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RESEARCH ARTICLE

POLLEN MORPHOLOGY OF SOME PLANT SPECIES OF ORDER MALVALES

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ABSTRACT

Present paper deals with the pollen diversity of some plant species of order Malvales, which belongs to subclass Polypetalae of class Dicotyledon. Malvales is the most important order of subclass Polypetalae. Here investigated plants were taken from Malvaceae, Sterculiaceae and Tiliaceae families. Mostly plants are multipalynous in porate grains the common type were polyporate. The pollen grains varies in their size from large to very large, the most common are large sized grains. The shape of the pollen grains seems to be more or less constant i. e. prolate, spheroidal to oblate. Spine morphology is variable may have blunt or pointed tips and with long or short spines. The pore size has been observed whereas the shape of pores seems to be fairly constant being more or less circular. The nexine is thicker than sexine.

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INTRODUCTION

The morphological structure of pollen grains exhibit wonderful criterion in identification of plants and has revolutionized the study of pollen and spores (i.e. Palynology). Pollen morphology is conducted as an aid to the morphological study and a significant tool for modern taxonomist for the delimitation of species. Pollen characters are useful in solving complicated problems of interrelationship between various taxa and assessment of their status in the classification, particularly with reference to the families, sub families, tribes, genera, species and sub species. Mature pollen grain size, exine sculpturing, and number of pores are the most distinctive features. Palynological data is useful for further research work in the field of allergic disease, forestry, agriculture, horticulture, archaeology and plant geography. Order Malvales is a major group of subclass Polypetalae, have large numbers of plants, specifically have economic and medicinal importance. This order contains highly multipalynous plants. It is expressed to a higher degree (more so the former with a large variety of aperture morph forms the colporate, porate, the aperture varying in number and distribution.), rarely unipalynous with one or two aperture forms.

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MATERIALS AND METHODS

The specimen selected for the study is authentically identified with help of Flora of Gujarat by G. L. Shah. Flowers and flower buds of *Abelmoschus manihot* L., *Abutilon indicum* L. *Bombax mulbaricum* L., Chorchorus *fascicularis* Lam., *Gossypium herbaceum* Linn., *Hibiscus schizopetalus* H.K.F., *Hibiscus tilaceus* var. *Tricolor* L., *Pentapetes phoenicea* L., *Sida cordifolia* L., *Sida ovata Forssk*. were collected from Bardoli area during April 2016, Pollen sample were collected from fresh plant material in to 10% formalin. They are stored for further investigation at room temperature. Each slide was prepared by acetolysis method of Erdtman (1952) and at a few places that of Walker (1974). An acetolysed pollen grains were mounted in lacto phenol. Observations were made with research binocular light photomicroscope.

RESULT AND DISCUSSION

1. Abelmoschus manihot L.

Family – Malvaceae
Local name – Khati Bhindi
Habit – Herb
Observation under – 100x.

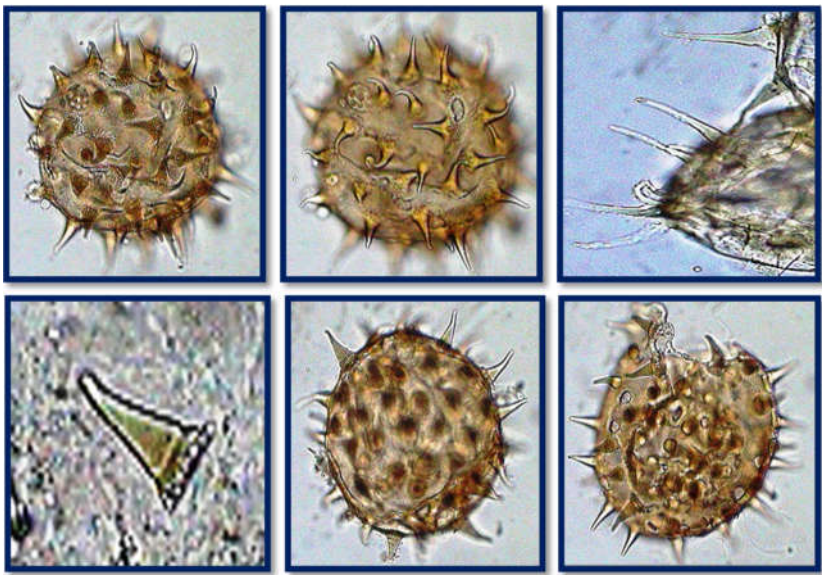

Figure 1. Pollen morphology of *Abelmoschus manihot* L.

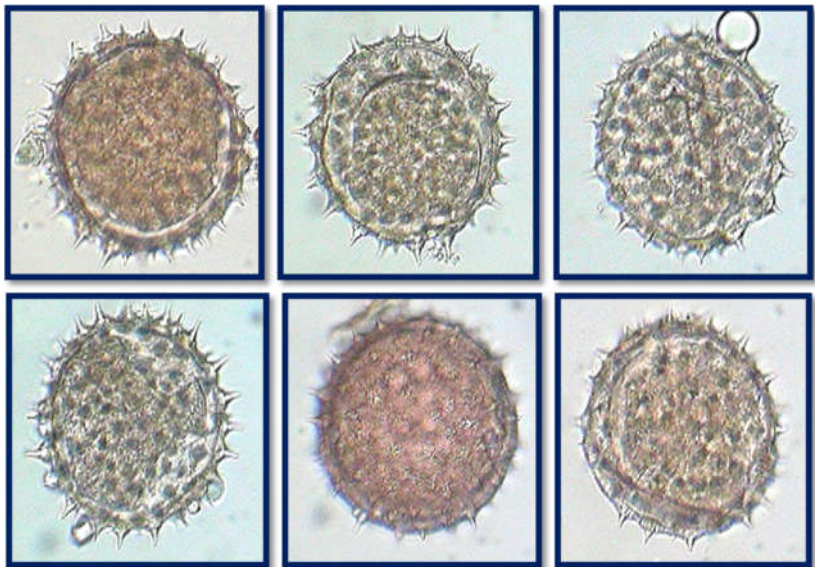

Figure 2. Pollen morphology of *Abutilon indicum* L.

Pollen grains prolate, spheroidal, average size 140.1 µ; (range 108 – 145.5 µ). Surface rough, Pores circular to elongate, diameter 10.2- 9.8 x 13.5 µm, distance between two pores- 8.9 – 31 µm. spine height 22 - 28.5 µm, broad at the base, basal cushion low to high, 2.3 – 5.8 µm, Inter basal distance present, small bacules present in the basal cushion and joint the bacules in the sexine forming rootlets. Distance between two spines 26.3 - 29.2 µm, spine large echinolophate with blunt ends, flat or bulbous sides, Exine 3.5 – 4.5 µm thick, 5.5 – 6.1 µm thick at the base of the spine, intactate nexine.

2. *Abutilon indicum* L.

Family – Malvaceae
Local name – Kansaki
Habit – Herb
Observation under – 40x.

Pollen grain 3 – porate, prolate spheroidal, large in size, polar axis 30.4 (30.1) 33 µm, equatorial diameter 23.3 (28) 30.4 µm, surface rough, pores circular, diameter of spore 1.8 µm,mesoporium 23 µm, apoporium 10.5 µm. spines echinolophate short with pointed ends, bulbous sides, spine height 1.9 µm, broad at the base 1.4 µm, distance between two spines 2.0 µm. Basal cushion high, 2.8 µm in height, Interbasal distance present. Exine 0.9 µm thick, once (2.2 x 4 µm).

3. *Bombax malbaricum* DC.

Family - Malvaceae (Bombacaceae)
Local name – Shimdo
Habit – Tree
Observation under – 100x

Pollen spheroidal, undulating, amb triangular, inter – apertual, corners rounded, colpi apices acute, finely granulate, exine reticulate. Pollen grains very large 40.0 - 45.0 µ, Triporate, baculate, prolate spheroidal and monad. Equatorial diameter 37. 5 - 44.2 µ.

4. *Chorchorus fascicularis* Lam.

Family: Tiliaceae
Local name: Chhunchh
Habit: herb
Observation under: 100x

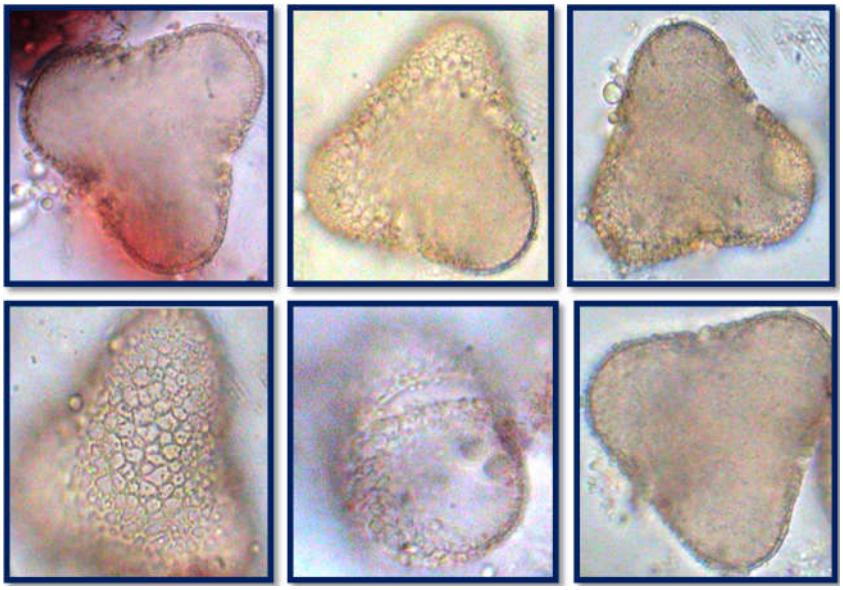

Figure 3. Pollen morphology of *Bombax mulbaricum* DC.

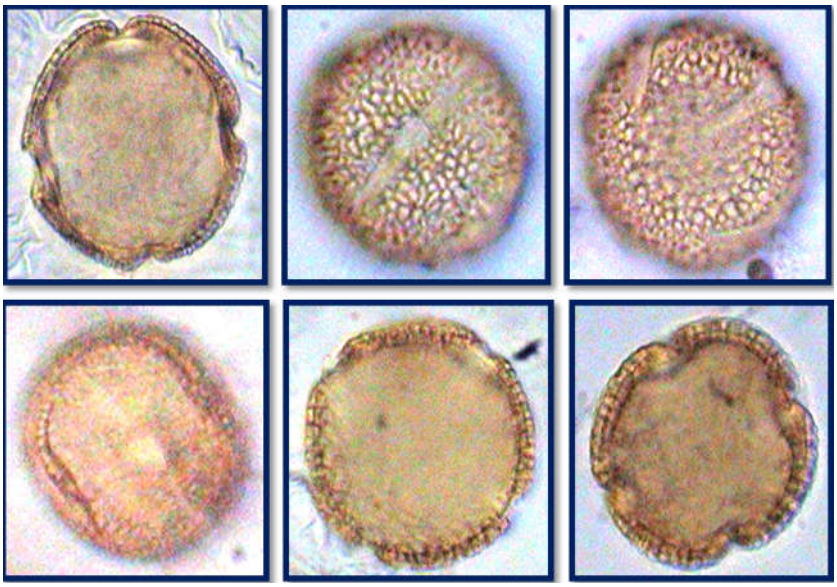

Figure 4. Pollen morphology of *Chorchorus fascicularis* Lam.

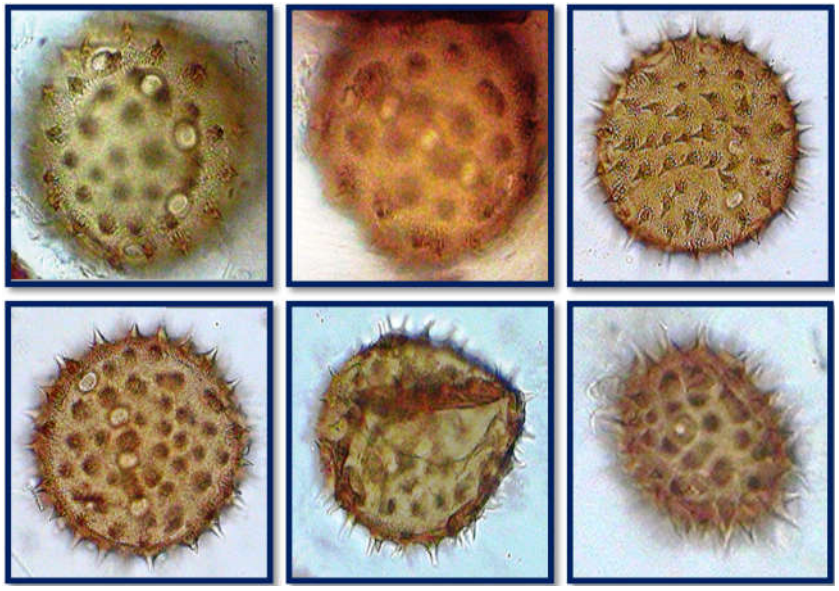

Figure 5. Pollen morphology of *Gossypium herbaceum* Linn.

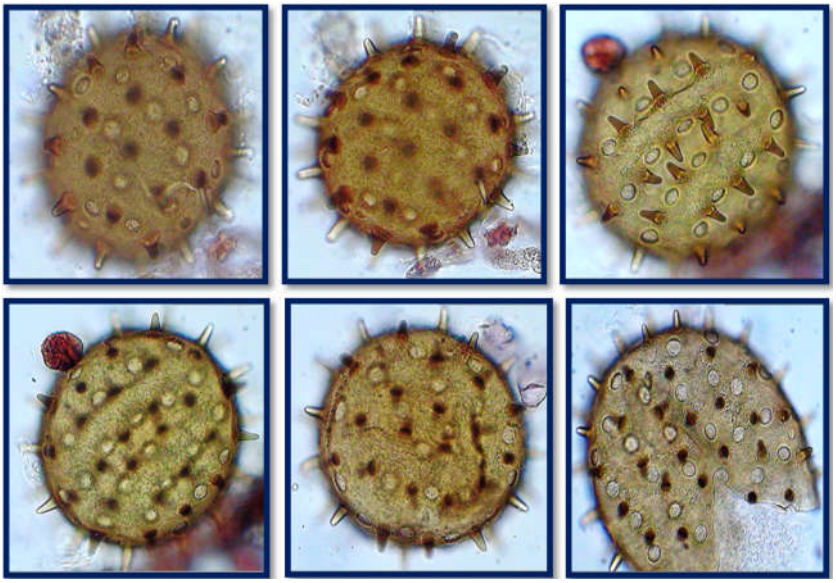

Figure 6. Pollen morphology of *Hibiscus schizopetalus* H.K.F.

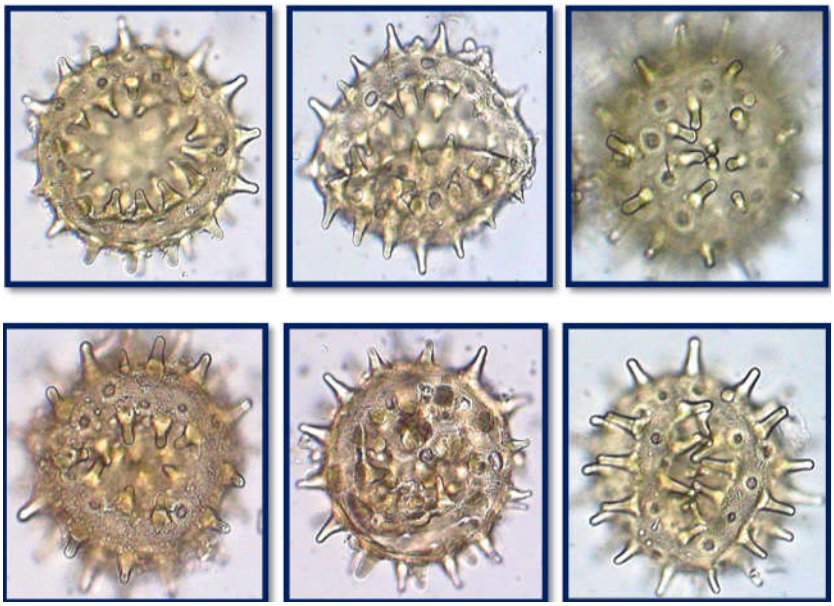

Figure 7. Pollen morphology of *Hibiscus tilaceus* var. (*Tricolor*) L.

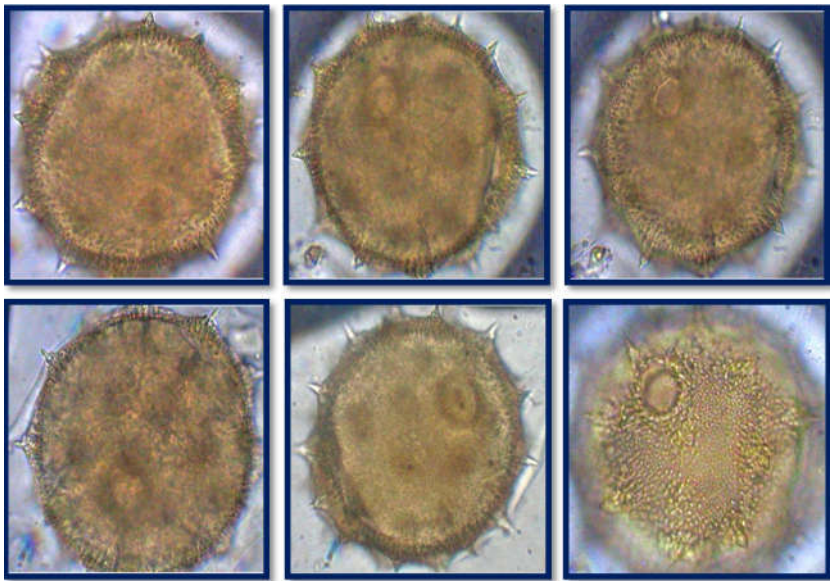

Figure 8. Pollen morphology of *Pentapetes phoenicea* L.

Pollen grain subprolate, spheroidal polar diameter 34.83 ± 0.64 µ, Equatorial diameter 27.13 ± 0.53 µ, colpi long extending up to pole, linear symmetrical, colpi length 33.83 ± 0.55 µ, colpi margin incurved, pore character inconspicuous, mostly polygonal and rarely triangular, muri 0.28 ± 0.06 µm to 0.50 ± 0.08 µm thick, Exine surface reticulate, cellular features instinct, shallow to foveolate.

***5. Gossypium herbaceum* Linn**.

Family: Malvaceae
Local name: Kapas
Habit: Herb
Observation under: 40x

Pollen grains prolate, Spheroidal, very large in size (Average size 100.5 µm; range 97 – 104 µm). Pores circular, diameter 6.5 µm, inter polar distance 18.5 µm, Spines with pointed ends, flat sides, spine length 6.5 µm, width at the base 4.5 µm, inter spinal distance 18.8 µm, basal cushion high, and 5.6 µm in height. Exine thickness 3.5 µm, sexine thicker than nexine.

6. Hibiscus schizopetalus H.K.F.

Family: Malvaceae
Local name: Jasud
Habit: Herb
Observation under: 40x

Pollen grain oblate, spheroidal, pantoporate, very large, about 118.4 µm, Pores circular, diameter 4.3 µm, distance between two pore is 15.2 µm, surface echinate, spines dimorphic large with curved and blunt ends, surface between spine is granulate, spine arrangement is varying type, spines are spaced widely hence easy to count and measure, spine length 17.5 µm, broad at the base 6.5 µm, distance between two spines 13.1 µm, basal cushion absent. Exine thickness 2 - 4 µm.

***7.Hibiscus tilaceus* var. (*Tricolor*) L.**

Family: Malvaceae
Local name: Jasud
Habit: Herb
Observation under: 40x

Pollen grain are symmetrical, spheroidal,, large in size, diameter 116 µm, Amb is circular, pantoporate, Aperture operculate with diameter of 6.2 µm, Exine thickness 6.2 µm, Nexine is thicker than Sexine, Exine ornamentation echinate type, spine length is 20 µm and width is 6.2 µm with blunt end.

***8. Pentapetes phoenicea* L.**

Family: Sterculiaceae
Local name: Saubhagya sundari
Habit: Herb
Observation under: 100x

Pollen grain prolate-oblate, spheroidal, pantoporate, tricolpate, 3 – colporate, large in size range 75.9 – 82.6 µm, pores circular, diameter 3.9 µm, distance between two pore is 7.9 µm, spines echinate with pointed ends, large and small, flat sides, spine length 9.0 µm, broad at the base 2.8 µm, distance between two spine is 10 µm. Exine 4.4 µm thick. Sexine thicker than nexine.

Conclusion

The families Malvaceae (including Bombacaceae), Tiliaceae and Sterculiaceae have been included by all systematize in the order Malvales, except for Hutchinson who separated the Tiliaceae and Sterculiaceae along with some others to another order Tiliales. Among the families of the order Malvales, families Sterculiaceae and Tiliaceae are highly multipalynous, the pollen of the order is characteristically 3-colporate thick walled and often elaborately ornamented, being either reticulate or spinous. The species from Malvaceae have distinctly spiny pollen grains with different size of spines, where as Bombax mulbaricum have non spiny pollen grains mostly triangular and 3- colporate. Species from Sterculiaceae have also spiny pollen grains with short spines. Species from Tiliaceae have non spiny pollen grains, colpate, and colporate.

REFERENCES

Ali S. I., Nasir Y. J. (eds.) 1990–1993. Flora of Pakistan 190–193.species at University of Arid Agriculture, Rawalpindi.

Bera S. K. Basumatary S. K. Dixit Swati, 2007. Studies on pollen morphology and phonological 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 M R. Gupta Bhattacharya S. 2009. A text Book of Palynology. New Central Book Agency (P) Ltd. Kolkata, India.

Christensen, P. B. 1986. Pollen morphological studies in the malvaceae. *Grana*, 25: 95-117.

Culhane, K. J and S. Black More, 1988. Malvaceae. In: (Eds.): W. Punt, S. Black More and G.C.S.

Devarkar V. D. 2011. Study of Allergenic Pollens from Ethnobotanically Important Plants from Osmanabad District. *Lifesciences Leaflets*, 13: 427 -434.

Edwards K J. and Macdonald G. M. 1991. Holocene Palynology: Ii Human Influence And Vegetation Change. *Progress In Physical Geography*, 15**:**364-391.

Erdtman 1969. *Handbook of Palynology*. Munksgaard, Copenhagen.

Erdtman, G. 1952. Pollen morphology and plant taxonomy-Angiosperms (An introduction to palynologyI). Almqvist & Wiksell, Stockholm.

Erdtman, G. 1960. The acetolysis method. A revised description. *Svensk Botanisk Tideskrift*, Bd. 54, H4: 561 – 564.

Faegri, K. and J, Iversen, 1989. Textbook of pollen analysis, Fourth edition. John Wiley and Sons, Chichester, UK.

Frosh, R., Radivo, A. and Ulrich, S. 2009. Pollen terminology-an illustrated handbook. Wien: Springer

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

Mandal, S. and Chanda, S. 1981. Pollen atlas of Kalyani, West Bengal, with reference to aeropalynology. Trans. Bose Res. Inst. 44(3): 35-62.

Moore P. D., Webb J. A. 1978. An illustrated guide to pollen analysis. Hodder and Stoughton, London, UK.

Moore, P. D., Webb, J. A. and Collinson, M. E. 1991. Pollen analysis, Second edition. Blackwell Scientific Publications, Oxford, UK.

Nair P. K. K. 1960. A Modification in the Method of Pollen Preparation. *Ibid*. 19C (1): 26 -27

Nair, P. K. K. and Kapoor, S.K. 1974. Pollen morphology of Indian vegetable crops. *Glimpses Pl. Res*., **2**: 106-201

Noor, M. J., Ahmad, M., Asghar, R., Kanwal, A. And Pervaiz, S. 2004. Palynological studies of cultivated plant in Pakistan. *Asian J. Plant Sci.,* **3** (4), 476-479.

Patel G. I, Datta R. M. 1958. Pollen grain studies in various types of *Corchorusolitorius* L.,*C .capsularis* L. and some other species of *Corchorus*. *Grana* **1**,18-24

Sharma, M. and Nair, P. K.K. 1965. Pollen analysis of some honeys from Uttar Pradesh. *Ind. J. Hor*., 22(1): 46 - 51.

Patel V. C, Skvarla J. J., Raven P. H ; Pollen characters in relation to the delimitation of Myrtales. *Ann Missouri Bot Gard.,* 1984; 71:858-969

Sivaram, V., Roopa, P. Shubharani, R. Guntimasuwannapong, 2012. Pollen analysis in honeys collected from Karnataka region of Nilgiri Biosphere, South India. *J. of Apiculture*., 27(3): 223 -231

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