

Floral source of *Apis dorsata* honeys from Khammam District, Telangana, South India

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ABSTRACT

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Pollen characterization of five squeezed honey samples of *Apis dorsata* collected during December 2013 from Kamepalli, Karepalli and Yellandu mandals of Khammam district, Telangana has been carried out. Four samples were found to be unifloral and one multifloral. *Prosopis juliflora*, *Ocimum basilicum* and *Capsicum frutescens* constitute the predominant pollen types in the unifloral honeys. The other significant pollen types recorded include *Sphaeranthus indicus*, *Asteracantha longifolia*, *Chenopodium album*, *Vernonia cinerea*, *Cyanotis* sp., *Abutilon indicum*, *Commelina benghalensis*, *Albizia lebeck*, *Celosia argentea*, *Polygonum glabrum*, *Coccinia grandis*, *Rungia repens*, *Spinacia oleracea*, *Justicia procumbens* and *Hyptis suaveolens*. The flora recorded was dominated by herbaceous taxa.

Key-words: *Apis dorsata* honeys, pollen analysis, floral source, unifloral, multifloral, Khammam District, Telangana, India.

INTRODUCTION

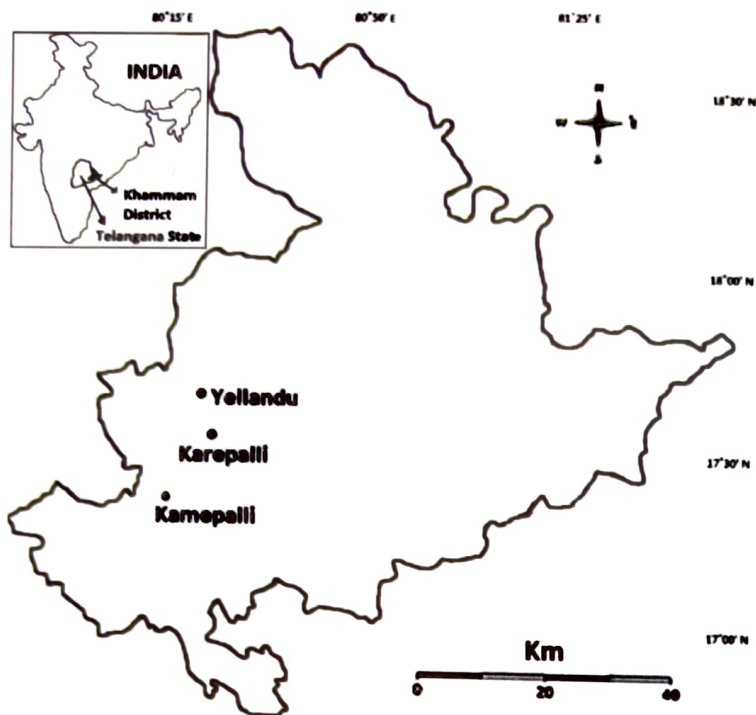
Apis dorsata is a good honey gatherer among the indigenous *Apis* species. It also collects food even during night on nocturnally blooming plant species. On an average, a single comb of *Apis dorsata* yields about 25 kg of honey and 2 kg of bee wax per year (Venkatrao 1946, Muttoo 1947, Thakar & Tonapi 1961). Bulk of total honey harvested in India is obtained from the wild combs of *Apis dorsata* (Phadke 1968). Therefore, its contribution to honey production is very important.

Pollen analytical studies on *Apis dorsata* honeys from Telangana and Andhra Pradesh have been carried out by Jhansi et al. (1991), Ramanujam and Khatija

(1992, 1995), Ramanujam (1994), Lakshmi and Suryanarayana (1997, 2004), Ramakrishna and Bushan (2006) and Chaya and Reddy (2011). For the survival of honey bee colonies and also the apiary industry, availability of nectar/pollen source plants is essential within their foraging range. The present study is aimed primarily to identify the nectar source plants for *Apis dorsata* honeys of Khammam district, Telangana.

MATERIAL AND METHODS

Five squeezed honey samples from wild bee combs of *Apis dorsata* were collected during 20 to 26 December 2013 from five villages of three mandals in



Text-figure 1. Map showing location of three mandals in Khammam district, Telangana, from where honey samples were collected.

Khammam District, Telangana, South India (Text-figure 1). Of these, three samples (K-K-H-Ad, K-K-K-Ad and K-K-B-Ad) were collected from Kamepalli Mandal, one (K-K-Y-Ad) from Karepalli Mandal and one (K-Y-B-Ad) from Yellandu Mandal (Table 1). For recovery, analysis and quantification of the pollen types, the methodology recommended by International Commission of Bee Botany (Louveaux et al. 1978) was followed. Three pollen slides were prepared for each honey sample by using acetolysis technique (Erdtman 1960) and pollen types were identified by comparing with the same of the reference slides prepared from local flora. Based on quantification, the recorded pollen types were placed under four pollen frequency classes, viz. Predominant ($P = >45\%$), Secondary ($S = 16-45\%$), Important Minor ($IM = 3-15\%$) and Minor ($M = <3\%$). Honey sample with a single predominant pollen type has been recognized as “unifloral” and the sample with no predominant pollen type as “multifloral”.

RESULT AND DISCUSSION

Palynological analysis of five squeezed honey samples of *Apis dorsata* reveals that four samples are unifloral and one (K-K-B-Ad) is multifloral. *Prosopis juliflora* in 2 samples (K-K-K-Ad, K-K-Y-Ad),

Capsicum frutescens in one sample (K-Y-B-Ad) and *Ocimum basilicum* in one sample (K-K-H-Ad) are recorded as predominant pollen types. Secondary pollen types include *Sphaeranthus indicus*, *Capsicum frutescens*, *Asteracantha longifolia*, *Commelina benghalensis*, *Prosopis juliflora* and *Ocimum basilicum*. The other noteworthy pollen types, viz. *Vernonia cinerea*, *Prosopis juliflora*, *Asteracantha longifolia*, *Celosia argentea*, *Sphaeranthus indicus*, *Abutilon indicum*, *Ocimum basilicum* and *Cyanotis* spp., are recorded as important minor. 16 pollen types were recorded as minor pollen types. Non-melliferous pollen include grass pollen recorded in minor proportions. *Alternaria* is meagrely recorded in K-Y-B-Ad. Frequency classes and frequencies of the pollen types recorded in the present study are shown in Table 1. Altogether, following 19 pollen types referable to 12 families are recorded and the flora is dominated by herbaceous taxa. A list of families and pollen types recorded from the honey samples is given ahead: **Acanthaceae:** *Asteracantha longifolia*, *Justicia procumbens*, *Rungia repens*; **Amaranthaceae:** *Celosia argentea*; **Asteraceae:** *Sphaeranthus indicus*, *Vernonia cinerea*; **Chenopodiaceae:** *Chenopodium album*, *Spinacia oleracea*; **Commelinaceae:** *Commelina benghalensis*, *Cyanotis* spp.; **Cucurbitaceae:** *Coccinia grandis*; **Labiatae:** *Hyptis suaveolens*, *Ocimum basilicum*; **Malvaceae:** *Abutilon indicum*; **Mimosoideae:** *Albizia lebbek*, *Prosopis juliflora*; **Polygonaceae:** *Polygonum glabrum*; **Solanaceae:** *Capsicum frutescens*; **Tiliaceae:** Tiliaceae type. Significant pollen types were illustrated in Plate 1.

The present investigation highlights the floral sources for *Apis dorsata* bees. It also records floral diversity as indicated by the pollen types obtained from 5 honey samples. Other noteworthy pollen types, recorded in less than 10%, include *Sphaeranthus indicus*, *Asteracantha longifolia*, *Commelina benghalensis*, *Prosopis juliflora*, *Ocimum basilicum*, *Capsicum frutescens* and *Celosia argentea* which serve as significant nectar sources to the honey bees. *Prosopis juliflora*, *Ocimum basilicum*, *Sphaeranthus indicus* and *Asteracantha longifolia* occur frequently

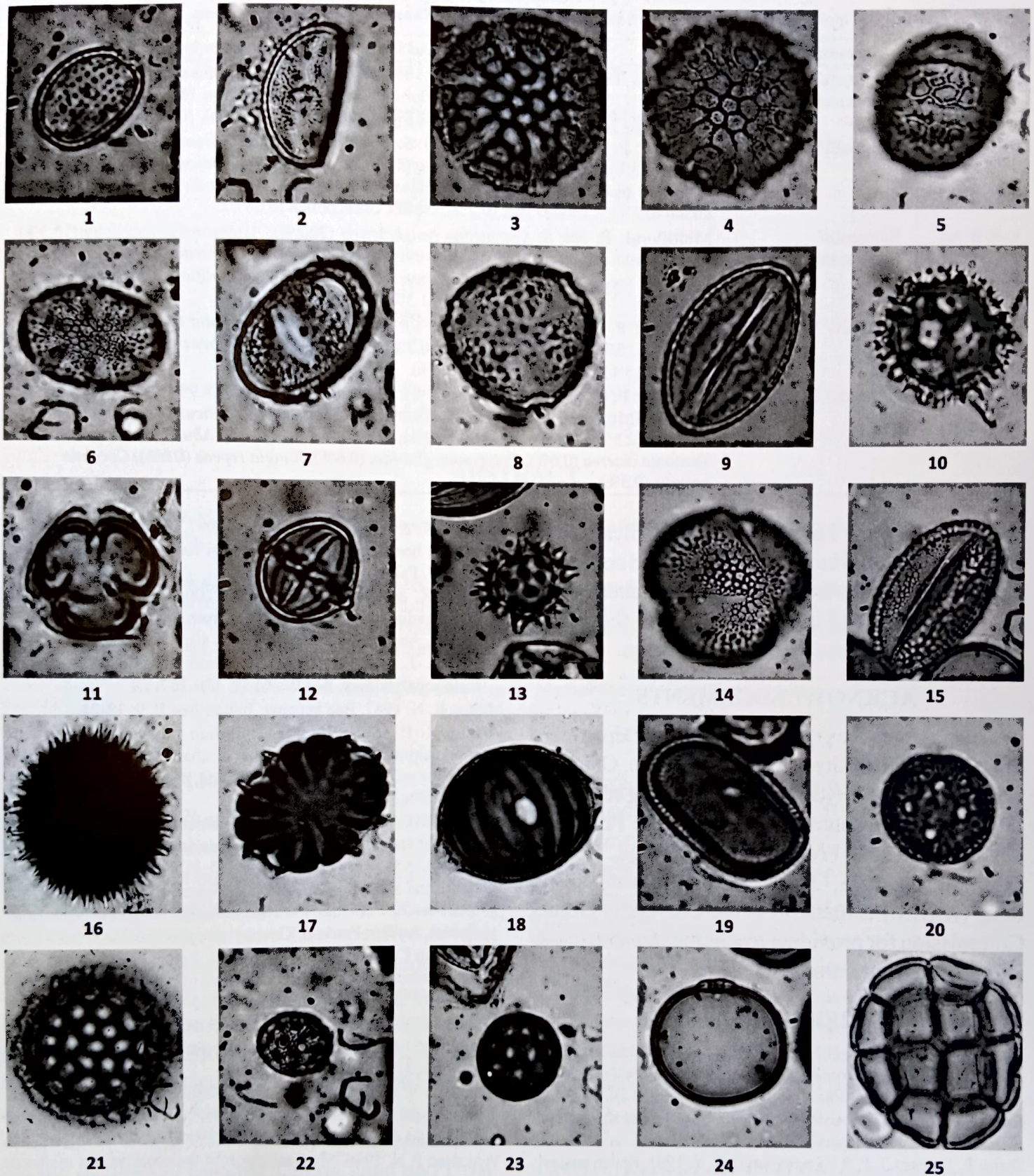


Plate 1

All figures magnified x1000

1-25. Pollen types recorded from honeys. 1. *Commelina benghalensis*. 2. *Cyanotis* spp. 3-5. *Ocimum basilicum*. 6-7. *Hyptis suaveolens*. 8-9. *Prosopis juliflora*. 10. *Vernonia cinerea*. 11-12. *Capsicum frutescens*. 13. *Sphaeranthus indicus*. 14-15. *Coccinia grandis*. 16. *Abutilon indicum*. 17-18. *Asteracantha longifolia*. 19. *Rungia repens*. 20. *Celosia argentea*. 21. *Polygonum glabrum*. 22. *Spinacia oleracea*. 23. *Chenopodium album*. 24. Grass pollen. 25. *Albizia lebbeck*.

Table 1. Percentage of pollen species in the honey samples collected from Khammam district, Telangana.

Sample code	Mandal/ Village	Nature of honey and frequencies (%) of pollen types
K-K-H-Ad	Kamepalli/ Harishchandra Thanda	Unifloral; P: <i>Ocimum basilicum</i> (50%); S: <i>Sphaeranthus indicus</i> (20%), <i>Capsicum frutescens</i> (16%); IM: <i>Prosopis juliflora</i> (5%), <i>Abutilon indicum</i> (3%); M: <i>Asteracantha longifolia</i> (2%), <i>Polygonum glabrum</i> (1.5%), <i>Albizia lebbek</i> (1.5%), <i>Rungia repens</i> (1%).
K-K-K-Ad	Kamepalli/ Kamepalli	Unifloral; P: <i>Prosopis juliflora</i> (90%); S: Nil; IM: <i>Ocimum basilicum</i> (4.2%), <i>Sphaeranthus indicus</i> (3%); M: <i>Asteracantha longifolia</i> (1%), <i>Abutilon indicum</i> (0.5%), <i>Capsicum frutescens</i> (0.5%), <i>Commelina benghalensis</i> (0.2%), <i>Coccinia grandis</i> (0.2%), <i>Chenopodium album</i> (0.2%), <i>Cyanotis</i> spp. (0.2%); NMP: Grass pollen (0.08%).
K-K-B-Ad	Kamepalli/ Baburaonagar	Multifloral; P: Nil; S: <i>Commelina benghalensis</i> (22.8%), <i>Asteracantha longifolia</i> (16.3%); IM: <i>Celosia argentea</i> (15%), <i>Sphaeranthus indicus</i> (13.5%), <i>Ocimum basilicum</i> (12.2%), <i>Cyanotis</i> spp. (8.1%), <i>Vernonia cinerea</i> (5.3%), <i>Prosopis juliflora</i> (3%); M: <i>Hypitys suaveolens</i> (2.1%), <i>Abutilon indicum</i> (1.5%), <i>Tiliaceae</i> spp. (0.2%).
K-K-Y-Ad	Karepalli/ Yerrabodu	Unifloral; P: <i>Prosopis juliflora</i> (46.3%); S: <i>Asteracantha longifolia</i> (34.9%); IM: <i>Ocimum basilicum</i> (6.9%), <i>Celosia argentea</i> (6.2%); M: <i>Justicia procumbens</i> (2.6%), <i>Sphaeranthus indicus</i> (2.5%), <i>Vernonia cinerea</i> (0.6%).
K-Y-B-Ad	Yellandu/ Bojjaigudem	Unifloral; P: <i>Capsicum frutescens</i> (50%); S: <i>Ocimum basilicum</i> (18.9%), <i>Prosopis juliflora</i> (18.8%); IM: <i>Asteracantha longifolia</i> (3.1%); M: <i>Sphaeranthus indicus</i> (2.5%), <i>Spinacia oleracea</i> (2.5%), <i>Celosia argentea</i> (0.9%), <i>Albizia lebbek</i> (0.6%), <i>Abutilon indicum</i> (0.6%), <i>Vernonia cinerea</i> (0.6%), <i>Polygonum glabrum</i> (0.6%), <i>Rungia repens</i> (0.6%), <i>Coccinia grandis</i> (0.3%).

in all the samples. The present study indicates that *Prosopis juliflora* which is growing in wild condition, *Capsicum frutescens* from the nearby agricultural tracts and the herbaceous taxa contributed to the honey production of this area during winter season.

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