

## Morphological study of some dominant plant pollen grains of south Mumbai region

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### Abstract

In our present investigation pollen morphology from six species of angiosperms from South Mumbai was collected and cellular studies were carried out. In our study, pollen grains of *Turnera diffusa* (Willd. ex Schult) of the family Passifloraceae, *Vinca rosea* (L.) of the family Apocyanaceae, *Ruellia simplex* (C. Wright) of the family Acanthaceae, *Couroupita guianensis* (Aubl.) of the family Lecythidaceae, *Plumeria rubra* (L.) of the family Apocynaceae and *Zephyranthes citrina* (Baker) of the family Amaryllidaceae were studied. Shape of the pollen grains found to be mostly round, and one obclavate. Sculpture of exine wall was found to be rough, coarse, smooth and one perforated type. Aperture of the pollen grains was found to be tricolporate to multiporate. The S, M and L (small, medium and large) sized pollen grains were observed in our research.

**Keywords:** Acetocarmine, dicot and monocot plants, pollen grain, Aperture, Mumbai vegetation

### Introduction

The male reproductive cells (pollen grains) are one of the important tools for the analysis and systematic of plants. Pollen grains are of various shapes and sizes and are essential in fertilization process also. This analysis is widely recognized across the globe by taxonomists in the classification of angiosperms. The pollen grains consist of two layers that are exine and inner intine. In pollination biology, morphological characters of the pollen grains are essential in order to study the functional aspect. The exit point of the pollen grain that is aperture, serves as the main route with the outside environment. Mallick (2017) [5] had reported ten species of angiosperms from Nepal. As per Bove (1993) [1], pollen morphology of 33 species of the family Bignoniaceae shows that the pollens are monads, medium to large sized, spheroidal, sub-spheroidal, prolate and multiporate. In order to establish phylogeny pollen characters are greatly utilized. In plant taxonomy, the outer appearance of pollen grains is utilized in order to study various reproductive processes including germination. (Erdtman, 1952) [3].

In our present investigation an attempt has been made to study the symmetry, shape, apertural pattern and exine configuration as they are very conservative feature for the taxonomic assessment of the plants.

### Materials and Methods

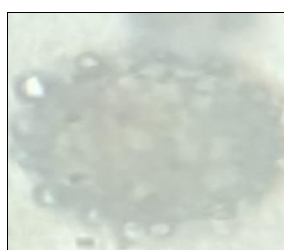
The selected flowering plants were collected from different regions of South Mumbai. The mature anthers were then kept in a sterilized petridishes. Then the pollen grains from mature anthers were kept in a clean grease free slide and then 1% of aceto-carmine stain was added and observed under compound microscope using 10x eyepiece and 40x objective magnification. Later on the photomicrographs were enlarged to suitable sizes.

### Results and Discussion

Pollen shape, pollen size, pattern of aperture and sculpture of exine are very much important in plant taxonomy and these are tabulated in Table-1. The morphological observations of presently studied taxa are given below.

**Table 1:** Characters of Pollen grains of current plants

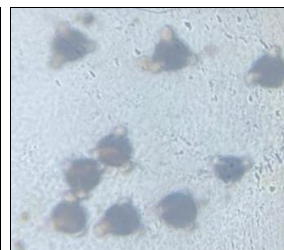
Name of Plant	Family	Sculpture of Exine	Pattern of Aperture	Size of Pollen	Shape of Pollen
<i>Turnera diffusa</i>	Passifloraceae	Rough	Tricolporate	Medium	Round
<i>Vinca rosea</i>	Apocyanaceae	Smooth	Multiporate	Medium	Round
<i>Ruellia simplex</i>	Acanthaceae	Coarse	Multiporate	Large	Round
<i>Couroupita guianensis</i>	Lecythidaceae	Smooth	Multiporate	Medium	Tetrad & Round
<i>Plumeria rubra</i>	Apocynaceae	Smooth	Multiporate	Small	Round
<i>Zephyranthes citrina</i>	Amaryllidaceae	Perforated	Multiporate	Large	Obclavate



*Ruellia simplex*



*Couroupita guianensis*



*Turnera diffusa*

*Vinca rosea**Plumeria rubra**Zephyranthes citrina*

### ***Turnera diffusa* (Willd. ex Schult)**

It is a small, deciduous, highly branched shrub, measuring between 35 and 190 cm, leaves are lance-shaped with serrated edges and measure approximately 20 and 30 mm of length; fruits are small and round and in the form of a capsule with a sweet smell and attractive yellow flowers. Pollen grains are round, medium sized with tricolporate aperture and rough exine sculpturing (Fig-c).

### ***Vinca rosea* (L.)**

This plant is found all over India but grows well in tropical and subtropical areas (like southern and north-eastern parts) of India. It does not require any particular type of soil. It grows well in light sandy soil which should be rich in humus content. *Vinca* contains two important alkaloids that is vincistrine and vinblastine, immensely used in curing cancer. Pollen grains are round, medium sized with multiporate aperture and smooth exine sculpturing (Fig-d).

### ***Ruellia simplex* (C. Wright)**

*Ruellia simplex* is an evergreen perennial plant, forming colonies of stalks with lance-shaped leaves that are 8 to 15 inches and 0.6 to 0.85 inches wide. Flowers are of trumpet shape and are of blue to purple in colour. Pollen grains are round, large sized with multiporate aperture and coarse exine sculpturing with reticulate surface pattern (Fig-a).

### ***Couroupita guianensis* (Aubl.)**

*Couroupita guianensis* also known as cannonball tree is a deciduous tree belonging to the family Lecythidaceae. It reaches height of up to 45 m. Leaves are usually 6 to 18 inches long, but can reach lengths of up to 28 inches. Pollen grains are round, medium sized with multiporate aperture and smooth exine sculpturing (Fig-b).

### ***Plumeria rubra* (L.)**

It is a deciduous plant native to Mexico and Central America, cultivated in subtropical and tropical climates worldwide and is a popular garden and park plant, as well as being used in temples and cemeteries. It grows as a spreading tree to 25–30 feet high and is flushed with fragrant flowers of shades of pink, white and yellow. Pollen grains are round, small sized with multiporate aperture and smooth exine sculpturing (Fig-e).

### ***Zephyranthes citrina* (Baker)**

It is also called as Yellow rain lily of Amaryllidaceae family. The upright flowers are lemon yellow colour, funnel-shaped ranging from from 4 to 5 cm. It grows luxuriantly in natural grasslands and gardens in the month of July after rain. On blooming, it makes the gardens yellowish in waterlogged plains. Pollen grains are obclavate, large

sized with multiporate aperture and perforated exine sculpturing (Fig-f).

Sarkar *et. al.* (2017) [6] reported that pollen morphology of taxa is extremely varied which can be correlated with the varied habit and family. In their investigation, these interesting characters can be correlated with other biosystematical characters like pollen-ovule ratio, leaf architecture, seed characteristics, cytology, chemistry, anatomy, etc. for better understanding of the intra and inter relationship of the taxa and phylogeny of the family. The studied pollen morphology of 10 species of Brassicaceae from eastern region of Saudi Arabia has been reported by Dalia (2018) [2] and found morphology of pollen grains can be useful to differentiate between species belong to the same genera. According to Mallick (2019) [4] smooth pollen grains are linked with wind or water pollination while sculptured pollen grains are associated with biotic pollination.

### **Acknowledgement**

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