IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Melissopalynological study of honey from 26 blocks of Murshidabad district, West Bengal, India

Ankush Pal and Sneha Das
Department of Botany
Berhampore Girls' College
Berhampore, Murshidabad

ABSTRACT:

Melissopalynology is the study of the pollen they collect, intentionally and accidentally, which gets into honey. Melissopalynological studies are useful those interested in accurately labelling commercial honeys or for substanting source claims for particular type of honey. The present study deals with melissopalynological analysis of honey sample collected from twenty-six blocks of Murshidabad district, West Bengal, India. As most of the plants are crosspollinated, the role of the pollinatorsin crop production, bees are considered to be the best performer in relation to pollination. Murshidabad is the historic place from the time of 17th century and flourished with different types of exotic and indigenous plants.

KEYWORDS: Melissopalynology, Honey, Pollination, Murshidabad

INTRODUCTION:

Melissopalynology is an effective tool for studying the interaction between honeybees and the vegetation (Shilpa and Ratan, 2011). Studying the pollen in honey is very essential to determine the geographical and botanical origin of honey as well as to assess the quality of honey. The determination of geographical origin is generally based on the entire pollen spectrum in honey. It is being consistent with the flora of a particular region. The earliest scientific information on melissopalynology was conducted by Pfister, 1895. Later the pollen analysis of honey gaining more importance around the world in order to understand the bee-plant relationship as well as the various pollen and honey source which includes countries like New Zealand (Moar, 1985) ;Turkey (Kaya er al, 2005); Italy (Fortunato er al, 2006); Brazil (Oliviera et al, 2010); Nigeria (Ebenezer and Olugbenga, 2010);Croatia (Sabo et al, 2011); China (Song et al, 2012); Bangladesh (Shilpa and Ratan, 2011); Nepal (Paudayal and Gautam, 2012). In India, melissopalynological study was initiated by Deodikar et al. (1958) at Mahabaleshwar hills, Maharashtra; Later, some of the significant studies in melissopalynology were carried out from various parts of the country which includes Nair (1964); Western Ghats (Chaubal and Deodikar, 1965): Calcutta (Bhattacharya et al, 1983); Andhra Pradesh (Lakshmi and Suryanarayana, 1997 a, b and Bhusari et al., 2007); Assam (Bera et al., 2007);Karnataka (Bhargava er al., 2009 and Sivaram et al., 2012); Andaman (Shilpa and Ratan, 2011); Uttarakhand (Tiwari et al., 2012). The present study was carried out to determine qualitative and quantitative estimation of pollen grains in honey samples as well as the floral source in order to recognise the ecological origin. The district Murshidabad is located in 23°43' and 24°52' North latitude and 87°49' and 88°44' East longitude. The shape of the district resembles an isosceles triangle with its apex pointing towards Northwest. It is bounded on the East by the river Padma; on South by the district of Burdwan and Nadia and to its West lie the district of Birbhum and Santhal parganas. The town Berhampore is the head quarter of the district. The river Bhagirathi, flowing through the district from North to South divides it into two more or less equal portion of contrasting physiography. The tract to the West of Bhagirathi is locally referred to as Rarh and the

tract to the East as Bagri. Bagri, the Eastern tract is low lying alluvial plain occasionally getting

flooded by the spill of Bhagirathi and other rivers, having a relatively humid climate and fertile soil. In the Western tract, on the other hand the surface is high and undulating, the soil is haw clay and the climate is drier in the Eastern tract. Being situated in the lower Gangetic valley, the overall inclination of the district is from north-west to south-east.

MATERIALS AND METHODS:

For qualitative microscopic studies of the pollen contents, five ml. of honey sample were dissolved in twenty ml. of warmwater and the solution was repeatedly centrifuged with water and was finally treated with five ml. of glacial acetic acid. This was then followed through acetolysis (Erdtman, 1952) and finally the sediment was mounted in glycerin jelly on several micro slides depending upon the quantity of the sediment. Qualitative pollen analysis was performed according to the method recommended by the International Commission of Bee Botany (ICBB, 1970). The pollen types were identified with the help of reference slides made from ground flora.

Pollen frequency (%) of honey samples from 26 blocks of Murshidabad district:

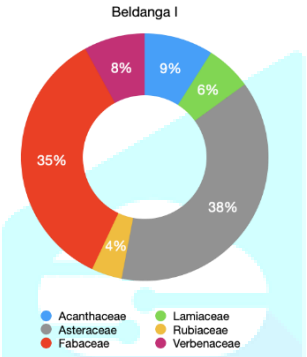

Fig.1. Pollen frequency (%) in honey sample of Beldanga I block

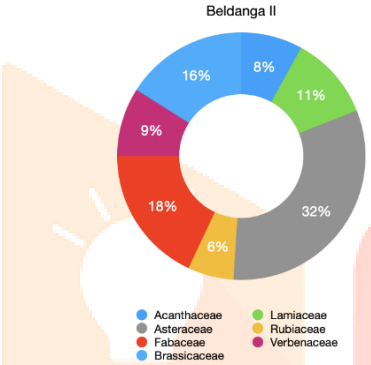

Fig.2. Pollen frequency (%) in honey sample of Beldanga II block

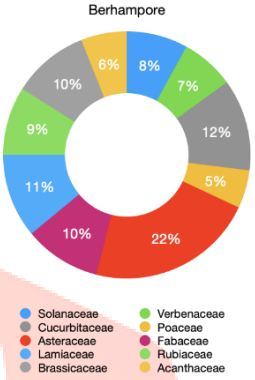

Fig.3. Pollen frequency (%) in honey sample of Berhampore block

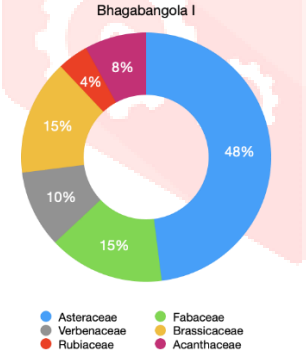

Fig.4.Pollen frequency (%)in honey sample of Bhagabangola I block

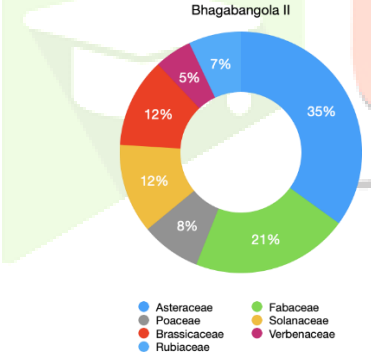

Fig.5.Pollen frequency (%)in honey sample of Bhagabangola II block

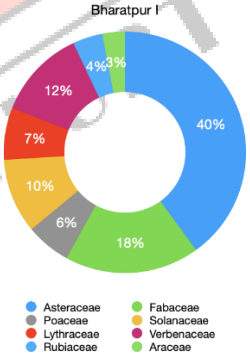

Fig.6.Pollen frequency (%)in honey sample of Bharatpur I block

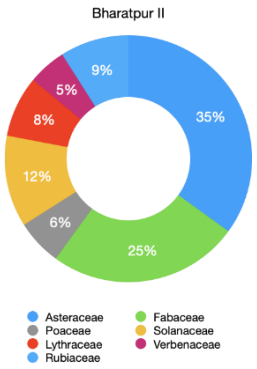

Fig.7.Pollen frequency (%)in honey sample of Bharatpur II block

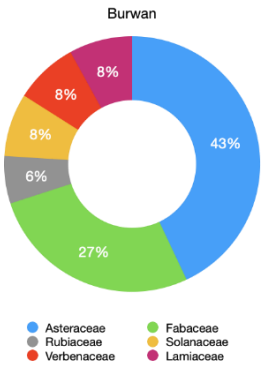

Fig.8.Pollen frequency (%)in honey sample of Burwan block

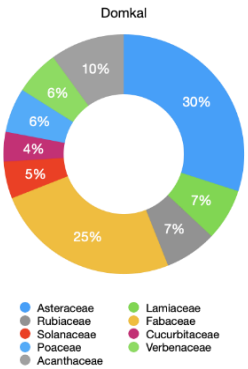

Fig.9.Pollen frequency (%)in honey sample of Domkal block

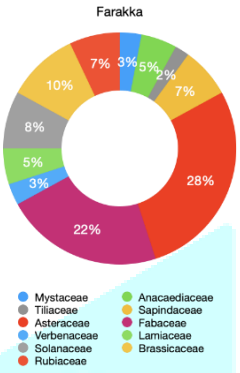

Fig.10.Pollen frequency (%)in honey sample of Farakka block

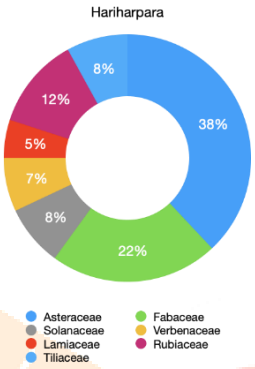

Fig.11.Pollen frequency (%)in honey sample of Hariharpara block

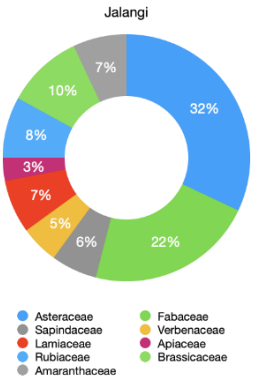

Fig.12.Pollen frequency (%)in honey sample of Jalangi block

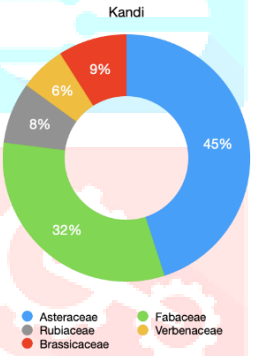

Fig.13.Pollen frequency (%)in honey sample of Kandi block

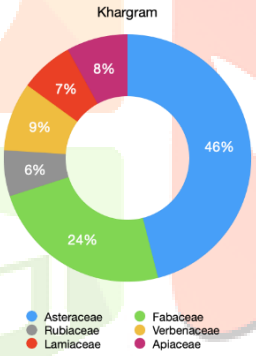

Fig.14.Pollen frequency (%)in honey sample of Khargram block

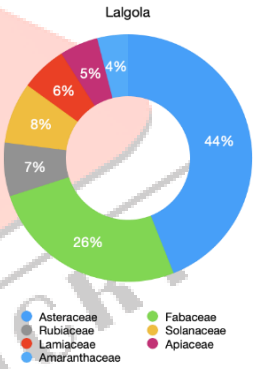

Fig.15.Pollen frequency (%)in honey sample of Lalgola block

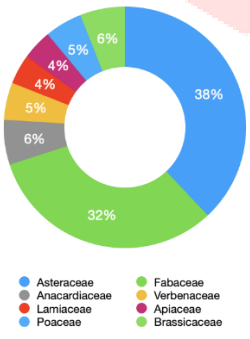

Fig.16.Pollen frequency (%)in honey sample of Murshidabad-Jiagang block

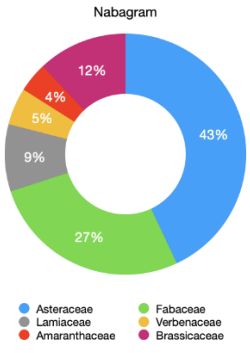

Fig.17.Pollen frequency (%)in honey sample of Nabagram block

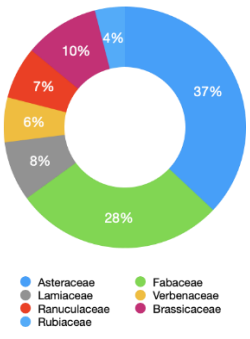

Fig.18.Pollen frequency (%)in honey sample of Nawda block

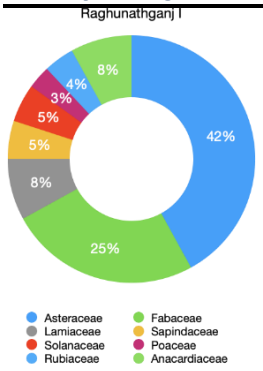

Fig.19.Pollen frequency (%)in honey sample of Raghunathganj I block

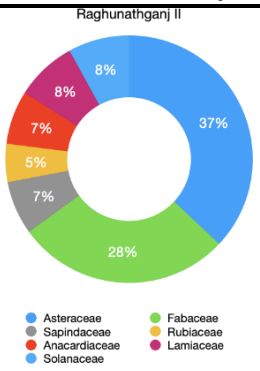

Fig.20.Pollen frequency (%)in honey sample of Raghunathganj II block

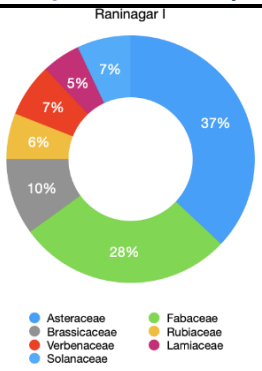

Fig.21.Pollen frequency (%)in honey sample of Raninagar I block

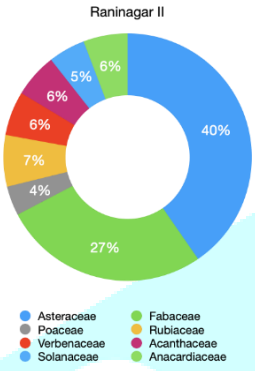

Fig.22.Pollen frequency (%)in honey sample of Raninagar II block

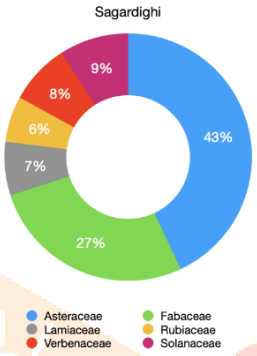

Fig.23.Pollen frequency (%)in honey sample of Sagardighi block

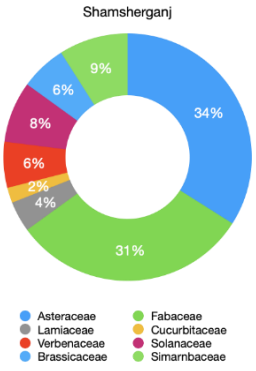

Fig.24.Pollen frequency (%)in honey sample of Shamsherganj block

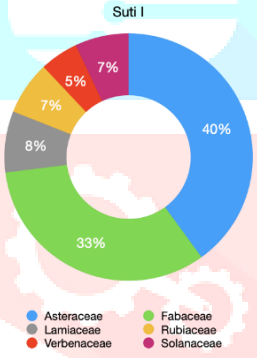

Fig.25.Pollen frequency (%)in honey sample of Suti I block

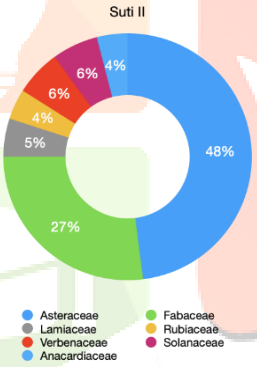

Fig.26.Pollen frequency (%)in honey sample of Suti II block

RESULT:

Twenty-eight different pollen types belonging to twenty-one different families were identified from twenty-six honey samples where the maximum number of pollen morphotypes identified from a single sample is eleven and the minimum number is five. Melissopalynogical screening of different pollen types and their relative frequencies arepresented in the Fig.1 -26. Out of fifteen squeezed honey samples nine are unifloral and six belongs to multifloral. The highest percentage of (78%) pollen was found in unifloral sample from Farakka where total floral eleven pollen types were identified. The dominant types belong to the family Asteraceae and Fabaceae.

DISCUSSION AND CONCLUSION:

The pollen type abundance varied among the different blocks of the district. Asteraceae pollen types particularly *Parthenium sp* and *Cosmos sp* shows the highest pollen frequency followed by Fabaceae. The members of Asteraceaegrowing all over the India and flowering round the year. The most common Fabaceous pollen types are *Bauhinia sp, Caesalpinia sp, Cassia sp* and *Delonix sp* etc. *Parthenium* is the most common pollen types in several honey samples. Pollen loads were collected both in summer and winter season. Prevalence of Asteraceae pollen had been reported from Hydrabad and Andhrapradesh. Asteraceae pollen types were collected mainly by the honeybees like *Apis florea, Apis dorsata, Apis cerana indica*. Thus, it becomes apparent that the Asteraceae pollen types particlarly Parthenium sp is an important bee plant which can successfully attract different bee species for its pollen and nectar which is evident from the past records of phytogeographical zones of India. Pollen frequency is high in Farakka

block due to its geographical location. Consequently, it is obvious that the negative impact of floral competition is sure to reduce pollination to target crop if it is cultivated in vicinity where the abundanceof *Parthenium sp* becomeshigh. Similar procedure should be implemented in case of *Parthenium sp* to decreasedrifting of beepollinators from the target cropsof mix crop culture should be followed in Murshidabad disstrict of West Bengal, India to minimalize the acute problem and to increase the crop yield.

ACKNOWLEDGEMENT:

The authors are thankful to Prof. P. K. Pal, Department of Botany, University of Burdwan for his valuable suggestion and comments on the present investigation.

REFERENCES:

Atanassova, J.. Yurukova, L., Lazarova, M. 2012. Pollen and inorganic characteristics of Bulgarian unifloral honeys. Czech J. Food Sci. 30 (6): 520-526.

Erdtman, G. 1952. Pollen Morphology and Plant Taxonomy. Angiosperms. Almquist and Wiksell, Stockholm.

Ford. I. 1971. Chinese gooseberry pollination. N.Zeal.J.Agric. 122 : 34-35.

Free, J.B. 1968. Dandelion as a competitor to fruit trees for bee visits. J.Appl. Ecol. 5: 169 -178.

Garg. Arti 1996. Palynocontents of Bee-collected pollen loads of Autumn Season in Bhimtal, India. Taiwania. 41(3): 197-207.

Garg, Arti and Nair, P.K.K. 1994. Seasonal analysis of honey bee pollen loads from a temperate zone in Kumaon Himalaya in UttarPradesh, India. Jour. Palynol. 30: 1-34.

Hjelmroos, M. and Lobreau-Callen, D. 1994. Ecological relationship of pollen and bees, Melissopalynology. Grand. 33(4/5): 43-49.

International Commission for Bee Botany (ICBB). 1970. Methods of Mellissopalynology, Bee World.51: 125-138.

Jay, D. and Jay, S.C. 1984. Observations of honevbees on Chinese Gooseberries ('Kiwi fruit') in New Zealand. Bee World. 65: 155-166.

Kalpana. T.P. and Ramanujam, C.G.K, 1994. Carum copticum- A major source of winter honeys in Ranga Reddy District, Andhra Pradesh. Proc. Indian Natn. Sci. Acad.B60 (6): 583-593.

Kalpana, T.P., Fatima. K. and Ramanujam, C.G.K. 1990.Pollen analysis of Apis cerand and Apis florea honeys from Adikmet area, Hyderabad. Proc. Indian Acad. Sci. (Plant Sci.) 100 (3):183-193.

Lazarova, M., J. Atanassova, L. Yurukova. 2010. Botanical origin and inorganic content of bee honey in northeast Bulgaria (Shumen region). Phytologia Balcanica, 16 (1):131-135.

Maria, D.. Tananaki, C.. Goras, G., Karazafins. E. and Thrasyvoulou, A. 2013.Melissopalynological analysis of royal jelly from Greece. Grana, 52(2):106-112.

Pendleton, M. 2006. Descriptions of melissopalynological methods involving centrifugation should include data for calculating Relative Centrifugal Force (RCF) or should express data in units of RCF or gravities (g). Grana. 45(1):71-72.

Ramanujam, C. G. K., Reddy, P.R. and Kalpana, T.P. 1992.Pollen analysis of apiary honeys from East Godavari District, A.P. J. Indian Inst. Sci. 72: 289-299.

Ramanujam, C.G.K and Kalpana, T.P. 1990-91. Pollen analysis of Prosopis juliflora honeys from Ranga Reddy Dist., A.P. and its relevance to apiculture and social forestry. Jour. Palynol. (Silver Jubilee Commemoration Volume): 345-368.

Ramanujam, C.G.K and Kalpana, T.P. 1992. Tamarindus indica L. an important forage plant for Apis florea F. in south central India. Apidologie. 23: 403-413.

Sajwani, A., Farooq. S.. Patzelt. A.. Eltayeb, B. and Bryant, V.M. 2007. Melissopalynological studies from Oman. Palynology. 31(1): 63-79.