

Diversity of Gymnosperms in Kanpur, U.P. (India)

Archana Srivastava

Botany Department, D.G. P.G. College, Kanpur

Dr. Naina Srivastava

Department of Botany D.A.V. (P.G.)
College, Dehradun

Abstract

Gymnosperm is a small but vital group of plant kingdom represented by 44 genera and 82 species in India. Most of its species occur in Himalayan region, some desert regions and southern hills in India. Gymnosperms are also grown as an ornamental plant in all parts of India. The present study deals with the distribution of Gymnosperms in Kanpur Nagar, Uttar Pradesh, India. In this study, 11 genera of 15 species belonging to 9 families are reported. Some plant species of gymnosperms are reported the first time in this area.

Key Words - Gymnosperms, Ornamental Plant, Naked seeded plants.

I. Introduction

The term gymnosperm was coined in 300 BC by Latin philosopher and botanist *Theophrastus*, which means naked seeded plants. Until 1827, Gymnosperms were presumed as a part of Angiosperms. Gymnosperms were classified in various groups under the Angiosperms according to their properties. In 1827, Robert Brown described Gymnosperms as a different group. Presently, Gymnosperms are considered a small group in plant kingdom in which 84 genera and 1026 species are known till today. A number of plants of this group are found in fossil form, while some others are considered to disappear in near future and such gymnosperms are also called living fossils. Gymnosperms are the most ancient seeded plants, which are believed to be originated about 265 million years ago during the late Palaeozoic period.

In most of the gymnosperm plants, multiplication occurs by means of vegetative reproduction only. In other words, it can be said that sexual reproduction occurs scarcely in gymnosperms and this is the reason why a number of gymnosperms are endangered to become extinct.

Gymnosperms are grown mostly as ornamental plants around the world. This has led to the high availability and great chances of survival for the gymnosperms. The present study is based on the diversity of Gymnosperms in Kanpur city.

II. Study Area

Kanpur Nagar, or simply called Kanpur is one of the most important metropolitan cities of North India. Situated at the banks of the holy Ganga in the central region of Uttar Pradesh between 25°26' N and 28°58' N longitudes and 79°31' E and 80°34' E latitudes, it is the biggest city of the state that was once also known as the Manchester of the East. The elevation of Kanpur is between 130-150 metres above the sea level. Kanpur Nagar district is surrounded by Unnao and Fatehpur districts in the east, Hamirpur district in the south, Kannauj and Kanpur Dehat districts in the west. About 40% population of the city depends upon the farming of wheat, rice and vegetables. A number of industries are also established in various industrial areas of Kanpur and hence it can also be called the city of Labourers.

III. Methodology

Frequent taxonomic field surveys were conducted out in selected areas namely Nana Rao Park Kanpur, Nana Rao Park Bithoor, ELDECO Housings, Motijheel Garden, Botanical Gardens of several institutions such as D.A.V. College, A.N.D.N.N.M. College, CSJM University, I.I.T. and N.S.I. between January to December in 2016-17. Collected information about plants was arranged and classified with their botanical names, family and popular names. The collected data was also compared with already existing literature. Photographs of identified plants and voucher specimens 2016-17 were prepared and deposited in Department of Botany, D.A.V. College, Dehradun for future references and study. All collected specimens are taxonomically identified.

IV. Results and Discussion

During the study, 15 plant species belonging to 11 genera from 9 families have been recorded (Table-1). Identified plant species were then alphabetically arranged. Out of these, all 15 plant species were found to be perennial. Cycadaceae, Pinaceae and Cupressaceae were dominant families with 3 species each. Araucariaceae were represented by 2 species, while Ephedraceae, Gentaceae, Taxaceae and Zamiaceae were among those represented by single species. All the species of gymnosperms exist throughout the year. *Zamia* and *Ephedra* are perennial under- shrubs. All other species are small or big trees. This is the first study about Gymnosperms that grow in Kanpur and adjacent areas.

Table-1
Diversity of Gymnosperms in Kanpur, U.P. (India)

S.No.	Botanical Name / Family	Common Name / Habitat	Occurrence
1.	<i>Araucaria excelsa</i> (Araucariaceae)	Perennial tree, Xerophytic in nature	Throughout Kanpur
2.	<i>Araucaria calummaris</i> (Araucariaceae)	Perennial tree, Xerophytic in nature	Throughout Kanpur
3.	<i>Cycas revoluta</i> (Cycadaceae)	Sagopalm (<i>Dharti ka phool</i>) Perennial, woody, Xerophyte	Throughout Kanpur
4.	<i>Cycas circinalis</i> (Cycadaceae)	Palm cycas Perennial, woody, Xerophyte	Botanical Gardens, D.A-V. College, Kanpur
5.	<i>Cycas siamensis</i> (Cycadaceae)	Siyam cycas Perennial, woody, Xerophyte	ELDECO Estate, Jawahar puram, Kanpur.
6.	<i>Cryptomaria japonica</i> (Taxodiaceae)	Perennial tree	Throughout all gardens
7.	<i>Ephedra foliata</i> (Ephedraceae)	<i>Soam lata</i> (Perennial undershrub)	Botanical Gardens, A.N.D.N.N.M.P.G. College Kanpur
8.	<i>Gnetum</i> (Gnetaceae)	Tree	Botanical Gardens, D.B.S. College, Kanpur
9.	<i>Cedrus deodara</i> (Pinaceae)	<i>Deodar Tree</i>	Planted in areas near Kanpur University.
10.	<i>Pinus roxburghii</i> (Pinaceae)	Chir Perennial Tree, Xerophytic	Gardens, National Sugar Institute, Kanpur
11.	<i>Pinus montana</i> (Pinaceae)	Chir Perennial tree	In home gardens of Ashok Nagar
12.	<i>Thuja orientalis</i> (Cupressaceae)	Morpankhi Perennial undershrub	Throughout Kanpur
13.	<i>Thuja plicata</i> (Cupressaceae)	Perennial undershrub	Throughout Kanpur
14.	<i>Taxus baccata</i> (Taxaceae)	Long tree	Various gardens and public places
15.	<i>Zamia pygmaea</i> (Zamiaceae)	Small undershrub	Various gardens and public places of Kanpur

The effect of different extinction probability transformations and the handling of IUCN data deficient species on the resulting ranking are investigated. The results of the study highlight the necessity of using approaches that integrate evolutionary information in conservation science. Gymnosperms are among the most endangered organisms on earth. 40% gymnosperms are at high risk of extinction, which is about twice as many as the most recent estimates for all plants. Which species should be kept at priority for conservation can be a recurrent question, but even more so in groups with such high number of threatened species such as gymnosperms.

The present study concluded that there is a great diversity of Gymnosperms in Kanpur district, Uttar Pradesh, India. Some plant species of Gymnosperm like *Gnetum*, *Ephedra* and *Cycas siamensis* are first time reported in Kanpur. The documented information also provides enough opportunities for future studies.

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