Bioscience Discovery
A Journal of Life Sciences
MAHENG/2010/37060

http://www.biosciencediscovery.com
ISSN: 2229-3469 (Print)
ISSN: 2231-024X (Online)
Dr. Umesh P Mogle
Chief Editor

[illegible] Vol I/

Date: 08 Dec. 2014

To

JIBAN K. PAL,
Department of Botany,
Netaji Mahavidyalaya, Arambagh,
Hooghly, West Bengal, Pin-712601, India

Subject: Letter of acceptance.

Sir/Madam,

With reference to the subject cited above, your manuscript entitled "PALYNO-TAXONOMIC STUDY OF SOME PLANT TAXA OF FABACEAE FROM ARAMBAGH REGION OF HOOGHLY DISTRICT, WEST BENGAL, EASTERN INDIA" Author: PRITHA BHATTACHARYA (SASMAL), SAYANI BISWAS & JIBAN K. PAL, accepted for publication in the Bioscience Discovery tentatively in Volume 6 No. 1, Jan 2015.

Thanking you for your interest in the journal.

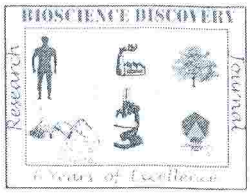
With warm regards,

Yours Sincerely,

(Dr. Umesh P. Mogle,
Chief Editor)

Correspondence Address
Dr. Umesh P. Mogle, Kaushalyaaie, P. No. 43, Priyanka Residency, Mantha Chaufulli,
Jalna 431203 (M.S.) India.
Email: upmogle@gmail.com Mobile No./ Whats App /T[illegible]

Bioscience Discovery, 6(1):27-34, Jan - 2015
Jibon Printer and Publisher (http://jbsd.in)
ISSN: 2229-3469 (Print); ISSN: 2231-024X (Online)
Received: 16-11-2014, Revised: 26-12-2014, Accepted: 21-12-2014



Full Length Article

Palyno-taxonomic study of some plant taxa of Fabaceae from Arambagh region of Hooghly district, West Bengal, eastern India

Pritha Bhattacharya (Sasmal)[1], Sayani Biswas[1] and Jiban K. Pal[1]

[1]Department of Botany, Netaji Mahavidyalaya, Arambagh, Hooghly, West Bengal, Pin-712601, India
jkpal62@gmail.com

ABSTRACT

The aim of the present investigation is to study different pollen parameters such as shape, size, colpa and exine ornamentation for the taxonomic assessment of the groups of plants. The pollen morphology of some plant taxa of the family Fabaceae growing in the area of Arambagh of Hooghly district, West Bengal, India were studied using light microscopy (LM) and scanning electron microscopy (SEM) during the period of September 2012 to July 2013. The pollen grains of *Cassia sophera, Cassia alata, Cassia occidentalis, Cassia fistula, Cassia tora, Cassia siamea, Butea monosperma, Bauhinia purpurea, Crotalaria retusa, Delonix regia, Peltophorum pterocarpum, Sesbania grandiflora* and *Tamarindus indica* are 3-colporate type. The polyad types of pollen grains consisting of 12 cells were observed in *Acacia auriculiformis* and *Acacia arabica*. The polyad type of pollen grain consisting of 16 cells is observed in *Albizzia lebbek*. The flowering period of the investigated taxa are recorded.

Key Words: Pollen, Taxonomic assessment, 3-colporate, Eurypalynous

INTRODUCTION

The family Fabaceae (Leguminosae) is the third largest family of the flowering plants (Mabberley, 1997), being the sources of gums, dyes, oils, insecticides, fibre, fuel, timber, medicinals and pulses (Wojciechowski, 2003). Nearly all species of the family exhibit the formation of root-nodulation with symbiotic bacteria to fix atmospheric nitrogen and thereby improving the soil fertility (Sprent and McKey , 1994; Sprent,2001). Apart from economic importance, ecologically the family is also important as the plant species of this family grow on earth from tropical rain forests to deserts and alpine tundra. Most of the species of the family grow in wild in Arambagh region of Hooghly district, West Bengal from Eastern India.

Many investigators studied different plant taxa of this broad group to find out the phylogenetic relationships of the family Fabaceae on the basis of morphological, anatomical, cytological, biochemical and molecular gene sequencing data (Kass and Wink, 1996; Doyle *et al.*, 1997, 2000; Kajita *et al.*, 2001; Wojciechowsk, 2003). Still now the family Fabaceae is continuing to attract the attention of scientists from diverse disciplines of plant sciences.

Now a day's study of pollen is an important area of research. Various pollen morphological features such as symmetry, shape, apertural pattern and exine configuration are very conservative features for the taxonomic assessment of the plants (Perveen, 2006; Bera *et al.*, 2007; Keshavarzi *et al.*, 2012). Moreover, some plants growing in the surroundings causes respiratory troubles or allergy in human beings (Singh and Kumar, 2004; Chauhan and Goyal, 2006). It has been reported that there are many plants growing in the surroundings such as rice, mustard, coconut, grasses etc., the pollen grains of which are responsible for allergy (Singh, 2012).

These plants also grow in Arambagh region of Hooghly district, West Bengal. It is supposed that similar allergenic activity will be observed from the plants of this region.

Some plant taxa e.g. *Cassia tora, Cassia fistula, Cassia occidentalis, Delonix regia* and *Peltophorum pterocarpum* of this family are important allergenically (Mandal *et al.*, 2009; Hussian, 2012). In fact, during teaching and research experiences, it has been found that a large number of patients of different parts of Hooghly district, West Bengal are suffering from bronchial asthma and other respiratory troubles. There may be several causes such as pollutants, dusts, industrial dusts, fungal spores, pollen grains etc. for bronchial asthma and related respiratory troubles. One of the most important reasons of these diseases is pollen allergy.

Keeping in view the sufferings of the people due to allergic disorders in this district, primarily detailed pollen morphological study of some plants growing in Arambagh region of Hooghly district, India during the period of September 2012 to July 2013 was undertaken. Pollen morphological study is related with pollen viability tests. A comparative pollen viability study of two species of *Jatropha* was made by Gam, 2014.

MATERIALS AND METHODS

In the present investigation 10 genera including 16 plant species of the family Fabaceae were investigated. Out of 16 taxa investigated, the genus *Cassia* comprises six species namely *Cassia sophera, Cassia alata , Cassia occidentalis, Cassia fistula, Cassia tora and Cassia siamea.* The genus *Acacia* comprises two species namely *Acacia auriculiformis* and *Acacia arabica.* The remaining eight investigated genera were *Butea monosperma, Bauhinia purpurea, Crotalaria retusa, Delonix regia, Peltophorum pterocarpum, Sesbania grandiflora, Albizzia lebbek* and *Tamarindus indica.*

The mature flowers of the above plant taxa were collected and pollen morpho types studied by Acetolysis method (Erdtman, 1952). The microphotographs of the pollen grains were taken in a microscope (Make- Olympus & Model- CX21i and number 12M268). The measurement of the pollen grains were taken with the help of an Ocular Stage Division (Erma) and the measuring unit converted into µm(milimicron).The terminology of pollen is in accordance with Bhattacharya *et al.*,2009; Erdtman, 1952; Faegri and Iversen, 1964; Kremp, 1965 and Moore and Webb (1978).

Scanning Electron Microscopic (SEM) study was carried out for the observation of pollen grains in detail. For this purpose fresh pollineferous material (non-treated pollen grains) was taken for microphotographs. The fresh pollen material was placed on stub and gold coating was made by IB_2 ion coater before taking microphotographs.

RESULTS AND DISCUSSION

The flowering period of the investigated taxa was recorded (Table 1). The pollen morphology of the investigated taxa was studied critically. Out of 16 plant species studied, tri-colporate (3-colporate) type of pollen grains were observed in 13 species namely *Cassia sophera, Cassia alata, Cassia occidentalis, Cassia fistula, Cassia tora, Cassia siamea, Butea monosperma, Bauhinia purpurea, Crotalaria retusa, Delonix regia, Peltophorum pterocarpum, Sesbania grandiflora* and *Tamarindus indica* (Figure 1 & Figure 2). The polyad types of pollen grains were found in *Acacia auriculiformis, Acacia arabica* and *Albizzia lebbek*. The polyad of *Acacia auriculiformis* and *Acacia arabica* showed 12 celled configurations, whereas it was 16 celled structures in *Albizzia lebbek*. Each cell of the polyad is sub-globose in periphery and square in centre in *A. auriculiformis* and *A. Arabica.* All 16 cells of polyad are rectangular in shape in *Albizzia lebbek* (Figure 2). The shape of the 3-colporate pollen grains varied from Oblate-spheroidal to Prolate on the basis of value of P/EX100. The shape of the grains, exine ornamentation, length of colpa, diameter of pore, exine thickness and the value (P/EX100) for determining the shape of the grains are given below (Table 2).

The pollen sample i.e. anthers of collected flowers was acetolysed for clear observations of exine layers. Different parameters of the pollen grains like colpa, exine ornamentation etc. was determined from acetolysed grains. Microphotographs of the acetolysed grains were taken by Light Microscopy (LM). The SEM microphotographs were taken from fresh pollen grains (Figure 3 and 4). Some roundish structures called gemma were found on exine layer in *Bauhinia purpurea.* In *Peltophorum pterocarpum* some honey-comb like hexagonal meshes with muri and lumen were found on the surface of exine (Figure 4). The honey-comb like meshes was also observed in *Delonix regia.*

Table 1: Investigated plant taxa with their common names, respective families and flowering period

Name of the plants	Common name	Family	Flowering period
Cassia sophera	Kalkashunda	Caesalpiniaceae	Throughout the year
Cassia alata	Dadmurdan	Caesalpiniaceae	June-September
Cassia occidentalis	Kalkashunda	Caesalpiniaceae	June-September
Cassia fistula	Bandar lati / Shondal	Caesalpiniaceae	June-September
Cassia tora	Chakunda	Caesalpiniaceae	June-August
Cassia siamea	Siamese senna (Siamese cassia)	Caesalpiniaceae	June-August
Bauhinia purpurea	Kanchan	Caesalpiniaceae	Throughout the year
Phoenix regia	Gulmohor	Caesalpiniaceae	March-May
Peltophorum pterocarpum	Radhachura	Caesalpiniaceae	March-May
Tamarindus indica	Tentul	Caesalpiniaceae	June-August
Acacia auriculiformis	Sonajhuri	Mimosaceae	July-November
Acacia arabica	Babla	Mimosaceae	Throughout the year
Albizzia lebbek	Sirish	Mimosaceae	April-May
Crotalaria retusa	Atashi	Papilionaceae	July- September
Butea monosperma	Palash	Papilionaceae	February- March
Pachania grandiflora	Bakphul	Papilionaceae	July-August

The family Fabaceae (Leguminosae) is the third largest family of the flowering plants (Mabberley, 1997), below the rank of Orchidaceae and Asteraceae (Ghosh and Keshri, 2007). Fabaceae (Leguminosae) – bean or pea family (after faba, Latin name for broad bean) consists of 720-730 genera and 19,500 species (Michael, 2010). The Fabaceae are traditionally classified into three sub-families :Caesalpinioideae, Mimosoideae and Papilionoideae (Faboideae). These are, however often treated as three separate families known as Papilionaceae/Fabaceae (Article 18.5 of the code, final sentence), Mimosaceae and Caesalpiniaceae (Mc Neil and Brummitt, 2003). The sub-families Mimosoideae and Papilionoideae have both been resolved as monophyletic, nested within a paraphyletic Caesalpinioideae, in all recent molecular studies (Kass and Wink, 1996; Doyle *et al*., 1997, 2000; Kajita *et al.*, 2001; Wojciechowski *et al.*, 2004).The two sub-families Mimosoideae and Papilionoideae are derived from the third sub-family Caesalpinioideae, which is basal and paraphyletic (Doyle, 1975). Many workers carried out research for determining phylogenetic relationships among different groups of the family Fabaceae. In the present study, an attempt was made for the taxonomic assessment of the investigated taxa from the point of view of pollen morphological data.

A botanical survey of flowering plants growing in the area of Arambagh, West Bengal (India) during the period of September 2012 to July2013 was made for the purpose of collection of the pollen materials from plants growing in the field and to study different pollen parameters such as shape, size, and colpa and exine ornamentation. The present study is useful in the preparation of a complete pollen calendar in different seasons of the area under investigation. A pollen calendar is useful for allergy clinics (Tilak, 2012). Pollen calendar is compiled based on data and knowledge obtained from field botanical survey of the area under investigation combined with data from aeropalynological survey (Agashe, 2012; Bhattacharya-Sasmal and Pal, 2013).

Table2: Pollen parameters of the investigated plant taxa by light microscopic study

Name of plants	Pollen type	Polar axis (P) (µm)	Average (µm)	Equatorial axis (E) (µm)	Average (µm)	Length of colpa (µm)	Diameter of pore (µm)	Exinethickness (µm)	Exine ornamentation	P/E X 100	Shape of pollen
Cassia sophera	3-colporate	20.00-33.00	26.50	22.00-34.50	28.25	7.50-10.00	2.50-5.00	3.75-4.50	Punctitegillate	93.80	Oblate-spheroidal
Cassia alata	3-colporate	22.50-27.50	25.00	17.50-22.50	20.00	15.00	10.00	±1.25	Punctitegillate	125.00	Sub-prolate
Cassia occidentalis	3-colporate	22.50-30.00	26.25	20.00-27.50	23.75	10.00-12.50	5.00-7.50	3.75-5.00	Punctitegillate	110.52	Prolate-spheroidal
Cassia fistula	3-colporate	17.50-27.50	22.50	15.00-25.00	20.00	7.50-8.00	5.00-7.50	5.00-6.25	Punctitegillate	112.50	Prolate-spheroidal
Cassia tora	3-colporate	20.00-25.00	22.50	25.00-30.00	27.50	17.50	1.25-2.50	±1.25	Punctitegillate	81.81	Sub-oblate
Cassia siamea	3-colporate	32.50	32.50	35.00	35.00	15.00	5.00	±2.50	Punctitegillate	92.85	Oblate-spheroidal
Bauhinia purpurea	3-colporate	55.00-100.00	77.50	50.00-92.50	71.25	45.00-90.00	17.50	±2.50	Reticulate	108.77	Prolate-spheroidal
Delonix regia	3-colporate	52.00-65.00	58.75	45.00-62.50	53.75		1.25-7.50	±5.00	Reticulate	109.30	Prolate-spheroidal
Peltophorum pterocarpum	3-colporate	57.50-70.00	63.75	47.50 60.00	53.75		1.25-7.50	±5.00	Reticulate	118.60	Sub-prolate
Tamarindus indica	3-colporate	27.00	27.00	30.00	30.00	20.00	5.00-10.00	±1.25	Striato-reticulate	90.00	Oblate-spheroidal
Acacia auriculiformis	Polyad-12 celled	----	---	---	---	----	---	---	Psilate	----	---
Acacia arabica	Polyad-12 celled	----	---	-----	---	-----	---	---	Psilate	----	----
Albizzia lebbek	Polyad-16 celled	----	----	-----	---	----	----	---	Psilate	----	----
Crotalaria retusa	3-colporate	22.00-27.50	24.75	20.00-25.00	22.50	12.50	5.00	±1.25	Finely reticulate	110.00	Prolate-spheroidal
Butea monosperma	3-colporate	37.00-40.50	38.75	29.50-30.00	29.75	33.50	7.50-12.50	±2.50	Obscure pattern	130.25	Sub-prolate
Sesbania grandiflora	3-colporate	20.00-40.00	30.00	12.50-22.50	17.50	17.50-37.50	5.00-7.50	1.25-2.50	Finely reticulate	171.42	Prolate

A considerable variation in pollen morphology was observed among the investigated taxa of the family Fabaceae, particularly exine ornamentation and apertural pattern. This observation supports the eurypalynous characteristics of the family Fabaceae. In the present study10 genera including 16 species were studied.

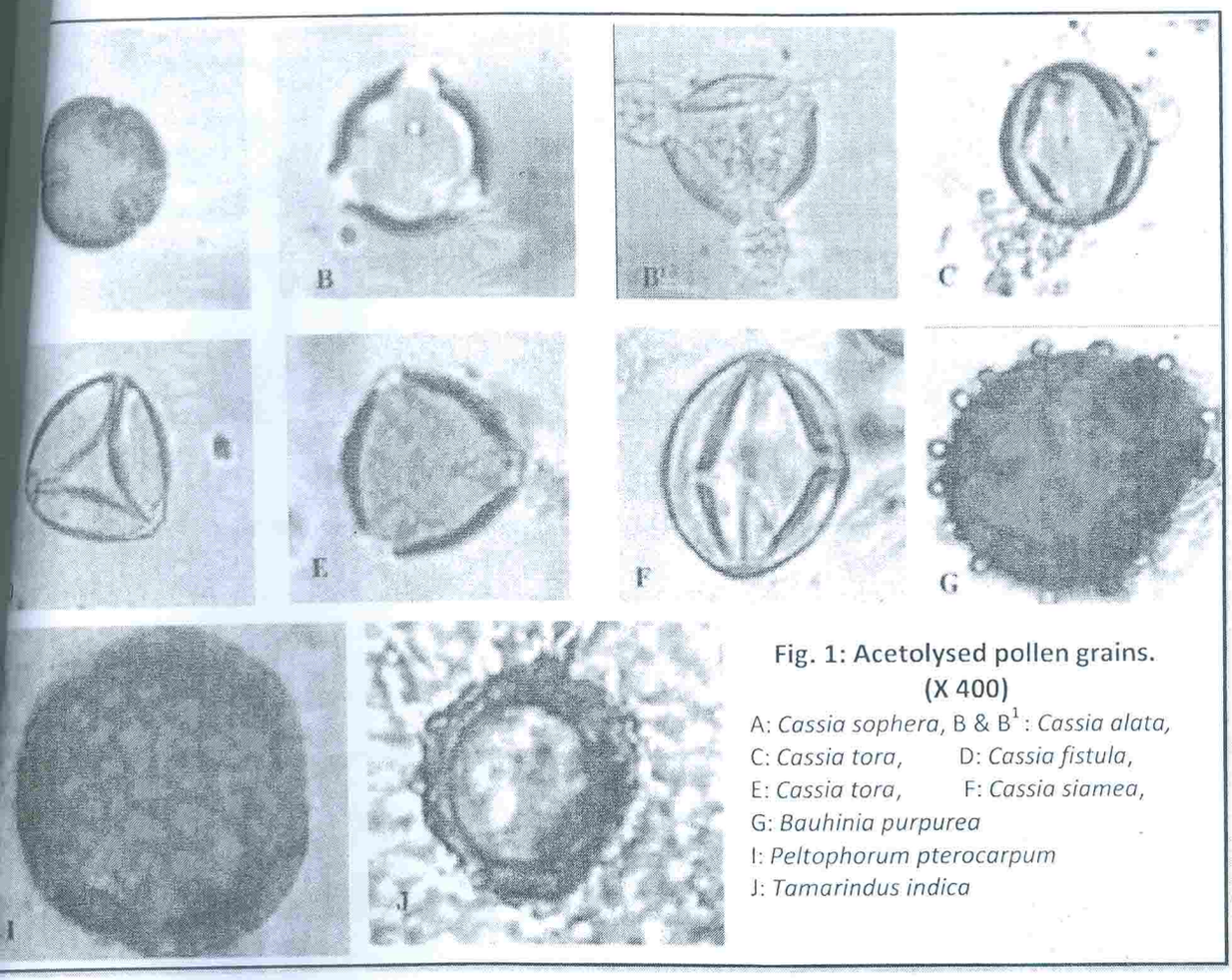


Fig. 1: Acetolysed pollen grains. (X 400)

A: *Cassia sophera*, B & B[1]: *Cassia alata*,
C: *Cassia tora*, D: *Cassia fistula*,
E: *Cassia tora*, F: *Cassia siamea*,
G: *Bauhinia purpurea*
I: *Peltophorum pterocarpum*
J: *Tamarindus indica*

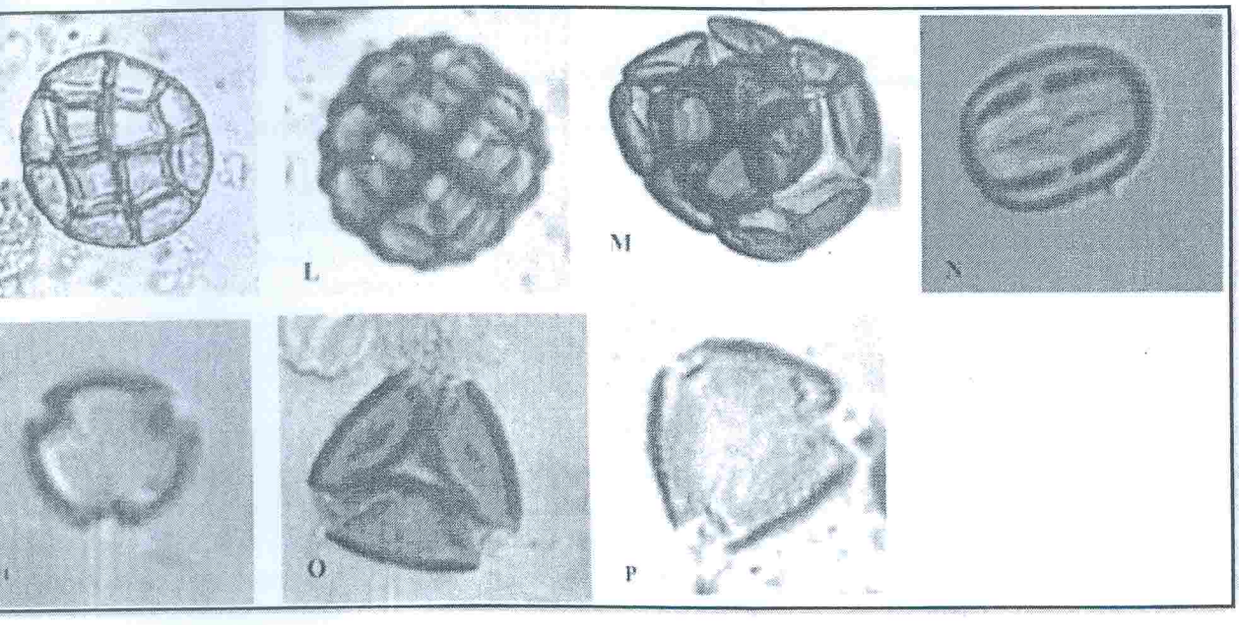


Fig. 2: Acetolysed pollen grains. (X 400)

Acacia auriculiformis, L: *Acacia arabica*, M: *Albizzia lebbek*, N: *Crotolaria retusa* (Equitorial view),
Crotolaria retusa (Polar view), O: *Butea monosperma*, P: *Sesbania grandiflora*

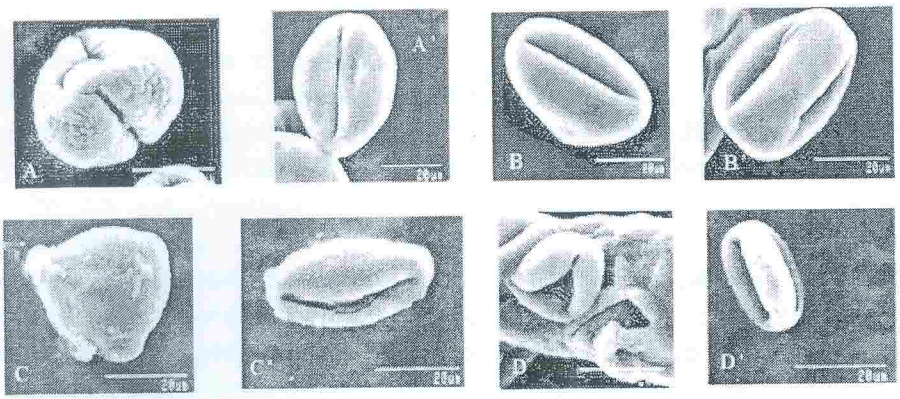


Figure 3 **SEM Microphotographs of pollen grains of some plant taxa investigated**

A. *Cassia siamea* (Polar view). A'. *C. siamea* (Equatorial view).
B & B'. *C. occidentalis* (Equatorial view).
C. *C. tora* (Polar view). C'. *C. tora* (Equatorial view).
D. *C. alata* (Polar view). D'. *C. alata* (Equatorial view).

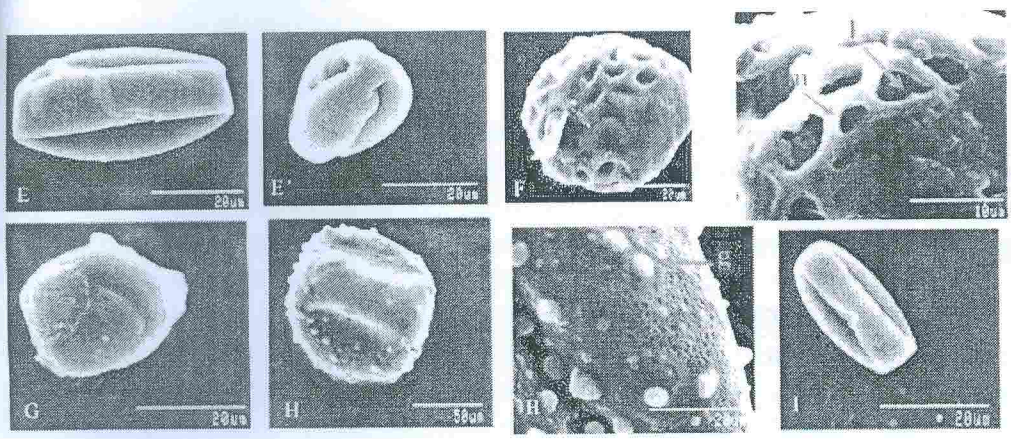


Figure 4 SEM Microphotographs of pollen grains of some plant taxa investigated

E. *Cassia sophera* (Equqatorial view). E'. *C. sophera* (Polar view).
F. *Peltophoram pterocarpum* (Polar view). F'. *Peltophorum pterocarpum*
(Surface view showing Muri and Lumen). G. *Tamarindus indica* (Polar view).
H. *Bauhinia purpurea* (Polar view).
H'. *Bauhinia purpurea* (Surface view showing Gemma). I. *Crotalaria retusa* (Equqatorial view).

l= Lumen, m= Muri, g= Gemma.

Most of the genera such as *Cassia sophera, Cassia alata , Cassia occidentalis, Cassia fistula, Cassia tora, Cassia siamea, Butea monosperma, Bauhinia purpurea, Crotalaria retusa, Delonix regia, Peltophorum pterocarpum, Sesbania grandiflora* and *Tamarindus indica* shows 3-colporate type of pollen grains. The polyad type of pollen grains is found in *Acacia auriculiformis, Acacia Arabica* and *Albizzia lebbek*. In the previous study (Pal 1992, Pal *et al.*, 1993a; 1993b) it has been found that the taxa having tricolporate pollen grains reveals their advanced status whereas taxa with polyad or colpate type of pollen grains shows its primitive status in the evolutionary scale. Tricolpate pollen is the main and basic type found in most eudicots while other aperture types such as 5-colpate, 6-colpate, porate, colporate and pororate are regarded as derived among eudicots (Walker and Doyle, 1975).

Thus the taxonomic assessment of the species investigated is possible considering the pollen parameters. However, the data from other field of study like cytological, serological, biochemical and immunological might strengthen this taxonomic assessment of the species. On the basis of pollen parameters, the present investigated taxa like *Cassia sophera, Cassia alata , Cassia occidentalis, Cassia fistula, Cassia tora, Cassia siamea, Butea monosperma, Bauhinia purpurea, Crotalaria retusa, Delonix regia, Peltophorum pterocarpum, Sesbania grandiflora* and *Tamarindus indica* having tricolporate pollen grains may be considered as in advanced status whereas *Acacia auriculiformis, Acacia Arabica* and *Albizzia lebbek* has primitive status in scale of evolution. This observation is also supported from pollen morphological study of some plant taxa of Hooghly district, India (Bhattacharya-Sasmal et al., 2013). The prepared pollen slides of the taxa investigated may be used as reference slides for identifying the pollen grains captured from air.

CONCLUSION

A taxonomic assessment of some plant taxa of the family Fabaceae growing in wild condition of the Arambagh region, India was made on the basis of different parameters of pollen grains. The plant taxa having tricolporate (3-colporate) pollen grains like *Cassia sophera, Cassia alata, Cassia occidentalis, Cassia fistula, Cassia tora, Cassia siamea, Butea monosperma, Bauhinia purpurea, Crotalaria retusa, Delonix regia, Peltophorum pterocarpum, Sesbania grandiflora* and *Tamarindus indica* may be considered as in advanced status whereas *Acacia auriculiformis, Acacia arabica* and *Albizzia lebbek* has primitive status in the scale of evolution. This study will be helpful in the preparation of a complete pollen calendar of a particular geographical area. A complete pollen calendar of different seasons throughout the year and the concentration of respective pollen grains in air may help for proper diagnosis and treatment of allergic patients.

ACKNOWLEDGEMENT

The authors gratefully acknowledge the financial assistance of UGC in the form of a Major Research Project [F.No. 41-444/2012(SR)]. The authors are thankful to Dr. A. K. De, Principal, Netaji Mahavidyalaya for his constant inspiration in this regard. Technical help received from Dr. Srikanta Chakraborty, USIC, Burdwan University for SEM microphotographs is duly acknowledged.

REFERENCES

Agashe SN, 2012. Is Aerobiology Really Useful to Mankind. *Proc.17th. National Conference of Indian Aerobiological Society on Impact of Airborne Microbes* pp.3.

Bera SK, Basumatary, SK and Dixit S, 2007. Studies on pollen morphology and phenological characteristics of some economically important arborescent taxa of tropical forest,lower Brahmaputra valley, Assam, North East India. *Journal of Palynology,* **43**:1-19.

Bhattacharya K, Majumdar MR and Gupta Bhattacharya S, 2009. *A text Book of Palynology*.New Central Book Agency (P) Ltd., Kolkata.

Bhattacharya (Sasmal) P, Pal JK, Biswas P and Pal PK, 2013. Pollen Morphological Study of Some Plant taxa From Arambagh Region of Hooghly District, West Bengal, India. *International Journal of Current Science,***7E**: 97-103.

Bhattacharya (Sasmal) P and Pal JK, 2013. Scope of research on pollen grains in Arambagh region of Hooghly district (India) with reference to allergic disorders.*International Journal of Current Science,* **8E**:9 -15.

Chauhan SVS and Goyal R, 2006. Pollen calendar of Agra city with special reference to allergenic significance. *Journal of Environmental Biology),* **27**(2): 275-281.

Doyle JJ, 1975. DNA data and legume phylogeny : a progress report. In *Advances in Legume Systematics, Part- 7, Phylogeny*, eds Crisp M, Doyle JJ (Royal Botanic Gardens, Kew, UK), pp.1-20.

Doyle JJ , Chappill JA, Bailey CD and Kajita T, 2000. Towards a comprehensive phylogeny of legumes: evidence from rbcL. sequences and non molecular data. In P.S. Herendeen and A.Bruneau (Ed.), *Advances in Legume Systematics, Part 9* (pp.20). Royal Botanic Graden, Kew.

Doyle JJ, Doyle JI, Ballenger JA, Dickson EE, Kajita and Ohashi H, 1997. A phylogeny of the chloroplast gene rbcL. In Leguminosae : taxonomic correlations and insights into the evolution of nodulation. *American Journal of Botany, 84,* 541-554.

Erdtman G, 1952. Pollen morphology and plant taxonomy Angiosperm. *In Introduction to Palynology, vol. 1* **A** Imqvist and Wiksell, Stockholm.

Faegri K and Iversen J, 1964. *Text Book of Pollen Analysis. 2nd. Ed.* Munksgaard, Copenhagen.

Gam NK, 2014. Comparative pollen viability study on *Jatropha curcus* L. and *Jatropha gossypifolia* L. *Science Research Reporter*, **4**(1):35-38.

Ghosh S and Keshri JP, 2007. *Levant's Q & A Series Botany* (1st. Ed). Sarat Book Distributer, Kolkata, pp. 237-238.

Hussain MM, Mandal J and and Bhattacharya K, 2012. Air borne load of *Cassia* pollen in West Bengal, eastern India: its atmospheric variation and health impact. *Environmental Monitoring and Assessment,* **19:** 22810379.

Kajita T, Ohashi H , Tateishi Y, Bailey CD and Doyle JJ, 2001. rbcL. and legume phylogeny, with particular reference to Phaseoleae, Millettieae, and Allies. *Systematic Botany,* **26**: 515-536.

Kass E and Wink M, 1996. Molecular evolution of the Leguminosae : phylogeny of the sub-families based on rbcL. sequence. *Biochemical Systematics and Ecology,* **24:** 365-378.

Keshavarzi M, Abassian S and Sheidai M, 2012. Pollen morphology of the genus *Clypeola*(Brassicaceae) in Iran.*Phytologia Balcanica,* **18**(1): 17-24.

Kremp GOW, 1965. *Encyclopedia of Pollen Morphology.*Univ. Arizona Press Tuscon,USA.

Mabberley DJ, 1997. *The Plant Book, 2nd edition.* Cambridge University Press, Cambridge.

Mc Neil A and Brummitt RK, 2003. The usage of the alternative names of eight flowering plant families.*Taxon*, **52:** 553-556.

Michael G, 2010. *Plant Systematics*, Accademic Press, pp.328.

Mandal J, Manna P, Chakraborty P, Roy I and Gupta-Bhattacharya S, 2009. Clinical and immunobiochemical characterization of airborne *Delonix regia* (Gulmohar tree) pollen and cross-reactivity studies with *Peltophorum pterocarpum* pollen: 2 dominant avenue trees from eastern India. *Annals of Allergy Asthma & Immunology,* **103**(6):515-524.

Moore PD and Webb JA, 1978. *An illustrated guide to pollen analysis.*Hodder and Stoughton, London.

Pal JK, 1992. Cytopalynological studies on some woody angiospermic taxa and effects of mutagen as well as polyploidizing chemical on cell nuclei. *Ph.D thesis. Central library, VishaBharatiUniversity, Santiniketan.*

Pal JK, Datta BK, Mandal S and Bhattacharya GN, 1993a. Cyto-palynological Investigation in *Cassia fistula* L. *Environment & Ecology,* **11**(2): 435-438.

Pal JK, Mandal S and Bhattacharya GN, 1993b. Cyto-palynological studies in *Shorea robusta* Gaertn.f. *Science and Culture,* **59**(7-10): 55-57.

Perveen A, 2006. A contribution to the pollen morphology of the family Gramineae.*World Applied Science Journal,* **1**: 60-65.

Singh AB, 2012. Pollen allergy a national health problem. Proc. **17th**. National Conference of Indian Aerobiological Society on Impact of Airborne Microbes, pp.5.

Singh AB and Kumar P, 2004. Aerial pollen diversity in India and their clinical significance in allergic diseases.*IndianJournal of Clinical Biochemistry.* **19**(2):190-201.

Sprent JI, 2001. Nodulation in Legumes.*Royal Botanic Gardens, Kew.*

Sprent JI and Mc Key D, 1994. *Advances in Legume Systematics, **Part 5.*** The Nitrogen Factor.Royal Botanic Gardens, Kew.

Tilak ST, 2012. Renaissance of Aerobiology. *Proc. **17th**. National Conference of Indian Aerobiological Society on Impact of Airborne Microbes* pp.1.

Walker JW and Doyle JA, 1975. The bases of angiosperm phylogeny : Palynology. *Annals of Missouri Botanical Garden, **62**:* 664-723. In Sarwar A.K.M. Golan Ph.D thesis, pollen morphology and its systematic significance in the Ericaceae.Hokkaido University.

Wojciechowski MF, 2003. Reconstructing the phylogeny of legumes (Leguminosae): an early 21st century perspective. In B.B. Klitgaard and A.Bruneau (Ed.), *Advances in Legume Systematics, **Part 10**, Higher Level Systematics* (pp. 5-35). Royal Botanic Gardens, Kew.

Wojciechowski, MF, Lavin M and Sanderson MJ, 2004. A phylogeny of legumes (Leguminosae) based on analysis of the plastid mat K gene resolves many well – supported sub-clades within the family. *American Journal of Botany*, **91:** 1846-1862.

How to Cite this Article:

Pritha Bhattacharya (Sasmal), Sayani Biswas and Jiban K Pal, 2015. Palyno-taxonomic study of some plant taxa of Fabaceae from Arambagh region of Hooghly district, West Bengal, eastern India. *Bioscience Discovery,* **6**(1):27-34.

March, 2015

2278-1501

Immune Response to Pollen Allergic Reaction

Pritha Bhattacharya (Sasmal) and Jiban Kumar Pal

Department of Botany , Netaji Mahavidyalaya

Arambagh , Hooghly -712601 , West Bengal , India

Corresponding author : jkpal62@gmail.com*

ABSTRACT

In recent years about 20 – 30 % population of the world suffers from allergic disorders. There are various sources of allergy in atmosphere like dusts , pollutants , industrial dusts , fungal spores and pollen grains. The pollen grains is one of the most important causative factor for the expression of allergy in human body. The pollen grains enters into the body through respiratory tract , the nostrils , mouth and eyes. The ciliated portion of the respiratory tract defend the pollen grains not to reach to lungs. Most of the pollen grains become accumulated into the stomach. Pollen grains discharge their proteins while passing through the stomach and a moderate proportion of the proteins are introduced into the bloodstream to start allergic reaction. Blood is the main site of the immune system. In response to the pollen protein i.e allergen (antigen) , the B – lymphocyte or B – cell of the immune system produces antibody IgE to defend foreign pollen protein. There are five types of antibodies in serum such as IgG , IgD , IgM , IgA and IgE. The antibody IgE is involved in accelerating allergic symptoms. The antibody IgE is very specific , it acts on particular pollen allergen. The coupling between antibody IgE and pollen allergen is held together by hydrogen bonding. The antibody IgE is attached on the membrane of mast cells keeping two arms free so that pollen allergen may attached with the IgE. Finally the pollen allergen are degraded by the antibody IgE secreted from B cells. MHC II molecules , T H – Cells play an important role in the degradation of pollen allergen.

Key Words : pollen , allergy , IgE , allergen, protein.

INTRODUCTION

The word allergy is very much popular to us which is derived from two Greek words , *allos* means different or changed and *ergos* means work or action. In 460-375 BC, the occurrence of allergy had been reported in the writings of Hippocrates, an ancient Greek Physician who is known as father of modern medical science (Marketos and Ballos,1982; Grammaticos and Diamantis,2008). The term allergy was introduced in 1906 by the Viennese pediatrician Clemens Von Pirquet. He described allergy as a changed responsiveness in individuals, who had previously been exposed to the