeneration of sal is generally inadequate. On the clayey soil, asna (*Terminalia alata*) predominates and in some places it occurs in almost pure and extensive groups. Regeneration of asna is almost absent. Mixed in the overwood is a small proportion of haldu (*Adina cordifolia*). Patal (*Stereospermum suaveolens*), kusum (*Scheuchera oleosa*) and *Ficus* species. The under wood is moderate to dense and consists of Rohini (*Mallotus philippinensis*), Jamun (*Syzygium cumini*), Asidh (*Logerstroemia parviflora*), Kari (*Milnisa velutina*) and Tendu (*Diospyros chloroxylon*) Rohini appears to be competing with sal, thus retarding natural regeneration of sal. The undergrowth consists of light grasses with bhant (*Clerodendron viscosum*), Kasraut (*Moghania brevipes*), Puchere (*Colebrookia oppositifolia*), Guturu (*Glycosmic pentaphylla*), Bhakmal (*Ardisia solanacea*) and Ban-tulsi (*Pogostemon plecentranthoides*). The common climbers are Karwanth (*Tiliacora acuminata*), Maurain (*Bauhinia vahlu*) and Gauj (*Milletia auriculata*). This type occurs in Rampurwa 1, Rampurwa 2, Nishangara 4 to 12 and Murtiha 2 to 4.

3C/C2b Moist Bhabhar Sal 5B/C1b Dry plains Sal: The forests of this type represent a transitory stage between the high level and the dry alluvial sal. These are hardly distinguishable from the surrounding moist forests except for the presence of dying trees. These forests occur in areas contiguous to the type mentioned above. Sal predominates over most of the areas with an admixture of asna in varying proportions being greatest near nalas and low lying areas. Other common species in the over wood are Haldu (*Adina cordifolia*), Padal (*Stereospermum suaveolens*), Kusum (*Schleichera oleosa*) and various species of figs. The density is extremely variable, the younger age classes are generally deficient and regeneration of sal is very poor on the whole. The underwood mostly consists of Asidh (*Lagerstroemia parviflora*), Jamun (*Syzygium cumini*), Kura (*Holarrhena antidysentrica*), Kari (*Miliusa velutina*), Amaltas (*Cassia fistula*), Bhilawa (*Semicarpus anacardium*), Sandan (*Ougenia ougeninensis*) and Rohini (*Mallotus philippinensis*). The undergrowth generally consists of Bhant (*Clerodendron viscosum*), Kasraut (*Moghania brevipes*), Morophal (*Helicteres isora*), Guturu (*Glycosmis pentaphylla*) and grasses. The common climbers are Gauj (*Milletia auriculata*) and Karwanth (*Tiliacora acuminata*). This type occurs in Rampurwa 2 to 45, Nishangara 13 and 14, Murtiha 24 and 25, Murtiha 5, 6, 10, 15 and 16.

5B/C1b Dry Plain Sal: This type occurs over much of the centre and south of the WLS, where the soil is a hard, dry and somewhat impermeable stiff loam overlying almost pure sand. The crop consists chiefly of middle aged and mature trees, while the younger age classes are generally in deficit, Sal is the main species and asna is comparatively scarce where soil and moisture conditions are still moderately favourable usually in slight depression, the stocking is good but elsewhere in open crop occurs much of growing stock having died of drought. In the driest areas the crop is xerophytic and sal is either disappearing or has disappeared and is being replaced by miscellaneous species usually Bel (*Aegle marmelos*), Tendu (*Diospyros chloroxylon*) and Haldu (*Adina cordifolia*) so that the sal areas gradually merge into purely miscellaneous forests. The over Wood consists of Bahera (*Terminalia belerica*), Haldu (*Adina cordifolia*), Padal (*Stereospermum suaveolens*), Kusum (*Schleichera oleosa*), Mahau (*Madhuca indica*) and Ficus species. In the under wood are found Asidh (*Lagerstroemia parviflora*), Jamun (*Syzygium cumini*), Kari (*Miliusa velutina*), Amaltas (*Cassia fistula*), Bhilawa (*Ougenia ougeninensis*) and Dhak (*Butea monosperma*). In more open areas there is dense undergrowth of Meethi-neem (*Murraya koenigii*), Bhant (*Clerodendron viscosum*), Kasraut (*Moghania brevipes*), Marophal (*Helicteres isora*) and Guturu (*Glycosmis pentaphylla*). The common climbers are Gauj (*Milletia auriculata*), Karwanth (*Tiliacora acuminata*), Maurain (*Bauhinia vahlu*) and Alia (*Acacia pinnata*). This type occurs in Murtiha 8, 22, 21, 19 and 16.

3/E1 Terminalia alata forest: Asna occurs throughout the sal region on heavy and wet soil, that is to say, on clayey alluvial patches, usually in small groups sometimes extending over fairly large areas. This is commonly found in Dharmapur and Nishangara ranges. Middle aged trees predominate and both the younger age classes and mature trees are generally deficient. The trees are of good height and bole form with occasional sal in the canopy. The understorey has smaller Asna and Jamun with shrubby undergrowth of Rohini, Bhant and sometimes coarse grasses.

I/E1 Cane brake: This type occurs in wet hollows on soils which are more or less permanently wet and which usually consists of fine clay very rich in humus. This type thus locally occurs in Motipur 1 to 4, 6, 8-10 along the numerous creeks and lakes and in swamps which occupy former river beds. Bent (*Calamus tenuis*) is the most common and important species. *Jamunm injur* (*Barringtonia acutangula*) and *Salix* species are also met with in this region.

4D/SSI Eastern seasonal Swamp forest/4D/SS2: Barringtonia Swamp forest: The vegetation in depressions and along nalas, which remains under water continuously for a fairly long period during the rains

comes under this category. The most common species found in such areas are Jamun, Injur, Gutel, Semal and *Salix* species. Bent and narkul also occur gregariously locally.

3/ISI Low Alluvial Savannah Woodland (*Bombax-Albizia*): This type occurs in the higher and more stable alluvial terraces which have been in existence long enough for the development of a true soil with more or less humus, floods occasionally submerge them for relatively brief periods and enrich them by a deposit of fertile silt. The soil may be porous or clayey and badly drained. The common species occurring in this type are Khair, Semal, Asidh, Haldu, Jigna, Bahera, Gutel, Jamun, Patju, aonla, Kaim, Bhilawa, Kumbhi, Kusum, Shisham, Bauhinia, Grewia and *Albizia* species. This type occurs in parts of Katarniaghat 1 to 6, Nishangara 1, Dharmapur 1 and 2, Murtiha 26, 20 and 17 and Murtiha 7, 9 and 14.

5B/C2 Northern mixed deciduous forest: In this forest type the upper canopy is formed by a mixture of trees practically all of which are deciduous during the dry season usually for several months, though some for a short period only. The upper canopy is light, the trees having relatively short boles and poor form. Most of the species also occur in the moist, deciduous forest with for better development. There is usually a thin shrubby under growth including some evergreen xerophytic species.

5/E6 Aegle forest: The type occurs as islands of varying size on stiff dry clayey soils in dry sal or inferior moist sal forests which it is said to be displacing. As the whole tract is typically higher than the surrounding areas and the river beds, the thin upper layer of loamy soil is rapidly eroded away from the edges of the dammars and stiffy dry clayey sub-soil often containing calcareous matter of manganese nodules are exposed. The bel colonizes such areas. Over considerable areas, bel is found pure of almost pure but elsewhere it is mixed with numerous exophtic species such as Tendu, Chittaina, Khair, Haldu, Jigna and Kanju. The crop is usually rather open and tree growth as a rule is stunted, although species like Haldu and Khair sometimes appears to be thriving fairly well. There is usually a light growth of grass, which in some places, notably northwest of Nishangara consists of baib. In places where continued erosion has cut through the beds of clay and exposed the lower sand, the resulting mixture has been washed down to form moist and fertile pockets of well aerated soil below the dammar which support well grown pole crops of sal often extending for some distance along sides of the ravines. Where erosion has been more recent and is still actively continuing patches of sal reproduction are becoming or have become established along the ravines owing to the exposure of a more fertile sandy alluvium underlying the beds of clay.

5/Khair-sissoo forest: This type is met within the north and east of the WLS and Dhamapur on the new sandy deposits of the rivers Girwa and Kauriala. The species occurs are Khair, largely young Jhau and Madar. Shisham and Semal are colonizing the older areas. In moister areas, however, babool replaces shisham and there is less Khair.

3/ISI Low Alluvial Savannah Woodland (*Bombax-Albizia*): This type is met with all the more stable riverine flats which are subject to occasional floods and tend to be water logged during the rainy season but which dry out during the rest of the year. The crop consists of scattered trees of the early series of normal succession on new riverian soils, almost entirely restricted to fire hardy species such as Semal, Haldu, Asidh, Jigna, Khair and Kanju standing over dense grass. Patches of shrub growth also of fire hardy species such as Ber and Karaunda are also met with the areas where this type occurs are Katarniaghat 1 to 6, Nishangara 1, Dharmapur 1 and 2, Murthia 7,9,11,15,17, 20 and 26.

The floral diversity in the WLS is immense. The present documentation indicates the presence of 95 tree species, 57 shrubs/small trees, 28 climbers and 23 species of grasses. The main tree species are Sal (*Shorea robusta*), Asna (*Terminalia alata*), Shisham (*Dalbergia sissoo*), Bel (*Aegle marmelos*), Kusum (*Scheuchera oleosa*), ficus spp. and Semal (*Bambax cieba*) etc. The main grass species occurring in the area are Kaans

(*Saccharum spontaneum*) and Moonja (*Saccharum munja*) *Calamus tenuis* is the cane found in the area.

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