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## **Pollen calendar of some rare trees of Fergusson college campus**

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### **ABSTRACT:**

A comprehensive study of selected 32 flowering plants were monitored throughout the span of a year. The study focused on analyzing all the pollen grains under light microscope. All the basic observed morphological characters were noted down and a full length analysis of each of them have mentioned with previous records. This study notifies and gives an absolute picture about the pollen calendars being studied throughout the world in educational and industrial campuses helping us in the branch of palynotaxonomical studies.

### **INTRODUCTION:**

Palynology is a Greek word meaning "the study of scattered dust". Palynology is the study of plant pollen, spores and certain microscopic plankton organisms (collectively termed palynomorphs) in both living and fossil form by David M. Jarzen (1996). The term is used to refer to a subset of the discipline, which is defined as "the study of microscopic objects of macromolecular organic composition (i.e., compounds of carbon, hydrogen, nitrogen and oxygen), not capable of dissolution in hydrochloric or hydrofluoric acids." (W.A.S. Sarjeant, 2002). The earliest reported observations of pollen under a microscope are likely to have been in the 1640s by the English botanist Nehemiah Grew, who described pollen and the stamen, and concluded that pollen is required for sexual reproduction in flowering plants. Botanists use living pollen and spores (actuopalynology) in the study of plant relationships and evolution. Quantitative analysis of pollen began with Lennart von Post's published works. Melissopalynology is the study of pollen in honey, with the purpose of identifying the source plants used by bees in the production of honey. This is important to honey producers because honey produced by pollen and nectar from certain plants as mesquite, buckwheat, tupelo or citrus trees demand a higher price in market. Entomopalynology is the study of pollen found on the body or in the gut of insects. It is useful for determining insect feeding and migratory habits, especially as it involves economically important insects (as the boll weevil, or earwigs).

A pollen calendar is used to show the peak pollen times for different types of plant pollen, which causes allergic reactions in certain people. A pollen calendar can be a very useful tool in forensic science, because it can be used to place the month, or week, or date of death. The use of pollen for criminal investigation purposes is called "forensic palynology". Forensic palynology is the use of pollen analysis in the solving of crimes used by Crime Scene Investigators around the world.

Earlier pollen researchers include Früh (1885), who enumerated many common tree pollen types, and a considerable number of spores and herb pollen grains. There is a study of pollen samples taken from sediments of Swedish lakes by Trybom (1888).

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**MATERIAL AND METHODS:**

The selected area is Fergusson College campus which shows huge plant diversity. The specimens were kept under observation from December 2017 to December 2018. All 32 specimens are marked under the study are presented in table 1. Each one of them were monitored throughout the year. Fresh and mature flowers are collected at the time of anthesis from the field. Pollen slides for light microscopic examination were prepared using the Erdtman's acetolysis method (1952) as well as Wodehouse method (1935). The size of pollen grains were studied by the help of micrometry through the use of a calibrated light microscope.

**RESULT AND DISCUSSION:**

*Adenanthera pavonina* belongs to family Mimosaceae. Flowering season is March to June. Previous reports of number of pollen units per polyad is 8 or 12 by Guinet & Ferguson (1989).

*Ailanthus excelsa* of family Simaroubaceae, commonly known as tree of heaven, is a large deciduous tree. The flowers appear in large open clusters among the leaves towards the end of the cold season. *Alstonia scholaris* belongs to family Apocynaceae. Flowering occur from March to July, extending to August in subtropical climate. Pollen grain has perforate ornamentation and it is similar throughout the pollen grain. Length pollard axis=22

*Anogeissus latifolia* of family Combretaceae has a pollen with 3-Zonocolporate, striated. *Anogeissus latifolia* shed leaves during February to May; new leaves develop in May, then initiates the flowering. Flowers are usually available in June to September.

*Anthocephalus chinensis* of family Rubiaceae. Flowering season is June, July, August to mid-September. *Bassia latifolia* is belongs to family Sapotaceae. Flowers of *B. latifolia* appears from February to April. *Bassia longifolia* belongs to family Sapotaceae. Flowering time of this plant is March to April. *Chloroxylon swietenia* belongs to Rutaceae. The flowers are small, creamy-white, produced in panicles. *Diospyros embryopteris*, family Ebenaceae. Flowers are inconspicuous. *Elaeis guineensis* belongs to family Arecaceae. *Elaeocarpus ganitrus*, family Elaeocarpaceae. *Ehretia aspera* belongs to family Boraginaceae. *Feronia elephantum*, family Rutaceae. *Filicium decipiens* belongs to family Sapindaceae. *Gardenia latifolia*, family Rubiaceae. *Gmelina arborea* belongs to family Lamiaceae.

*Haematoxylon campechianum* is of family Fabaceae

*Holarrhena antidysenterica* belongs to family Apocynaceae and its pollen grain are 3-porate and medium sized with foveolate exine ornamentation. *Helicteres isora* belongs to family Malvaceae.

*Kleinhovia hospita* is belongs to family Malvaceae

*Lagerstroemia indicia* of family Lythraceae has pollen grain 3-Zonocolpate, subprolate (few grains syncolpate) tenuimarginate, exine thick, pollen 40×34µm diameter.

*Manilkara hexandra* is belongs to family Sapotaceae and *Mesua ferrea* belongs to Calophyllaceae. While

*Mitragyna parvifolia* belongs to Rubiaceae. *Pterospermum suberifolium* belongs to family Malvaceae.

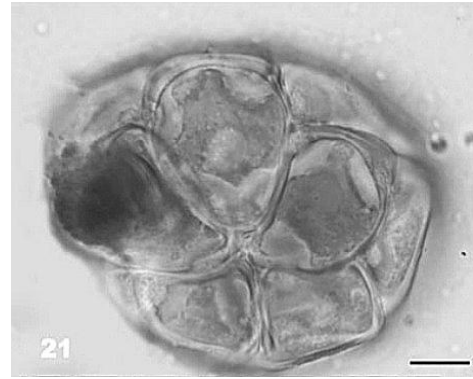
*Santalum album* belongs to family Santalaceae and *Schleichera oleosa* is of family Sapindaceae. *Serissa foetida* belongs to Rubiaceae. *Terminalia bellerica* and *Terminalia crenulata* belongs to family Combretaceae.

Table 1: List of special and rare trees on our campus.

Pollen size (µm.)	Flowering Period	Studied Specimens	S.No.
17 x 18.3	May-June	<i>Adenanthera pavonina</i>	
25 x 29	December-March	<i>Ailanthus excelsa</i>	
10 x 11.67	March-August	<i>Alstonia scholaris</i>	
16.78 x 12.1	June-September	<i>Anogeissus latifolia</i>	
19.3 x 20.2	July-September	<i>Anthocephalus chinensis</i>	
16.2 x 18.3	February-April	<i>Bassia latifolia</i>	
17.2 x 20.1	March-April	<i>Bassia longifolia</i>	
19.4 x 22.4	January-March	<i>Butea frondosa</i>	
11.2 x 13.6	October-December	<i>Chloroxylon swietenia</i>	
9.3 x 12	January-February	<i>Diospyros embryopteris</i>	
15 x 16.2	June-August	<i>Elaeis guineensis</i>	
13.4 x 15.1	April-May	<i>Elaeocarpus ganitrus</i>	
12.8 x 14.7	March-June	<i>Ehretia aspera</i>	
15.3 x 18.1	February-March	<i>Feronia elephantum</i>	
10 x 12.5	January-February	<i>Filicium decipiens</i>	
18 x 22.1	July-September	<i>Gardenia latifolia</i>	
16.9 x 18.3	February-April	<i>Gmelina arborea</i>	
11 x 13	November-February	<i>Haematoxylon campechianum</i>	
16.6 x 17	February-June	<i>Holarrhena antidysenterica</i>	
10.9 x 12	April-December	<i>Helicteres isora</i>	
26 x 28.3	January-December	<i>Kleinhovia hospita</i>	
23 x 25.2	July-September	<i>Lagerstroemia indica</i>	
13.8 x 14.3	September-December	<i>Manilkara hexandra</i>	
19.6 x 22.5	June-August	<i>Melatos philippians</i>	
12.1 x 13	March-September	<i>Mesua ferrea</i>	
22.6 x 23.4	March-August	<i>Mitragyna parvifolia</i>	
15.2 x 16.1	July-September	<i>Pterospermum suberifolium</i>	
17.3 x 18	March-April, September-October	<i>Santalum album</i>	
23.4 x 24	March-April	<i>Schleichera oleosa</i>	
13.7 x 14.1	August-December	<i>Serissa foetida</i>	
16.5 x 17.2	October-November	<i>Terminalia bellerica</i>	
10.1 x 11.9	April-May	<i>Terminalia crenulata</i>	



*Adenantha pavonina* pollen



*Lagerstroemia indicia* pollen

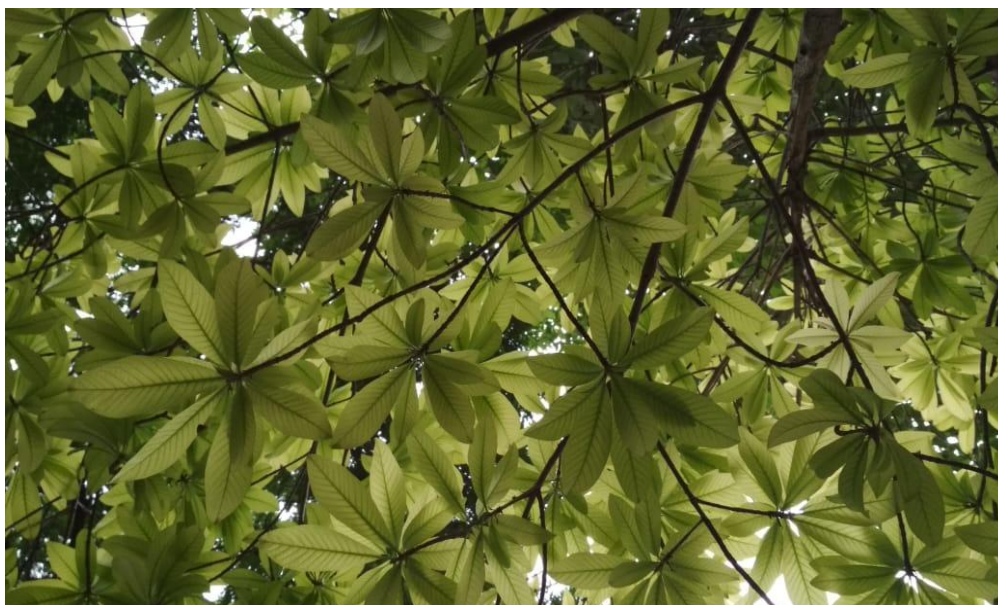


*Santalum album*



*Alstonia scholaris*





#### **CONCLUSION:**

Palynology is a useful tool in many applications, including a survey of atmospheric pollen and spore production and dispersal (aerobiology), in the study of human allergies, the archaeological excavation of shipwrecks, and detailed analysis of animal diets. Identification of pollen origin is a central aspect in pollination ecology studies. Archaeologists study pollen to learn how ancient human communities used plants, and even the seasons at which they occupied a particular site. And paleobotanists study pollen evidence to reconstruct former environments, thousands or even millions of years into the past. There are many interspecific variations seen between them. Airborne pollen spectrum of a place keeps on changing due to various biotic and abiotic factors which affect vegetation growth and phenology. Thus periodic phenological surveys and pollen morphological studies of different areas become a necessity, of pollen types of some species present in the campus of Fergusson College, Pune.

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