



MELISSOPALYNOLOGICAL STUDIES OF DISTRICT KAUSHAMBI UTTAR PRADESH

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ABSTRACT

This work is under the category of Melissopalynology. It has great importance because it reveals the plant species foraged by honey bees. The identified plants provide the finger print of the environment and pollen spectrum from where the honey comes. It will help us to increase the production of honey. Pollen analysis also provides the botanical and geographical origin of honey extraction, presence of contaminants, kinds of adulterant etc. Today pollen analysis has become a dispensable tool to authenticate honey. It will also provide to scrutinize the forage behaviour of *Apis* sp. in Bharwari, district Kaushambi, Uttar Pradesh. This work also includes the plant species from which specifically pollens are being harvested. It will also register the change of visited plant species with the change of seasons.

KEYWORDS: Melissopalynology, Kaushambi, Uttar Pradesh

Melissopalynology is the study of pollen in honey or in other words the study of pollen contained in honey. The term originated from the Greek words for "bee" and "honey" with the word for "Study of dust", which now refers to "pollen". It is worldwide accepted as being the least expensive and quickest way to determine the floral contents and geographical origin of honey. Now honey has become an important commercial business and provides sweetness used in several products.

Pollen grains are very crucial for the nutrition of honey bee. Generally these pollen grains are collected from different types of entomophilous and anemophilous plants. This nutrition is very helpful for the survival and reproduction of honey bee. Usually bee visited on several plants but they concentrate on very few plants. The present work throws a light into the pollen composition of honey samples collected from Kaushambi and adjoining areas of U.P. This information may help the beekeeper to conserve plant resources for honey production. It is also used to determine the geographical and botanical origin of honey.

In India, melissopalynological investigations have been reported from Maharashtra (Deodikar and Thakar 1953; Bhusari *et al.*, 2005; Dama *et al.*, 2016), Andhra Pradesh (Ramanujam and Kalpana, 1991; Jhansi *et al.*, 1994; Lakshmi and Suryanarayana 2004; Chaya and Verma 2010; Ramakrishna and Swathi 2013; Devender and Ramakrisna 2015), Karnataka (Agashe and Rangaswamy 1997; Bhargava *et al.*, 2009; Chauhan and Murthy 2010; Sivaram *et al.*, 2012), Bihar (Suryanarayana *et al.*, 1992), Madhya Pradesh (Chauhan and Quamar 2010; Sahney and Seth 2013), Uttarakhand

(Garg and Nair 1974; Gaur and Nanwani 1989; Tiwari *et al.*, 2012; Dixit *et al.*, 2013), Haryana (Chaudhary 2003), Himachal Pradesh (Sharma 1970; Sharma and Raj 1985; Attri 2010; Kaur and Mattu, 2016), West Bengal (Mondal and Mitra 1980; Bhattacharya *et al.*, 1983; Jana *et al.*, 2000; Kumar 2000; Pal and Karmarkar, 2013; Kamble *et al.*, 2015) and Orissa (Upadhyay and Bera, 2012; Upadhyay *et al.* 2014).

In Uttar Pradesh, melissopalynological studies have been carried out in Lucknow (Sharma and Nair 1965; Chaturvedi 1977; Chauhan and Trivedi, 2011; Chauhan *et al.*, 2013 & 2017), Unnao (Chauhan and Singh 2010), Shahjahanpur (Chandra and Sharma 2011), Allahabad (Sahney and Rahi 2015), Sahney *et al.*, 2018 and Varanasi (Sahney *et al.*, 2016). Moreover, the no previous study carried out at district Kaushambi.

MATERIALS AND METHODS

Three sites has been selected for preparation of pollen calendar and for the study of pollen grains in honey but this paper deals only one site- Bharwari in District Kaushambi, U.P.

Flowers of different plants have been collected from all sites for preparation of pollen calendar in different months and slides have been prepared for confirmation and identification of pollen. For the preparation of slides the following methods are followed-

Pollen grains have been collected from the plants with a large number of flowers and heavier dry pollen. Unwanted plant material can be taken out with a pair of forceps afterwards. In some cases no free pollen is

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available and only anthers can be sampled. Anthers release the pollen from the inside after they are dried. Now the pollen can be sieved and the remaining material from the anthers removed. In wind fertilized species male flowers need to be enclosed with paper bags to collect the pollen in a sufficient amount.

For microscopical studies of pollen grains in honey, the following methods are followed-

10 ml of honey sample was dissolved in warm water. After dilution of sample, it is repeatedly centrifuged and sediments was washed with 5 ml of

glacial acetic acid. After acetolysis, it is mounted on slides.

DISCUSSION AND CONCLUSION

Out of 16 honey samples collected from Bharwari of District kaushambi 72 pollen types belonging to 32 plant families were recovered. *Brassica campestris*, *Dalbergia sissoo*, *Eucalyptus sp.*, *Ageratum conyzoides*, *Bombax ceiba* and *Sesamum indicum* were recorded as predominant pollen types in unifloral honey samples collected from Bharwari, district Kaushambi (Plate-1).

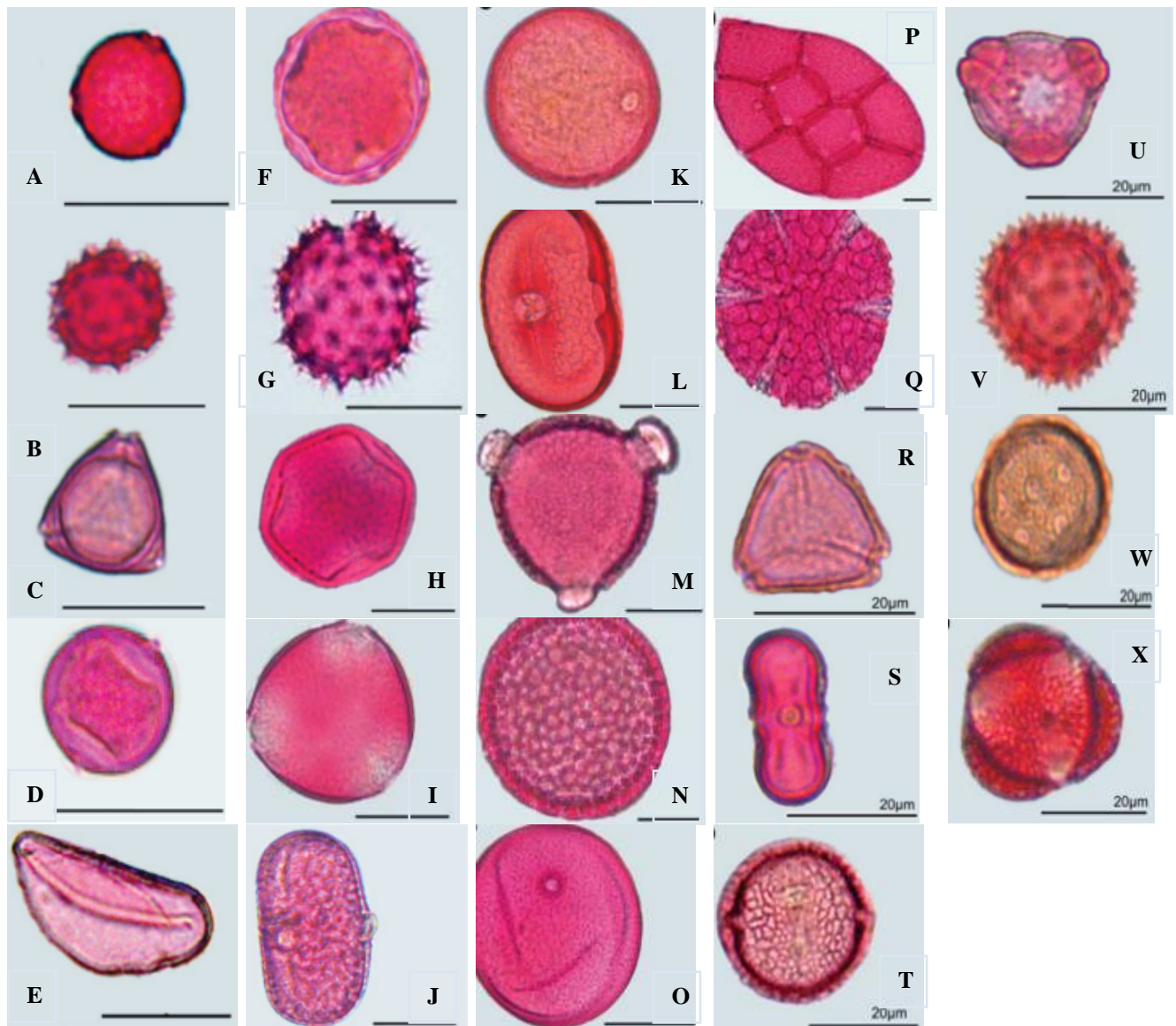


Plate 1: (A) *Acalypha indica* (B) *Parthenium hysterophorus* (C) *Callistemon citrinus* (D) *Morus alba* (E) *Phoenix sylvestris*(F) *Holoptelea integrifolia* (G) *Moringa oleifera* (H) *Tridax procumbens* (I) *Ailanthus excels* (J) *Cassia fistula* (K) *Pisum sativum* (L) *Lathyrus sativus* (M) *Cajanus cajan* (N) *Jatropha gossypifolia* (O) *Zea mays* (P) *Calliandra* sp (Q) *Salvia dorrii* (R) *Psidium guajava* (S) *Coriandrum sativum* (T) *Citrus* sp(U) *Eucalyptus citriodora* (V) *Ageratum conyzoides* (W) *Amaranthus/Chenopodium* sp. (X) *Brassica campestris*

Study of pollen grains present in honey, provides relevant information about the pollen and nectar sources

in a region utilized by bees for the production of honey, which is used to determine the geographical and botanical

origin of the honey. Nine honey samples were found to be unifloral while the remaining seven samples were multifloral. *Brassica campestris* and *Ageratum conyzoides* were found to be very frequent pollen types as they were recovered from more than 50% of the honey samples. Findings of the present melissopalynological study suggest *Brassica campestris*, *Dalbergia sissoo*, *Eucalyptus sp.*, *Ageratum conyzoides*, *Bombax ceiba* and *Sesamum indicum* are the important source plants of Allahabad. This information may help the beekeeper to conserve plant resources for honey production.

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