



Study of the Pollen grains of some Plants found in the Nests of Common Indian Birds of Rampur District, U.P.

**Dr. Richa Pandey, Asst. Prof. Botany, Pt. Deen Dayal Upadhyay Govt. Girls' P.G. College,
Rajajipuram, Lucknow, U.P.-226017.**

E mail- richa11tripathi@gmail.com

Abstract

Pollen Morphology is a significant tool for the taxonomic study of angiosperms. It is now prominently used as a tool to study the flora or the vegetation of any area. In the present study, the floral parts of various plants found in nests of Common Indian Birds of the Rampur District, U.P. was studied from January 2004 to January 2007 and on the basis of Pollen grains analysis and Floral Studies, the plants were identified. Pollen Grains' structure, exine ornamentation, aperture, ornamentation pattern, Pollen shape, size, number, etc. were taken into account and then finally the plant species were declared and henceforth the taxonomic name was determined.

Key Words- Pollen Grain Analysis, Identification, Plants, Floral Parts, Taxonomy and Systematics, Nidification.

Introduction

Recognition of plants is possible through the flowers and Floral Parts of the plants. The Pollen grains have been extensively used for the identification and plants and the Pollen grains of any plant are typically a characteristic feature of the plant and are unique in their appearance, shape, size and number and are hence used as a taxonomic tool or an identifying feature in Taxonomy and Systematics.(Nair,P.K. 1970). The Scope for the application of Pollen Morphological Characters in Plant Taxonomy is very wide due to their Taxon Constant but much variable Characteristics (Moore et.al. 1991). Since the pollen grains have Exine which have Sporopollenin, their Exine Characters remain Unchanged for millions of years and are hence used for the

identification and Nomenclature of Plants. Various Morphological and Exine Characters like Symmetry, Shape, Size, Aperture and Pattern and position of apertures, exine ornamentation and Configuration are very important features that remain conserved for long time and serve as best assistive tools for the taxonomic assessment of Plants.

Materials & Methodology-

Samples of Plant Nests made by various common Indian Birds in the Rampur District were hunted and collected. The Nests were systematically searched for in the surrounding vegetation with approximately constant effort from about middle of January 2004 until the end of January 2007. Nest contents were inspected after every 14-15 days to determine the fate. All nests that failed from reasons other than predation (inclement weather, disturbance by forestry or agriculture or by Anthropogenic reasons) were excluded from the analysis. Various successive visits to each individual nest were at the different times of the day.

The various floral parts, flowers and reproductive parts if any, in the nests' were separated out, sun dried and preserved in Formalin or FAA. Next, the materials in the nest were segregated into plant and synthetic materials. Still further, the plant materials were sorted into flowers, stems, leaves, etc. They were collected together and finally fixed and preserved in FAA.

The Study area included the following localities were considered for the collection.

- Nagaliya Akil, Rampur(28°53'45"N to 75°5'15"E), West U.P.
- Rampur City(25°45'N to 79°29'E), West U.P.
- Swar, Rampur(28°48'N to 79°10'E), West U.P.
- Kesarpur, Rampur(25°45'N to 79°29'E), West U.P.

In the next step , the floral parts were studied and taxonomically identified if possible on the basis of morphology and physical features. The next step was to list the names and families of plants and their plant parts used by various bird species of investigation for nest construction. For further confirmation of species, the Pollen grain Analysis or Pollen Study was carried out through Acetolysis Method as stated in Erdtman 1952.

The Study of the Flowers and the Pollen grains was carried out as follows:-

The pollen grains from the flowers were isolated and treated with 90% Alcohol. They were next stained and mounted in Safranin Jelly.(Stuessy, TF.; 1990).The identification of Pollen and Spores were largely made with the help of reference slides of pollen grains of local plant materials and also those prepared by Erdtman(1943) and sealed as given by Muller(1950). Wherever necessary, the identification was also made on the basis of comparisons with available publications and illustrations. In some cases of Pollen grains of Asteraceae and Gramineae, it was not possible to name

the genera and they were identified only upto the family level on the basis of their general resemblances to certain genera like *Aster*, etc. Shapes of Pollen grains have been determined according to Erdtman (1952), Erdtman G.; (1969). After the pollen grains were mounted in Glycerin- Safranin Jelly, the microphotographs of Pollen were taken and identification of Pollen Types was done with the help of Plant Flora or Taxa Flora of the local region and the reference slides prepared from the local floras well as from the published references of the past. The measurement unit of the pollen grains was Millimicrons (μm).

This step was followed by Photography (Sony Digital Camera-Model No.DSC.T70 was used) and Visual examination of nests, noting down of the surrounding vegetation and next, the behaviour of the bird was studied from mating, hatching, brooding of the eggs to raising their chicks into the young ones. Important events in the life of the bird was studied and noted down and later the samples were tallied or compared with the laboratory specimens and plants for further studies.

Observation and Discussion-

It is but natural for any bird to have collected the plants for nest making from the nearby surroundings. Very rarely is it found that the birds would have visited remote areas to collect the plants. However, preferences for the plants had been observed within birds for nidification or the nest making procedure. The same went for preferences of Floral Parts and Flowers in some birds.

The following pollen grains were observed in the nests of 5 Common Indian Bird species-

1. *Aethopyga siparaja* Tickell.(Sunbird).
2. *Passer domesticus* L.(House Sparrow).
3. *Pycnonotus cafer*.L.(Red Vented Bulbul).
4. *Bubulcus ibis* L.(Cattle egret).
5. *Acridotheres tristis* L.(Myna).

The pollen grains of *Psidium guajava* are oblate or sphaeroidal, they belong to Myrtaceae family, aperture is tricolporate, flower in between April- September, of 18-20 μm length and has triangular obtuse plane polar outline with psilate ornamentation.(Fig.1A).

The pollen grains of *Acacia nilotica* L. are Sphaeroidal or circular in shape, they belong to Fabaceae family, they have Polyads and Flower from August – February. They are 47-50 µm long, have circular polar outline and faintly Foveolate in Surface pattern or ornamentation. (Fig.1B).

The pollen grains of *Moringa oleifera* Lam., belonging to Family Moringaceae, have perprolate shape, tricolporate aperture, flower from February –June, is 30-31 µm long with triangular obtuse convex to circular polar outline and have psilate ornamentation (Fig.1C).

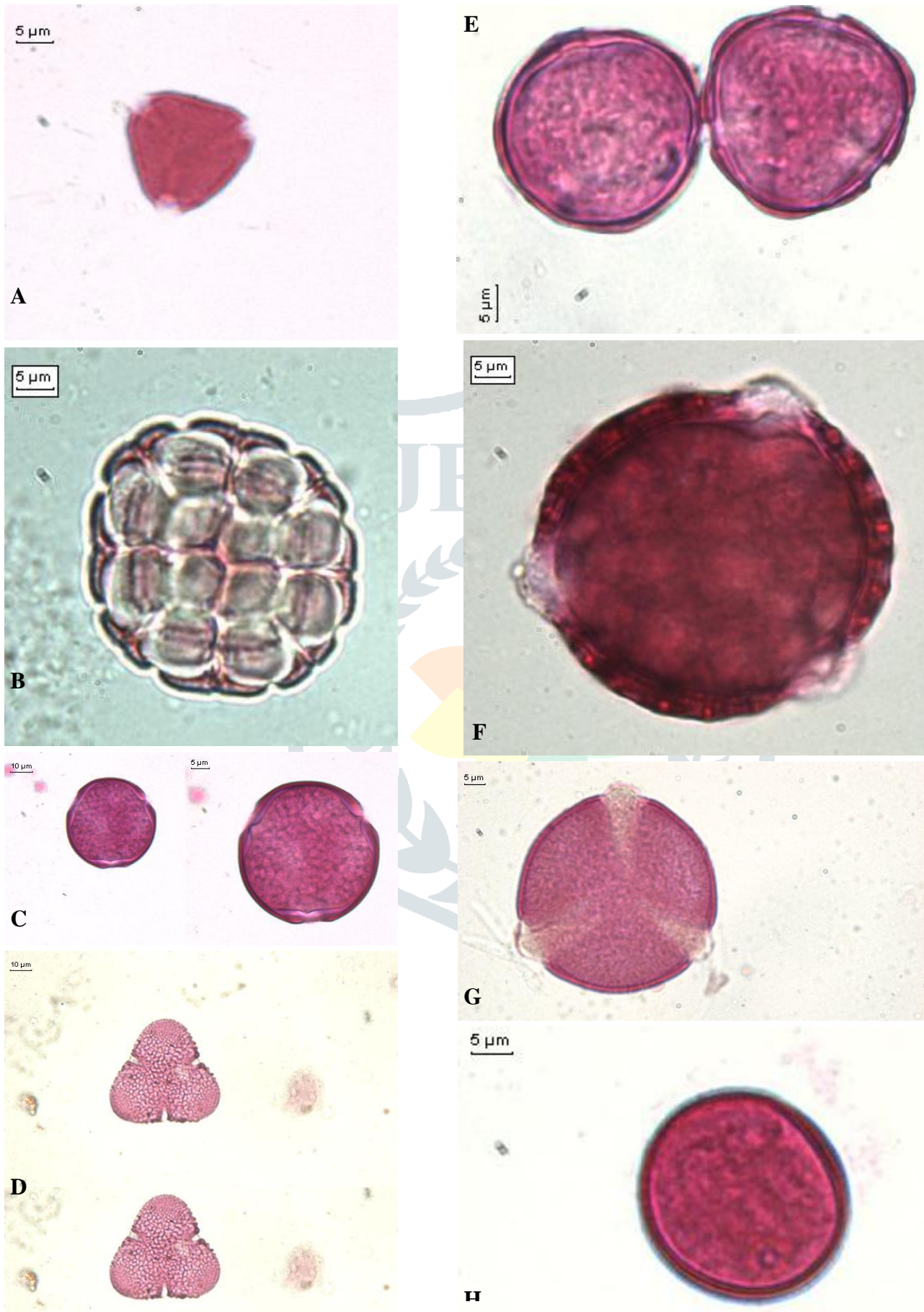
The pollen grains of *Bombax ceiba* L., belonging to Bombacaceae had oblate shape, tricolporate, flowered from February-April, 35µm long, reticulate pattern of surface ornamentation, had polar outline in triangular Obtuse plane.(Fig1D).

The pollen grains of *Lagerstroemia* sp., belonging to Lythraceae Family have prolate shape, with tricolporate aperture, flower from April-June, is 32-33 µm long, has circular polar outline and has psilate ornamentation.(Fig.1E).

The pollen grains of *Delonix regia*, belonging to Family Fabaceae, has sub –prolate shape, is tricolporate, flowers from April-June, is 42-43 µm long, with circular polar outline and with Reticulate ornamentation. (Fig.1F).

The pollen grains of *Cassia fistula* of Fabaceae had prolate sphaeroidal shape, tricolporate aperture, flowered in March-June and 35µm long, psilate ornamentation, had Triangular obtuse convex polar outline.(Fig1G).

The pollen grains of other families include those of Poaceae which were the most common. They were psilate, oval or rounded, Small sized about 25µm long, unicolporate, had oval or circular polar outline. (Fig1H).



Conclusions-

FIG.1 Pollen Grains of (A)-*Psidium guajava*; (B)-*Acacia nilotica* L.; (C)-*Moringa oleifera* Lam.;

(D)-*Bombax ceiba* L. (E)-*Lagerstroemia*, (F)-*Delonix regia*, (G)-*Cassia fistula*, (H)-Poaceae

The overall inference is the plants that have attractive floral parts are used or preferred by the birds. Some birds perhaps prefer them for their scent or smell. Still others love to make their nests beautiful.

The Poaceae were the most commonly used plants by birds for nidification.

The most rare pollen parts the was found amongst the present ones was of *Acacia* sp. as they were Polyads.

However, the birds preferred nests to be decorated with colourful floral parts that perhaps might be attraction to the female counterparts or as part of the alluring strategy of the birds.

References-

- 1.Erdtman G.:(1952); Pollen Morphology and Plant Taxonomy.; Angiosperms. Chron. Bot. Co., Waltham, Massachusettes.; Pg.48-87.
2. Erdtman G.; (1969); An Introduction to the study of Pollen Grains and Spores.;Copenhagen, Denmark: Munksgaard.; Pg.5-9.
- 3.Moore PD, Webb JA, Collinson ME; (1991); Pollen Analysis, 2nd Edition. Blackwell, Scientific Oxford; Pg.47-65.
4. Nair P.:(1970); Pollen Morphology of Angiosperms- a Historical and Phylogenetic Study; New York: Barnes and Noble, Inc.; Pg. 28-75.
- 5.Stuessy TF.:(1990); Plant Taxonomy: the systematic evaluation of Comparative Data. Columbia University Press, New York USA XVIII 514. Pg. 32-67.