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SALIENT FEATURE OF FLORISTIC OF ETAWAH DISTRICT (U.P.), INDIA

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The salient features of flora of Etawah district are presented in the communication. On the basis of scrutiny of literature as well as herbarium specimens housed at Janata Mahavidyalaya Ajitmal, Etawah (U.P.), 102 families, 340 genera and 560 species are present in the flora of Etawah district. A brief account of geographical position, topography, river system, water resources, geology and climatic conditions have been discussed in this paper.

Keywords : Flora; Salient Feature.

Introduction

The inadequate knowledge of Indian flora may be chiefly attributed to the lack of interest in teaching and research in floristic at College and University level[1]. In the same context, Santapau[2,3] had earlier suggested that the Universities should take up extensive exploration of their respective town and neighbouring areas. He strongly pleaded for creation and development of local herbaria; and recommended critical study of plants in the field, by taking small areas under study.

During last three decades a keen interest has been shown in the direction. With the result a number of floras, covering as area of a district or a part of province have been published[4-15]. Though Etawah forms the representative part of the upper Gangetic plains, yet it does not have a complete and modern flora of its own, despite contributions by several earlier workers[16-19]. It needed further exploration, particularly of the localities outside the township. Further more, the description of the flora has also to be made up to date in the light of current trends. A comprehensive floristic account of the angiosperms of the entire district would also benefit the students, teachers, research workers and other persons interested in angiospermic plants of this area.

Geographical Position - The district Etawah, which forms the south-west parts of the division Kanpur of Uttar Pradesh (India), lies in parallel between $26^0$21 and $27^0$01 N latitude and between $78^0$45 and $79^0$45 E longitude. The greater length of the district is 90.2 Kms on north-west to south east side. The narrower south-east base measures a little more than 50 Kms. The district occupies more or less uniform breadth of about 56 Kms except the stretch of the Tahsil Etawah, where it is under 34 Kms. It abruptly narrows further towards the boundary with Shikohabad. The entire district is spread over an area about 4486 Sq Kms (4367.27 Sq Kms as per revenue records). The elevation of district varies between 146.3 m and 147.7 m above the sea level. The boundary of the district is formed by the district of Farrukhabad and Mainpuri on north; Kanpur Dehat on east; Jalaun on south; and Agra, Firozabad and Bhind (Madhya Pradesh) on west.

Topography - The district is a part of upper Gangetic plain, exhibits great variability in soil texture and physiography. Geographically the district is divisible into three parts viz., (i) The northern (or Pachar) tract, (ii) The Sengar- Yamuna (or Ghar) tract, and (iii) Trans-Yamuna (or Parpatti) tract.

(I) *The Northern (or Pachar) tract :* This is north belt district lying northeast of the river Sengar comprising north part of the Tahsil Etawah, Bharthana, Auraiya and whole Bidhuna. The area chiefly consist of fertile uplands of alluvial soil. However, it includes large area as *Usar* land with high alkalinity and marshes.

Besides north banks of the river Sengar of full stretch and the Arind in Tahsil of Bidhuna seasonal rivers viz. Ahnaiya, Pura and Pandu also traverse through this tract. The rivers Sengar and Arind make their exit towards the district Kanpur Dehat from eastern boundary of the Tahsil Bidhuna.

(II) *The Sengar- Yamuna (or Ghar) tract* : It lies between the rivers Chambal and Yamuna running along the two sides of Mugal road (the National highway No. 2). The tract is slightly undulating and comprise south parts the Tahsil Etawah, Bharthana and Auraiya. Sandy loam and alluvial soil of the area with dense network of irrigational channels of lower Ganges canal make this tract most fertile and prosperous part of the Etawah district.

(III) *Trans - Yamuna (or Parpatti) tract :* The tract which lies across the river Yamuna is most heterogeneous in soil texture and physiography. The tract consists of three parts:

(a) A long narrow stretch of underrating doab land between the rivers Yamuna and Chambal.

(b) A narrow stretch of doab land between the rivers

Chambal and Kwari which is shorter than the former by about one half.

(c) A small piece trans-kwari lands sharing boundary with the districts of Bhind on South-west and Jalaun on south.

The tract comprises four types of land : The first cultivated land similar to Ghar; the second extensive and deeply ravinous stretch with scanty cover of grasses and thorny bush-wood; the third with some parts of the ravines being absolutely nude, with no plants of rich soil, which gets undulated when the river Yamuna is at flood; the forth with rich alluvial deposits on the south belt of the river Yamuna. The river Chambal as a tributary makes confluence with the Yamuna. The Yamuna becomes full of water before it moves out of the district territory, making boundary with the district Jalaun. The river Kwari which forms the territory with the district of Bhind from near the place, where the river Chambal enters into the district. After flowing for some distance it enter into the district and flows out towards west Madhogarh of the Jalaun district. Two seasonal rivers the Pandu and Sindh also present in this tract. Besides these innumerable streams, nullahs emerge from or merge into perennial and seasonal rivers.

River System and Water Resources : The river system of the district belong to main system of Yamuna (length 148 Kms) and the Chambal. The Chambal flows to a length of 74 Kms before it makes confluence with Yamuna as a tributary. The Sengar enters the district in streakly form in the Tahsil of Etawah. After some distance it gets water from another small tributary the river Sirsa. It acquires dimensions of river after some distance from the place of confluence with Sirsa. It flows about a distance of 97 Kms in the middle of the district and goes out of it towards the district Kanpur Dehat. Two perennial rivers Kwari and Arind also form minor water systems. Arind makes its appearance in the middle eastern part of Bidhuna and goes out of the district towards Kanpur Dehat, after a distance of 53 Kms. The river Kwari before entering the district forms bundary of the district with Bhind district (Madhya Pradesh). After flowing for just 40 Kms inside lower part of Auraiya Tahsil, it flows out of the district Jalaun near west Madhogarh. Three seasonal rivers viz., Sirsa - 29 Kms in the Tahsil Etawah; Pura - 48 Kms and Ahnaiya - 56 Kms both in the Tahsil of Bidhuna traverse through the land in district. Innumerable lakes, tals and nullahs further serve as natural water resources. Besides the river and lakes a network of canal belonging to lower and upper Gangetic system and numerous Tube wells also enrich the water resources of the district.

Geology : Geologically the district is generally covered by a thick layer on Indo-Gangetic alluvium of Pleistocene to sub-recent periods. This is more so in the southern part, which has alluvial deposits of the peninsular block, carried by the rivers Chambal and Yamuna. The alluvium represent a continuos and conformable series of fluyatile and sub-aerial deposit. South-west part of the district shows abundant dissemination of impure calcareous matter in form of irregular concretion *Kankar.* The formation of *'Kankar'* concretion is due to the seggregation of the alluvial deposits into lumps or cobbles. The north-eastern part of the district includes large areas under *'Usar'* land with high alkalinity.

Climatic Conditions : Etawah enjoys a delightfully cool and dry winter, a long and hot summer, and short rainy season. Besides these, there are two transition periods, one preceding to winter season and other after it.

Winter Season : It is spread over four months, from mid - November onwards. Temperature falls in December and January, the latter being the coldest month with average daily maximum and minimum temperature of 13.4^{0}C and 8.5^{0}C respectively. Towards December end or in January cold waves are often accmpanied with fog. Throughout February the temperature shows a rising trend but the climate remains pleasantly cool.

First transition period : It is of one month's duration and covers last fortnight of March and the first fortnight of April. There occurs gradual and fast increase in temperature. Towards the end of this period the temperature shoots up to limit 32.6^{0}C or some times even more.

Summer Season : From the second half of April, the temperature starts touching the high limits of 32.6^{0}C and above, and by the end of May summer acquires its peak fury with mercury occassionally touching up to 46^{0}C mark. This trend continues in June, until the monsoon breaks. The summer days are characterized by hot wind (*'Loo'*). These winds mainly blow west wardly and raise the temperature by 4.5 - 7.0^{0}C, and the mercury touches 46-48^{0}C mark. The summers are also marred with several dust storms (*'Aandhi'*), of nearly 175 Kms per hour velocity. These storms abruptly lower the temperature to some extent.

Rainy Season : With the break of monsoon, normally in second half of June, the temperature shows a steep fall of 4.5-7.0^{0}C. During July, August and half of September, which are the real rainy months, covering four-fifth of the annual and total rainy days, average daily mean temperature lies in vicinity of 30^{0}C. Towards the end of September the rainy season comes to its end.

Second transition period : After rains it comes the hot humid period of one month duration, which exists until arrival of the winter season by the second half of November. During this period in comparison to days, the night are comparatively cooler and pleasant.

Review of Literature : The publication of "Flora of British India" by Hooker[20] was followed by series of regional flora by Cook[21] for Bombay Presidency; Prian[22] for Bengal; Duthie[23] (completed by Parker and Turrill 1903-1929) for upper Gangetic plain and adjacent Siwalik and of Sub-

Himalayan tracts; Haines[24] for Bihar and Orissa; and Kanjilal *et al.*[25] for Assam.

With regard to flora of Upper Gangetic plain, Duthie could complete the flora only up to Juncaceae. Parker and Turrill took up the task and described Cyperaceae, however, the family Poaceae was still left. Several decades later Raizada and associates[9,26-28] completed Poaceae in several installments, Raizada[29] compiled addition made to the flora of upper Gangetic plain after Duthie (1903-1929) until then.

Method

The present work is based on continuous collection of plants from Etawah district. There are collections of 2000 field numbers of plant specimens of 5 years. This work aims to bring out a complete comprehensive account of the district flora and setting up a herbarium of collected plant specimens in the Botany department of Janata Mahavidyalaya Ajitmal, Etawah (U.P.) for future consultation.

Result and Discussion

On the basis of scrutiny of literature as well as herbarium specimens housed at Janata Mahavidyalaya Ajitmal, Etawah (U.P.), the flora of Etawah district comprise 560 species belonging to 340 genera and 102 families of angiosperms. The monocotyledons and dicotyledons ratio is 1 : 4.66 for families, 1 : 2.47 for genera and 1 : 2.83 for species.

The Etawah district have rich floristic vegetation. There are much variations in the number of genera and species and 102 families found during the research. The total number of the species with their respective families are Ranunculaceae, Magnoliaceae, Papaveraceae, Nelumbonaceae, Fumariaceae, Violaceae, Bixaceae, Tamaricaceae, Elatinaceae, Bombacaceae, Brassicaceae (Cruciferae), Rosaceae, Cactaceae, Apiaceae (Umbelliferae), Moringaceae, Sphenocleaceae, Plumbaginaceae, Primulaceae, Sapotaceae, Oleaceae, Salvadoraceae, Hydrophyllaceae, Cordiaceae, Cuscutaceae, Pedaliaceae, Martyniaceae, Piparaceae, Proteaceae, Loranthaceae, Pontederiaceae. Juncaceae, Typhaceae, Araceae, Butomaceae, Aponogetonaceae, Ulmaceae, Cannabinaceae, Casuarinaceae, Ceratophyllaceae, Orchidaceae, Amaryllidaceae, Eriocaulaceae : 1 species each; Annonaceae, Polygalaceae, Portulacaceae, Sterculiaceae, Zygophyllaceae, Simaroubaceae, Sapindaceae, Lentibulariaceae, Lythraceae, Ebenaceae, Orobanchaceae, Bignoniaceae, Nyctaginaceae, Hydrocharitaceae, Lemnaceae, Alismataceae, Potamoetonaceae : 2 species each; Menispermaceae, Nymphaeaceae, Rutaceae, Meliaceae, Anacardiaceae, Onagraceae, Aizoaceae, Gentianaceae, Chenopodiaceae, Liliaceae, Arecaceae (Palmae) : 3 species each; Rhamnaceae, Vitaceae, Combretaceae, Myrtaceae, Molluginaceae, Apocynaceae, Verbenaceae : 4 species each; Capparaceae; Oxalidaceae, Polygalaceae : 5 species each; Commelinaceae : 6 species; Caryophyllaceae, Cucurbitaceae, Rubiaceae, Asclepiadaceae, Solanaceae : 7 species each; Moraceae : 8 species; Boraginaceae : 9 species; Mimosaceae, Lamiaceae (Labiatae) : 10 species each; Tiliaceae, Caeslpiniaceae, Scrophulariaceae : 13 species each; Malvaceae, Convolvulaceae : 14 species each; Acanthaceae : 17 species; Amaranthaceae : 18 species; Euphorbiaceae : 20 species; Cyperaceae : 36 species; Asteraceae (Compositae) : 37 species; Febaceae : 40 species and Poaceae (Gramineae) : 73 species. Among 102 families Poaceae is the largest family.

At the time of research work the floristic vegetation of Etawah district has trees, shrubs, sedges and grasses. The grasses are dominant and are annual and biennial. Mainly terrestrial species are present in Etawah distrit but some aquatic species are also present. The smallest aquatic plant of angiosperm *Lemna purpusila* is also present. Insectivorous plants having two species *Utricularia exoleta* and *U. stellaris* are also present. Few species are parasite, namely root parasite *Dendrophthoe falcata* live on *Mangifera indica* and *Dalbergia sissoo.* Ten dominent genera are represented by their 6 or more species in the district viz. *Cyperus* : 18 species; *Fimbristylis* : 9 species; *Eragrostis* : 8 species; *Amaranathus, Cassia, Euphorbia* and *Ipomoea* : 7 species each; *Blumea, Heliotropium* and *Scirpus* : 6 species each.

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