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SUMMER POLLEN SOURCES TO *APISDORSATA* HONEYBEES COLLECTED FROM POMBHURNATAHSIL FOREST AREA OF CHANDRAPUR DISTRICT OF MAHARASHTRA STATE (INDIA)

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ABTRACT

76pollen loads recovered directly from the honeycombs of *Apisdorsata*(Rock Bee) collected in13April 2012 to 10 June2013 from Chiroli and Bembal forest area of Pombhurna Tahsil of Chandrapur District of Maharashtra State, were analysed.31(40.78%) pollen loads were found to be Uniforal, 37(48.68%) bifloral and 8 (10.52%) multifloral. The Unifloral pollen loads were contained *Terminalia* sp., *Mangifera indica* and *Albizia lebbeck*. The pollen of *Mangifera indica* was recovered from 57(75%) of the total pollen loads studied. The study high lights *Terminalia* sp. (combretrceace), *Blumea*sp. (Asteraceae), *Mangifera indica*(Anacardeaceae), *Psidium guajava*(Myrtaceae) as fairly important sources of pollen of the honeybeesduring the summer period.

***KEYWORDS**: Pollen Sources, Honeybee, Pombhurna Tahsil. Forest Area*

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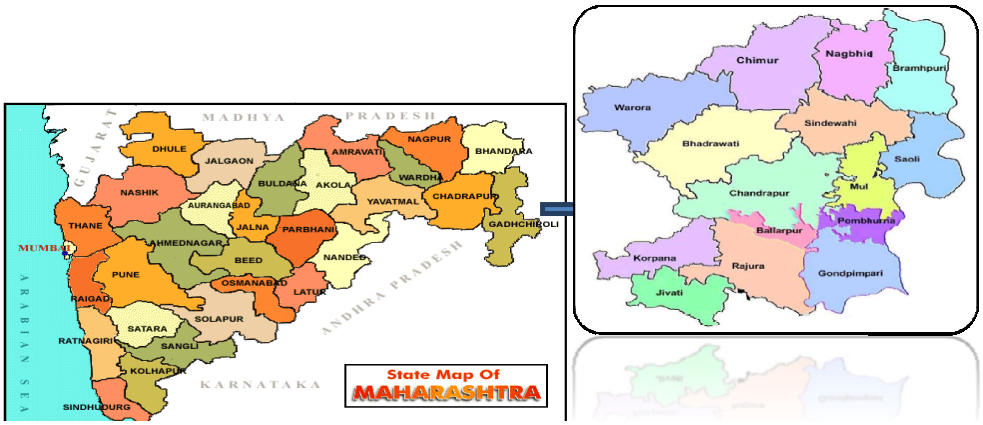
INTRODUCTION

Honey bees visit plants for nectar and pollen. Nectar consisting predominantly of sources often associated with limited quantity of glucose and pollen grains provide the chief source of protein requirement of the bees essential for building their body tissues. (Rahman khan 1941) particularly during the early embryonic growth, bees prefer the nectar of a plant species that has the maximum sugar concentration. (Ramanujam 1991) Similarly they prefer pollen type with the maximum nutritive values and palatability. Melittopalynological investigation involving honey samples and pollen loads furnish reliable information on the relative preferences of the honey bees among the floral sources available within their foraging ranges. (Ramanujam 1994) Analysis of pollen load unravels the floral fidelity of fixity of the bees to a particular plant speciesin any floristic community, by highlighting the numerical status of the pollen type in the individual loads. The quantification of the data would help us to recognize the major and minor sources of pollen in any particular area. (Chaudhari 1978)

Studies involving the analysis of pollen loads are few when compared to those of honeys, in the Indian context. Sharma (1970a & 1970b, 1972) and Chaturvedi (1973)studied the pollen loads of *Apiscerena*, the Indian hive bee, from Kangra in Himachal Pradesh and Banthara in the vicinity of Luckhnow. Seethalakshmi and Perey (1980) recognized Borassus flabellifer as a good pollen sources in Tamilnadu by analysing 900 pollen loads of *Apiscerena* at Vijayarai in

West Godawari District of Andra Pradesh and recognized potential of this region for apiculture Kalpana, Khatija and Ramanujam (1990) and Ramanujam and Kalpana (1990)provided information on the pollen sources of *Apisflorea* and *Apiscerena* honey bees in Hydrabad and Ranga Reddy District. Recently Borkar Laxmikant and Mate Devendra (2014) provided information on the pollen source of *Apisdorsata* Honeybees in the bramhapuri forest area of chandrapur District of Maharashtra state and Cherian *et al.* (2011) provided information on the pollen sources of *Apiscerena* honeybees in Nagpur District of Maharashtra. This study is aimed to recognize the major and minor sources of pollen to *Apisdorsata* bee in these forest during summer period (Honey flow season) on the basis of qualitative and quantitative analysis of numerous pollen loads recovered directly from various honeycombs.



Map Showing Pombhurna Tahsil of Chandrapur District from where the Pollen Loads were Collected

MATERIAL AND METHOD

Pollen loads (Comb loads) 76in number of *Apisdorsata* were obtained from two Honeycombs collected on 13 April 2012 to 10 June 2013 from Chiroliand Bembalforest area of Pombhurnatahsil of Chandrapur District of Maharashtra State.(CHN-POM-CHI), (CHN-POM-BEM).

The pollen grains of each pollen load were dispersed in 1 ml of glacial acetic Acid and later on subjected to acetolysis. Erdtman (1960)One slide prepared for each pollen load and microscopically examined. All such pollen loads consisting of a single pollen type represent unifloralloads, with two pollen types bifloral and with more than two, multifloral Sharma, (1970 a). Identification of the pollen types was based upon the reference palynoslides of the forest flora and the relevant literature. The pollen productivity of the significant taxa was computed using haemocytometer.

RESULT

The analysis has brought to light that 31(40.78%) loads were unifloral, 37(48.68%) were bifloral and the remaining 8(10.52%) loads multifloral (Table 2).

The pollen grain of 8 taxa referable to 8 families were recorded. These are *Terminalia* sp.(Combratrceace), *Mangifera indica* (Anacardeaceae), *Psidium guajava*(Myrtaceae), *Delonix regia*(caesalpiniaceae), *Albizia lebbeck*(Mimosaceae), *Bombax ceba* (Bombiaceacea),*Citrus* sp. Of these *Blumea*sp.isherbaceous weeds which represent the undergrowth, the remaining taxa are either arborescent member or shrub of the forest range.

Table 1: Pollen Morphological Characters of the Taxa Recorded

S.N.	Pollen Type	Size, Shape & Symmetry	Aperture Pattern	Pollen Wall (sporoderm) structure & sculpture
		Myrtaceae		
01	***Psidium guajava***Linn.	24-25 µm, Amb subtriangular; 13-16× 26-28 µm, oblate; Radially symmetrical	Tricolporate, syncolpate, parasyncolpate, oralalongate	Exine 1.5 µm thick , tectate surface granular to pailate
		Asteraceae		
02	***Blumea***sp.	21-24 µm, Amb spheroidal, isopolar, Radiallysymmetrical	21-24 µm, Amb spheroidal, isopolar, Radially	Exine 3 µm thick, surface echinate, spines 5-6 µm long, 4 spines in the interapertural region interspinal area psilate
		Bombiaceae		
03	***Bombax ceba*** Linn	51 µm (49.5×52.5) µm, peroblate, isopolar, Radially symmetrical	Tricolprate, col. length 12 (10.5-13.5) µm	Exine thick 3 µm, coarsely reticulate, mesh 4.1 µm (3-4.5 µm) in the major part except at the angles showing medium reticulations 1-8 µm (1.5 -3 µm), greater number of baculae are found in the lumen. Muri simplibaculate, faint LO pattern.
		Rutaceae		
04	***Citrus***Sp.	27-29 µm, Ambsquarish, 26-30 ×25-27 µm, prolate spheroidal radially symmetrical	Tetracolporate, colpi linear, tips acute, oralalongate	Exine 2 µm thick subtectate, surface Reticulate. Heterobrochate, meshes smaller near the apertural regions and larger elsewhere, lumina hexa to pentagonal or irregular, psilate, muri simpli to locally duplibaculate
		Mimosaceae		
05	***Albizia lebbeck***	16-celled polyad with central eight cells of two superimposed groups of 4 cells each and peripheral 8 cell (4+4+8 condition), spheroidal or biconvex disc, 72-74 µm in diam., each cell of the polyad 17-19m in diam, Amb of individual cell squarish; radially symmetrical	Individual pollen triporate , pores faint	Exine 1.6µm thick, tectate, surface psilate to faintly granular
		Casalpiniaceae		
06	***Delonix regia*** (Boj. ex. Hoof.) Ref.	59.62 µm, Ambmore or less spheroidal to subtriangular; 53-56× 57-60 µm, oblate to suboblate; Radially symmetrical	Tricolporate, colpi long with blunt ends, ora faint, more or less rounded	Exine 5.2 µm thick, subtectate, surface coarsely reticulate. Heterobrochate, meshes smaller near the apertural regions &larger elsewhere , lumina poly to hexagonal with a number of free bacules, muri thick, sinuous, simpli to locally duplibaculate

Combretaceae				
07	***Terminalia***sp.	19-22 µm, Amb spheroidal; 21-24 x20-22 µm, subprolate; Radially symmetrical	Tricolporate, colpi alternating with pseudocolpicolpi linear, tips acute pseudocolpi almost equal the size of colpi, ora more of less circular	Exine 1.5 µm thick, tectae, surface psilate to locally finely granular
Anacardiaceae				
08	***Mangifera indica*** Linn.	27-31 µm, Amb subtriangular; 29-32 ×26-28 µm , subprolate; Radially symmetrical	Tricolporatecolpi long, tips acute ora prominentlylanlongate	Tricolporatecolpi long, tips acute ora prominentlylanlongate

The unifloral pollen loads include 31unifloral loads.15contained the pollen of *Terminalia* sp. (48.38%), 14 (45.16%) of *Mangifera indica*and 2 (2.63%) of *Albizia lebbeck*(Fig.1) and bifloral37(48.68%) include *Terminalia* sp., *Mangiferaindica*, *Psidium guajava*, *Blumea*sp., *Bombax ceba, Citrus* sp., *Delonix regia*in combination.

The multifloral loads which are encountered showed the pollen types of *Terminalia*sp, *Mangifera indica*, *Psidium guajava, Blumea*sp., *Albizia lebbeck, Delonix regia, Bombax ceba,*and*Citrus* sp. (Fig. 2).

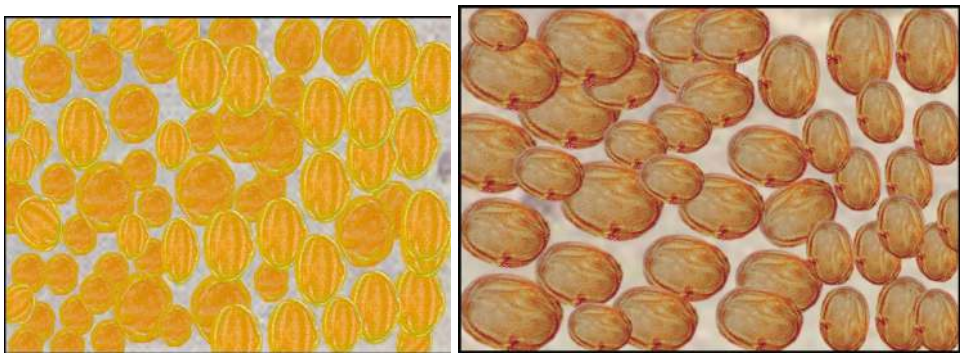
When the representation (Irrespective of percentage) of the various pollen types in the total number of pollen loads studied was considered& the percentages ofpollen types recorded in each bifloral and multifloral loads were determined by counting 200 pollen grains at random, (Sharma 1970a) pollen of*Mangifera indica*were noted in as many 57 loads (54.38%) followed by *Terminalia* sp. in 55 loads (72.36%).

Table 2: Analysis of Pollen Loads from Honeycomb

Pombhurna Tahsil							
Comb	**Total Po Pollen Loads**	**Unifloral Loads**		**Bifloral Loads**		**Multifloral Loads**	
		Number	**Composition**	**Number**	**Composition**	**Number**	**Composition**
CHN-POM-Bem-34	36	19	10 – Ma 7 – Te 2- Alb	17	14-Te(79,15), Ma(85,21) 3-Ma(52,40), Ps(60,48)	NIL	-------
CHN-POM-Chi-13	40	12	8 – Te 4 - Ma	20	16-Te(79,15), Ma(85,21) 2-Ma(23,48), Ps(52,77) 2-Bl(22,42), Te(58,78)	08	5-Ps(20), Te(67,85), Ma(7,13) 2-Bl(25,26), Te(64,67), Ma(8,10) 1-Bo(4), Ci(5), De(5), Te(81), Ma(5)
Total	76	31 (40.78%)		37 (48.68%)		8 (10.52%)	

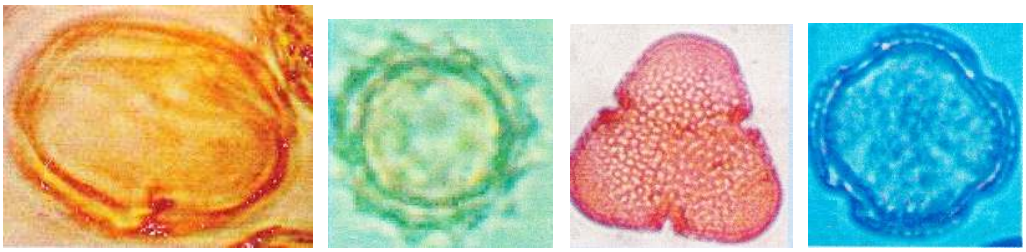
Abbreviations for pollen types recorded from pollen loads

Te- *Terminalia sp.* Ma- *Mangifera indica* Bl- *Blumea*sp. Ci- *Citrus sp.*Bo- *Bombax ceiba*Ps- *Psidium guajava*De- *Delonix regia* Alb- *Albizia lebbeck*

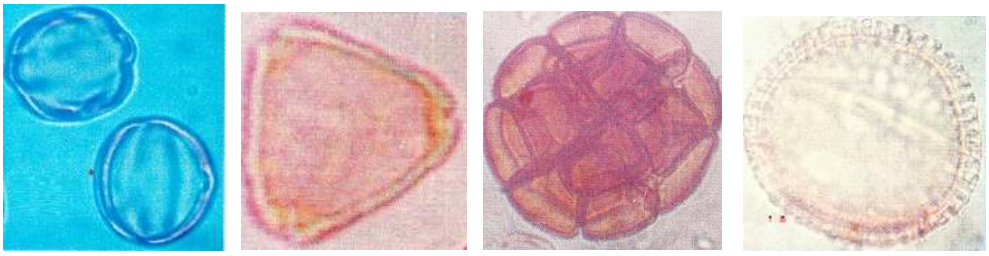


Terminalia* sp.** ***Mangifera indica

Figure 1: Pollen types in Unifloral Pollen Load.



Mangifera indica ***Blumea* sp.** **Bombax ceba** **Citrus sp.**



Terminalia* sp** ***Psidium guajava ***Albizia lebbeck*** ***Delonix regia***

Figure 2: Light Microscopic Photograph of Pollen Grain in Pollen Load.

DISCUSSION

The analysis showed that the pollen loads obtained from the beehives of *Apisdorsata* in the Chiroliand Bembalforest area of Pombhurna Tahsil of Chandrapur District of Maharashtra State, originated predominantly from some of the characteristics arborescent and shrubby plants of this forest area. Viz. *Terminali a*sp, Mangifera *indica*, *Psidium guajava, Albizia lebbeck, Delonix regia, Bombax ceba*, *Citrus* sp. The contribution to herbaceous weeds such as *Blumea* sp., as pollen source to *Apisdorsata* bees is very meagre.

The quantification of the data revels unequivocally the predominance of the pollen of *Terminalia*sp as evidenced by its very high representation of 14 (45.16%) in the Unifloral loads and 57 (75%) in the totality of the pollen loads material studied.

It can therefore be concluded that *Mangifera indica* constitutes the major source of pollen to the honey bees during the summer period. The other fairly significant source of pollen to the honeybees of this area are *Terminalia sp.* 55(72.36%), *Psidium guajava* 10 (13.15%), *Blumea sp.* 4 (5.26%).

All these taxa also constitute important pollen source during the summer season for the honeybees of this forest area.

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