Geophytology 37(2008) : 115-117

Melissopalynological studies of *Apis cerana* honeys in the identification of bee pasturage plants in various mandals of Khammam District, Andhra Pradesh

A. Vijaya Bhasker Reddy and P.Ramachandra Reddy

Department of Botany, P.G. College of Science, Saifabad, Hyderabad - 500004

Reddy AVB & Reddy PR, 2008. Melissopalynological studies of *Apis cerana* honeys in the identification of bee pasturage plants in various mandals of Khammam District, Andhra Pradesh. *Geophytology* **37** : 115-117.

The present paper deals the melissopalynological studies conducted on 6-unifloral summer honeys of *Apis cerana* collected from four mandals of Khammam District in Andhra Pradesh. This melissoplaynological information can be used to identify different bee pasturage plants in these mandals. *Phoenix sylvestris* (83.75%), *Schleichera oleosa* (53.75%-80%) and *Dillenia pentagyna* (58.75-90%) are the chief source of gathered honey or bee pasturage plants of the area.

Key-words—Melissopalynology, Bee pasturage plants, Khammam District, Andhra Pradesh, India.

INTRODUCTION

A preliminary study has been conducted on the bee pasturage plants of some of the mandals of the Khammam District of Andhra Pradesh. The Khammam District lies between 16^0 45' to 18^{0}35' of the north Latitude and 79^0 47' to 81^{0}47' of the east Longitude. The district is bound on the north by Orissa and Chhattisgarh states and on all other sides by various districts of Andhra Pradesh (Fig. 1).

MATERIAL AND METHOD

Six honey samples were collected from the Mudigonda (1, sample number K-M-C-1), Velurupadu (1, sample number K-V-B-2), Chintoor (2, sample numbers K-C-B-3 and K-C-N-4) and Mulkalapalli (2, sample numbers K-M-T-5 and K-M-M-6) mandals of the Khammam District. The squeezing of the honeycombs was carried out under personal supervision and only the honey-bearing portion of the combs used for this purpose. The methodology recommended by the International Commission of Bee Botany (Louveaux *et al.*, 1978) was employed for the recovery of pollen contents and their analysis. One ml of honey was dissolved in 10 ml of distilled water and centrifuged. The material obtained was treated with 5 ml glacial acetic acid. The acetic acid was decanted and the material was subjected to acetolysis (Erdtman, 1960). Three pollen slides were prepared from each honey sample and the pollen types were identified with the help of reference slide collection of local flora and relevant literature (Jhansi *et al.*, 1994; Kalpana & Ramnujam 1996a,b; Ramanujam 1991; Ramakirshna & Bhushan, 2004). For quantification of pollen types recorded, a total of 300 pollen grains were randomly counted from the three slides prepared from each sample. Based on their frequencies, the pollen types encountered were placed under the pollen frequency classes recommended by the International Commission for Bee Botany (ICBB-1978), viz., Predominant pollen type (>45%), Secondary pollen type (16-45%), Important minor pollen types (3-15%), and Minor pollen

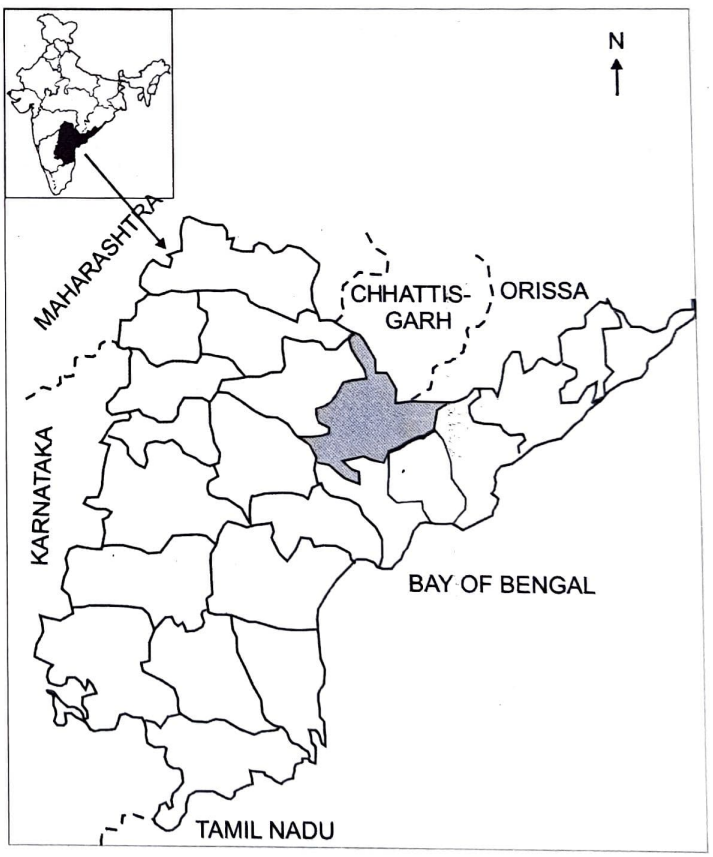


Fig. 1. Map showing location of Khammam District (shaded) in Andhra Pradesh.

Table-1. Frequency classes and frequencies (%) of pollen types recorded from honey samples

Details of honey samples (No, date of collection, colour, village, Mandal)	Pollen types
K-M-C-1, 15-03-05, Colour light amber Chirumarri Village, Mudigonda Mandal	P-*Phoenix sylvestris*-83.75% S-Nil I-*Capsicum frutescens*-10.25% M-*Borassus flabellifer* -2.75%, *Coccinia grandis*-1.33%, *Tridax procumbens*-0.66%, *Capparis grandis* 0.75%, Poaceae type-0.5%,
K-V-B-2, 20-03-07, Colour light amber Banjara Village, Velurupadu Mandal	P-*Schleichera oleosa*-53.75% S- NIL, I-*Zizyphus mauritiana*-15%, *Sapindus emarginatus*-10%, *Capparis grandis*-7.5%, *Terminalia arjuna*-6.25%, *Syzygium cumini*-5% M- *Borassus flabellifer*-2.5%,
K-C-B-3, 2-04-07, Colour yellow Boddugudem village, Chintoor Mandal	P-*Dillenia pentagyna*-90% S- NIL I- *Syzygium cumini*-9.25%, M-NIL
K-C-N-4, 10-04-07, Colour pale yellow Nellipaka village, Chintoor Mandal	P-*Dillenia pentagyna*- 68.75% S- *Schleichera oleosa*-24.25% I- *Terminalia arjuna*-3% M- *Acacia nilotica*-2.5%, *Lagerstroemia parviflora*-1.25%,
K-M-T-5, 3-04-07, Colour yellow Togugudem village, Mulkalapalli Mandal	P-*Schleichera oleosa*-80% S- NIL I-*Sapindus emarginatus*-6.25%, *Croton bonplandianum*-6.25%, *Borassus flabellifer* -5%, M-*Bombax ceiba*-1.25%,
K-M-M-6, 7-04-07, Colour yellow Mandavaram village, Mulkalapalli Mandal	P-*Schleichera oleosa*-72.5% S-NIL I- *Lagerstroemia parvilflora*-10.75%, *Terminalia arjuna*-9.87%, Fabaceae type-6%. M-NIL

P = Predominant pollen type (>45%), S = Secondary pollen type (16-45 %), I = Important pollen type (3-16 %), M = Minor pollen type (0-3 %)

types (<3%). The honeys were then designated as 'unifloral' if they contain more than 45% of one pollen taxa.

OBSERVATIONS

All the 6 honey samples of the present study were found to be unifloral, represented predominantly (above 45%) by *Phoenix sylvestris* in one sample (83.75%), *Schleichera oleosa* in 3 honey samples (53.75%, 80%, 72.5%), and *Dillenia pentagyna* in two samples (90 %, 58.75%). The other pollen types categorized under important minor pollen types based on their frequency classes are *Capsicum frutescens, Zizyphus mauritiana, Sapindus emarginatus, Capparis grandis, Terminalia arjuna, Syzygium cumini, Croton bonplandianum, Borassus flabellifer, Lagerstroemia parviflora,* and Fabaceae type. In addition, *Coccinia grandis, Tridax procumbens, Acacia nilotica* were also found as minor pollen types (Table -1).

DISCUSSIONS

The present investigation reveals that *Apis cerana* bees prefer mostly common arboreal forest plants as the nectar source in the region of present study. These include predominantly *Phoenix sylvestris, Schleichera oleosa, Dillenia pentagyna, Zizyphus mauritiana, Capparis grandis, Terminalia arjuna, Syzygium cumini, Lagerstroemia parviflora, Sapindus emarginatus, Borassus flabellifer.* All these plants are heavily flower bearing species and serves as pasturage plants to the *Apis cerana.*

ACKNOWLEDGEMENTS

The authors are extremely thankful to Prof. C.G.K.Ramanujam for his valuable suggestions, and Prof.Y.N.R.Varma and Prof.H.Ramakrishna for their help and encouragement during this investigation.

REFERENCES

Erdtman G, 1960. The acetolysis method. A revised description. *Svens.bot.tidskr.* **54:** 561-564.

Jhansi P, Kalpana TP & Ramanujam CGK, 1994. Pollen analysis of some *Apis cerana* Fabr. honeys from Andhra Pradesh, India, *Apidologie* **25:** 289-296.

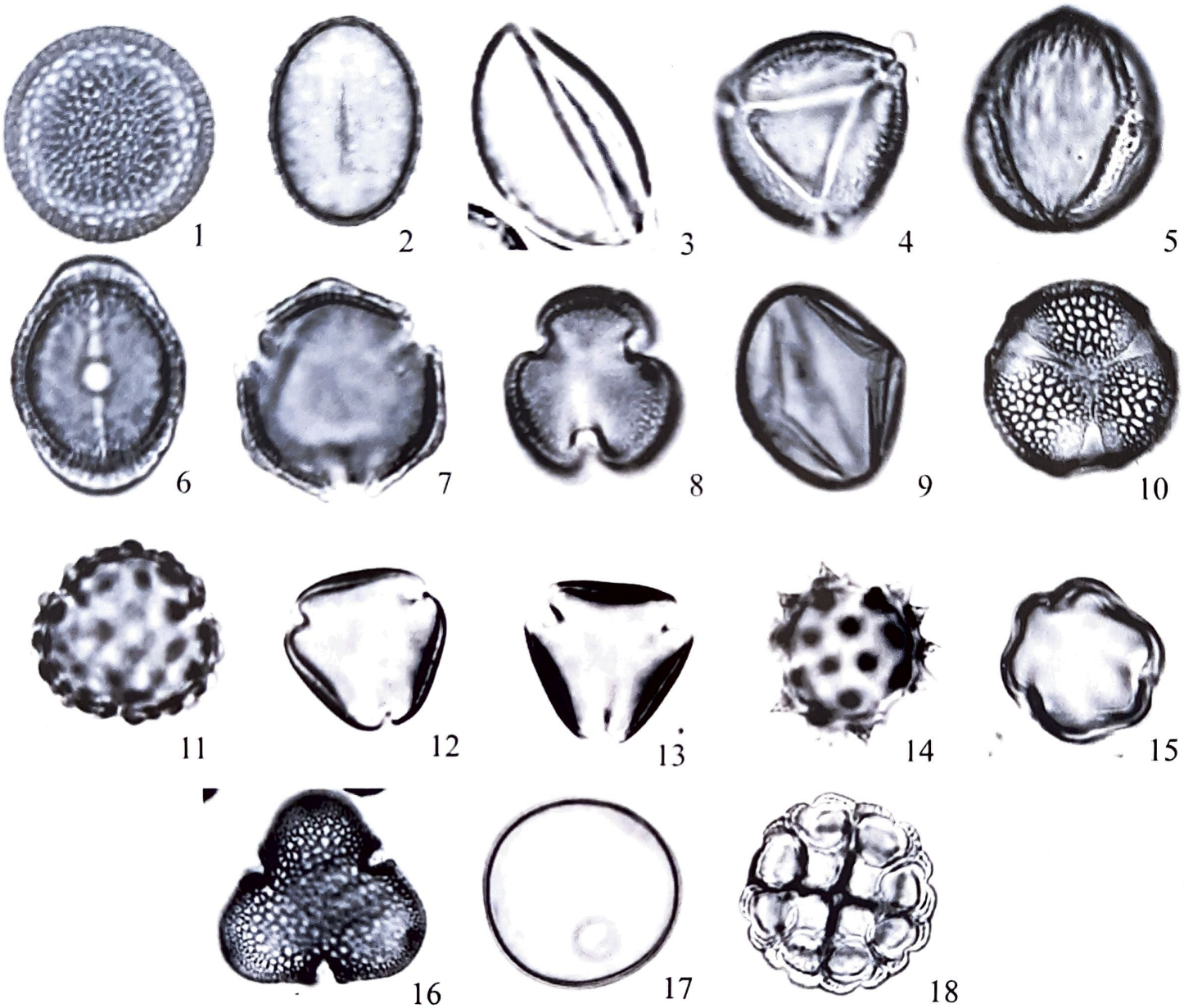
Kalpana TP & Ramanujam CGK, 1996a. Sugarcane honey-its significance. *Curr.Sci.***70** (4): 261-262.

Kalpana TP & Ramanujam CGK, 1996b. Nectar source for honey bees in a coastal district of Andhra Pradesh, India. IX *International palynological Conference, Houston, U.S.A.* :76 (Abst.).

Louveaux J, Maurizio A & Vorwohol G, 1978. Methods of melissopalynology. *Bee world* **59:** 139-157.

Ramanujam CGK, 1991. Beekeeping and Melittopalynology-Perspectives and Prospects. *Prof. T.N. Navaneeth Rao Commemoration Volume, Osmania University, Hyderabad* :74-79.

Ramakrishna H & Bhushan M, 2004. Diversity in pollen characterization of squeezed honey samples from Nizamabad district, Andhra Pradesh. *Geophytology* **34** (1&2): 23-31.



(Important pollen types recorded from honey samples)

PLATE-1
(Unless otherwise mentioned all photographs X 1000)

1. *Croton bonplandianum* (X750). 2. *Borassus flabellifer*. 3. *Phoenix sylvestris*. 4-5. *Schleichera oleosa*. 6,7. *Lagerstroemia parviflora* (X750). 8. *Capparis grandis*. 9. Fabaceae type. 10. *Coccinia grandis* (X750). 11. *Dillenia pentagyna*. 12. *Zizyphus mauritiana*. 13. *Sapindus emarginatus*. 14. *Tridax procumbens*. 15. *Terminalia arjuna*. 16. *Bombax ceiba*. 17. Poaceae type. 18. *Acacia nilotica* (X650).