



**MELLITOPALYNOLOGICAL STUDIES ON ROCK BEES HONEY SAMPLES
DURING WINTER SEASON IN KUHEE AREA OF NAGPUR DISTRICT IN
MAHARASHTRA STATE , INDIA**

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Abstract :

Studies on pollen analysis of rock bee honey were undertaken during winter season in Kuhee area of Nagpur District in Maharashtra. A total of six rock bee honey samples were collected. A total of 31 plant species served as pollen and nectar sources to honey bees (*Apis dorsata*).

The main pollen and nectar sources consisted of *Capsicum annum L.*, *Tinospora cordifolia* (Willd) Miers. ex Hk. f. & Thoms, *Helianthus annuus L.*, *Hyptis suaveolens* (L.) Poit., *Lagascea mollis* Cav., *Lathyrus sativus L.*, *Carthamus tinctorius L.*, *Tridax procumbens L.*, *Sphaeranthus indicus L.*, *Sonchus oleraceus L.*, *Ailanthus excelsa* Roxb., & *Coriandrum sativum L.*

The study reveals that this region has potentiality for bee keeping and therefore, the knowledge of the floral wealth of this region is important for its maximum exploitation.

Keywords :

Bee forage, *Apis dorsata*, Kuhee area, District Nagpur, Maharashtra.

Introduction:

The analysis of pollen in honey is important for identifying the geographical and botanical origin of honeys and also about contamination of honey with brood, dust etc. (Louveaux *et al*; 1978). Pollen, the male reproductive unit of plants are providing proteinaceous food., containing fats, minerals, vitamins, essential oils and colouring materials while nectar forms the carbohydrates source having sucrose, glucose and fructose in varying proportions, essential oils minerals and other materials in traces (Rakesh Kumar and Chaudhary, 1993).





Laboratory studies using melittopalynological methods have been made to evaluate sources of pollen and nectar for honey bees in different parts of the country namely Maharashtra (Thakar *et al*; 1962 , Bhusari *et al* ; 2005 , Mate D. M. 2013), Bihar (Suryanarayana *et al* ; 1992 ; Rakesh Kumar & Chaudhary ; 1994) , Andhra Pradesh (Jhansi *et al* ; 1990 , Ramanujam C. G. K.& Khatija Fatima 1992, 1993), (Chaturvedi; 1973 , 1977) from Banthra , Uttar Pradesh. This study is therefore aimed at identifying the pollen and nectar sources to the honey bees *Apis dorsata* Fabr. in Kuhee , District Nagpur , Maharashtra and the knowledge of the floral wealth of this region is important for its maximum exploration.

Material And Method:

Six rock bee honey samples were collected during winter season from six localities of Kuhee area , Nagpur District of Maharashtra namely Silli, Tarna, Mandhal, Ruyad, Bhojapur & Ajani. The colonies of *Apis dorsata* were disturbed by using water spray and smoker to calm bees. Once bees leave the comb and fly around it , the honey contained comb is collected quickly.

1 ml honey was mixed with 10 ml distilled water and centrifused. The recovered sediment was treated with 5ml glacial acetic acid and the mixture was subjected to acetolysis (Erdtman ; 1960) method. Three pollen slides were prepared from each honey sample. The pollen were identified with help of reference pollen slides and relevant literature.

For determining the frequency classes of pollen types, 300 pollen grains were counted (100 per slide)as recommended by the International Commission for Bee Botany (Louveaux *et al*; 1978) Four frequency classes were recognized.

Predominant pollen type (> 45%)

Secondary pollen type (16 - 45 %)

Important minor pollen type (3 - 15 %)

Minor pollen type (< 3%)





Result And Discussion:

From the results it is evident that a total number of 31 species served as pollen and nectar sources to *Apis dorsata* F. (Table -2). A total number of six samples were collected from Kuhee area of Nagpur District in Maharashtra . Sample NGP-KU-Aja-48 from Ajani area had the maximum number of pollen types (16) whereas sample NGP - KU- Sil-2 from Silli area had minimum number (6) of pollen types.

Table -1 : Details of collected honey samples

Sr. No	Sample no.	D. of collection	Probable sources
1	NGP-KU-Sil-2	18 -10-2008	Capsicum annuum, Hyptis suaveolens,
2	NGP-KU-Tar-9	12-12-2008	Capsicum annuum, Sphaeranthus indicus
3	NGP-KU-Mdh-15	18-2-2009	Tinospora cordifolia, Capsicum annuum
4	NGP-KU-Ruy-16	20-2-2009	Capsicum annuum, Helianthusannuus Sonchus oleraceus,Carthamus tinctorius
5	NGP-KU-Bho-47	20-1-2010	Lathyrus sativus, Lagascea mollis,Carthamus tinctorius,Sphaeranthus indicus,Capsicum annuum,Coriandrum sativum
6	NGP-KU-Aja-48	21-1-2010	Lagascea mollis, Lathyrus sativus,Sphaeranthus indicus,Carthamus tinctorius,Capsicum annu Coriandrum sativum





Table-2 :Frequency Distribution of Pollen Types in the Honey Samples

Sr. No	Species	Frequencies %					
		NGP-KU	NGP-KU	NGP-KU	NGP-KU	NGP-KU	NGP-KU
		Sil-2	Tar-9	Mdh-15	Ruy-16	Bho-47	Aja-48
1	Abutilon indicum P.Miller	-	-	-	-	-	0.08
2	Ailanthus excelsa Roxb	-	-	-	3.58	-	-
3	Albizia lebbbeck (L.) Benth	-	-	1.20	-	-	-
4	Alternanthera sessilis (L.)	-	0.16	-	-	-	-
5	R.Br.ex DC Brassica sp	-	-	-	0.94	-	-
6	Cajanus cajan (L.) Millsp	-	0.16	-	0.76	2.25	2.58
7	Capsicum annum L	43.5	. 43.5	82.91	31.23	4.33	7.41
8	Carthamus tinctorius L	-	-	1.01	7.09	18.16	10.25
9	Celosia argentea L	-	0.08	-	-	-	-
10	Citrus sp	-	-	1.47	-	-	-
11	Coriandrum sativum L	-	-	-	-	3.08	6.16
12	Helianthus annuus L	-	-	17.56	26.15	0.91	0.25
13	Hyptis suaveolens(L.) Poit	20	-	-	-	-	-
14	Justicia procumbens L	-	0.25	-	-	0.08	0.5
15	Lagascea mollis Cav	18.66	-	-	-	26.75	34.5
16	Lathyrus sativus L	-	-	-	-	29.75	24.66





Sr. No	Species	Frequencies %					
		NGP-KU	NGP-KU	NGP-KU	NGP-KU	NGP-KU	NGP-KU
		Sil-2	Tar-9	Mdh-15	Ruy-16	Bho-47	Aja-48
17	Leucaena leucocephala (Lam.) de Wit	2.91	-	0.27	-	0.16	-
18	Linum usitatissimum L	-	-	-	-	-	0.16
19	Mangifera indica L	-	-	0.09	-	-	-
20	Melia azadirachta L	-	-	-	-	-	0.5
21	Mimosa sp	2.91	-	-	-	-	-
22	Pisum sativum L	-	-	-	1.45	-	-
23	Rungia repens (L.) Nees	-	-	-	-	1	0.83
24	Sonchus oleraceus L	-	-	0.09	7.17	0.33	0.25
25	Sphaeranthus indicus L	-	14.91	-	-	13.16	11.08
26	Terminalia sp.	-	-	0.55	-	-	-
27	Tinospora cordifolia (Willd) Miers. ex Hk.f & Thoms	-	-	-	46.48	-	0.08
28	Tridax procumbens L	12	0.41	-	2.30	-	0.66
29	Vernonia cinerea (L.) Cess	-	1.08	-	-	-	-
30	Amaranthus / Achyranthes sp. (Non-melliferous)	-	-	-	0.16	-	-
31	Sorghum vulgare Pers.(Non-melliferous)	-	-	9.83	2.5	-	-

Of the six honey samples collected from Kuhee area (2,9,15,16,47,and 48) three were found to be unifloral (9,15,16) and other multifloral (2,47 and 48) (Table -2). *Capsicum annum* (82.91% and 50%) formed the predominant pollen type in two samples i,e 9 and 16 respectively and *Tinospora cordifolia* (46.48%) in one sample i,e 15.

In the multifloral honeys *Capsicum annum*, *Hyptis suaveolens*, *Lagascea mollis*, *Lathyrus sativus* and *Carthamus tinctorius* constituted the secondary pollen types. The other significant pollen types upto important minor recorded were viz; *Tridax procumbens*, *Sphaeranthus indicus*, *Sonchus oleraceus*, *Carthamus tinctorius*, *Ailanthus excelsa*, *Capsicum annum* and *Coriandrum sativum*.

Sorghum vulgare and *Amaranthus/ Achyranthes* sp.were the pollen of non-melliferous/ anemophilous taxa encountered in minor percentage. In the





sample 15, however, the pollen of *Sorghum vulgare* were found to be good in number (9.83%). A total of 31 pollen types (29 melliferous and 2 non-melliferous/anemophilous taxa) were recorded from Kuhee honeys.

The analysis revealed that *Capsicum annum*, *Helianthus annuus*, *Tinospora cordifolia*, *Hyptis suaveolens*, *Lagascea mollis*, *Lathyrus sativus* and *Carthamus tinctorius* were the main pollen and nectar sources Kuhee area of District Nagpur.

Conclusion:

The microscopic analysis of honey samples collected from Kuhee area during winter season in Nagpur District shows that the area is rich in a variety wild and as well as cultivated plants

Capsicum annum, *Helianthus annuus*, *Lathyrus sativus*, *Carthamus tinctorius*, *Coriandrum sativum* & *Sorghum vulgare* are the cultivated crop plants in this area. Of these *Capsicum annum* is the main predominant nectar and pollen source in this region. Similarly *Tinospora cordifolia* a wild plant is also the main predominant nectar and pollen source to the rock bees. The remaining wild plants viz; *Hyptis suaveolens*, *Lagascea mollis*, *Tridax procumbens*, *Sphaeranthus indicus*, *Sonchus oleraceus*, *Ailanthus excelsa*, & *Amaranthus/ Achyranthes* sp. were the main pollen and nectar sources to *Apis dorsata* in this area.

This study will be helpful to the beekeepers for identifying the pollen and nectar sources to honey bees during winter season in Kuhee area and is also important for its maximum exploitation.

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