

Forage sources for Rock bees during May to July in deciduous forests of Ranga Reddy District, A.P.

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The pollen contents of four honey samples and 935 comb-pollen loads of Rock bees obtained during the 3-month period, May to July, from the deciduous forests of Ranga Reddy District were studied to evaluate the forage sources for these bees. *Lagerstroemia parviflora* and *Aegle marmelos* provided the chief nectar source. The chief pollen source was provided by *Lagerstroemia parviflora*, *Aegle marmelos* and *Terminalia* sp.

Key-words – Melittopalynology, Rock bees, Forage sources, Deciduous forests.

INTRODUCTION

THE Rock bees (*Apis dorsata* F.) and Small bees (*A. florea* F.) are primarily responsible for the production of the bulk of honeys in Ranga Reddy District of Andhra Pradesh. The hives of the former are mostly encountered in and around the deciduous forest areas and those of the latter, in the vicinity of agricultural tracts. Adequate supplies of nectar and pollen together constituting the nutritional requirements of honey bees, are essential for the sustenance, proper growth and multiplication of the bee hives leading to copious honey production. The kind of honey that the bees produce in any locality is verily an expression of the floristic complex of that area.

The pollen content of the honeys reflects upon the nectar sources and that of pollen loads, the pollen source, to the honey bees. The information so obtained highlights the chief and alternate bee forage plants and facilitates recognition of single or mixed sources of honey. Little or no precise information is available on the forage pattern of Rock bees and the type of honeys produced by them in different seasons in Ranga Reddy District, although such data with regard to small bees could be documented during the recent years (Kalpana & Ramanujam, 1989, 1991; Ramanujam & Kalpana, 1990-91, 1992). The present contribution attempts to plug this lacuna and furnish evaluation of the forage sources during the three-month period, May to July, for Rock bees in the deciduous forests of this district based upon critical melittopalynological methodology.

MATERIAL AND METHOD

The material for this study includes four honey samples (squeezed) and 935 comb-pollen loads of Rock bees obtained during the period, May to July, 1993 from the deciduous forest areas of Mominpet, Nawabpet and Vikarabad mandals of Ranga Reddy District. Two of the honey samples (AD-11 and 12) were collected from Durgamcheruvu village of Mominpet mandal in June 93 and the remaining two (AD-14 and 15) from the Ekmamidi and Kummargudem villages of Nawabpet mandal in July 93. The comb-pollen loads were collected directly from six combs (one from Vikarabad, three from Mominpet and two from Nawabpet mandals). Table 1 shows the inventory of these combs.

The recovery of pollen from these honeys and the quantification of the pollen types is in accordance with the procedure stipulated by Louveaux *et al.* (1978).

The comb-pollen loads in the pollen chambers of the combs seen stacked neatly one above the other in discrete discs in a superimposed fashion, were dissected out carefully with arrow head needles and kept on a clean white paper and allowed to air dry for a few minutes. Afterwards a gentle tap with a needle facilitated separation of these loads. Small quantities of pollen from different parts of each comb-pollen load were studied in temporary mounts and the remaining load was subjected to acetolysis technique of Erdtman (1960). The comb-pollen loads were either unifloral (with >90% of a single pollen type in a count of 500 grains) or mixed.

Table 1. Inventory of honey combs which yielded comb-pollen loads.

Comb code	Month of collection	Mandal	Village	No. of comb-pollen loads studied
RR-V-A-AD-C ₁ *	May	Vikarabad	Anathagiri	175
RR-M-D-AD-11	June	Mominpet	Durgamcheruvu	100
RR-M-D-AD-12	June	Mominpet	Durgamcheruvu	200
RR-M-D-AD-C ₂ *	June	Mominpet	Durgamcheruvu	130
RR-N-E-AD-14	July	Nawabpet	Ekmamidi	200
RR-N-K-AD-C ₃ *	July	Nawabpet	Kummarigudem	130

* Only pollen loads were collected from these combs

Confirmation of the pollen types identified has been based upon the reference slides of the polleniferous material from this district.

OBSERVATIONS

Nectar source- 3 of the four honey samples studied were found to be essentially single source, i.e., unifloral honeys. The two June samples from Mominpet mandal (AD-11 and 12) represent unifloral *Lagerstroemia parviflora* honeys with the pollen of this plant as the predominant type. One of the July samples (AD-14) from Nawabpet mandal was recognized as unifloral *Aegle marmelos* honey. The remaining July sample (AD-15) from Nawabpet mandal was found to be multifloral (mixed source) honey. The multifloral honey is mostly from the nectar of *Dodonaea viscosa*, *Lagerstroemia par-*

viflora and *Hyptis suaveolens*. The presence of *Eucalyptus* sp. and *Delonix regia* in this honey as minor pollen types is traceable to the stray foraging of the bees outside the forest zone. For details of the pollen analysis of honeys highlighting the frequency classes (viz., predominant, secondary, important minor and minor) and the frequencies (%) of the pollen types, reference may be made to Table 2.

Only 5-7 taxa, on the whole, were involved in the production of unifloral honeys from June and July in the deciduous forests of Ranga Reddy District as evidenced by the pollen types recovered. Of these, *Lagerstroemia parviflora* and *Aegle marmelos* provided the chief source and, *Woodfordia fruticosa*, the alternate source of nectar. The contribution of the rest of the taxa to these honeys was very insignificant.

Table 2. Frequency classes and frequencies (%) of the pollen types recovered from honey samples.

Honey Samples		Pollen types
RR-M-D-AD-11	P-	<i>Lagerstroemia parviflora</i> (69.33)
	S-	<i>Woodfordia fruticosa</i> (21.33)
	I-	Nil
	M-	<i>Aegle marmelos</i> , <i>Gardenia lucida</i> (each 2.33), <i>Randia dumeforum</i> , <i>Dichrostachys cinerea</i> (each 1.67), <i>Strychnos potatorum</i> (1.33)
RR-M-D-AD-12	P-	<i>Lagerstroemia parviflora</i> (60.33)
	S-	<i>Woodfordia fruticosa</i> (30.33)
	I-	<i>Gardenia lucida</i> (6.0)
	M-	<i>Dichrostachys cinerea</i> (2.0), <i>Terminalia</i> sp. (1.67)
RR-N-E-AD-14	P-	<i>Aegle marmelos</i> (85.67)
	S-	Nil
	I-	<i>Syzygium cumini</i> (8.0)
	M-	<i>Terminalia</i> sp. (2.67), <i>Acacia nilotica</i> , <i>Casuarina elliptica</i> , <i>Grewia tiliaefolia</i> (each 1.0), <i>Capparis grandis</i> (0.67)
RR-N-K-AD-15	P-	Nil
	S-	<i>Dodonaea viscosa</i> (36.67), <i>Lagerstroemia parviflora</i> (27.0)
	I-	<i>Hyptis suaveolens</i> (13.33), <i>Mimosa rubicaulis</i> (7.0), <i>Woodfordia fruticosa</i> (5.67)
	M-	<i>Delonix regia</i> (2.33), <i>Aegle marmelos</i> (2.0), <i>Eucalyptus</i> sp., Malvaceae type (each 1.33), <i>Acacia nilotica</i> , <i>Randia dumetorum</i> (each 0.67), Unknown pollen type (2.0).

P : Predominant pollen type (> 45%); S : Secondary pollen types (16-45%); I : Important minor pollen types (3-15%); M : Minor pollen types (< 3%)

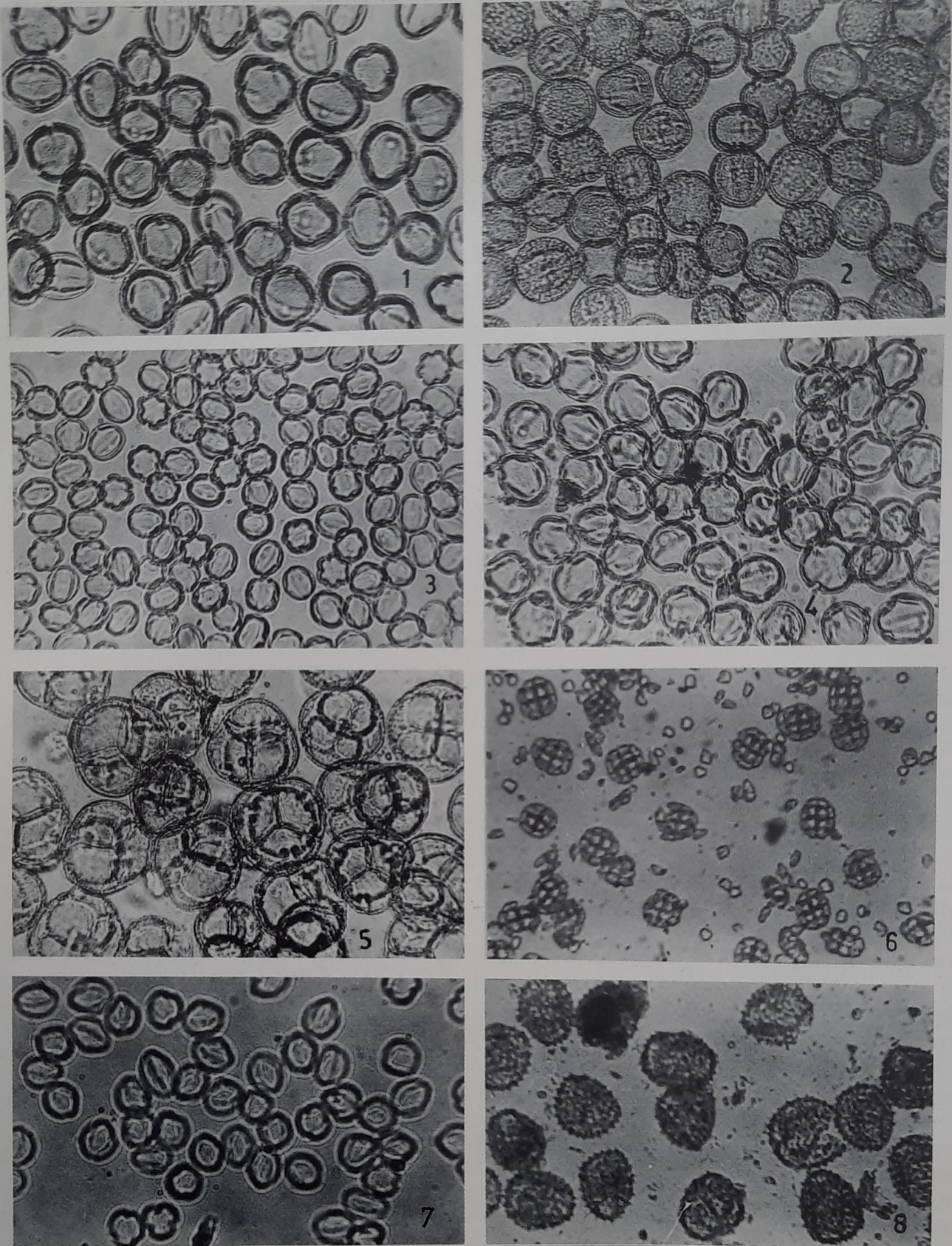


Plate 1

Figures 1-8. Pollen types in some of the unifloral pollen loads.

(unless otherwise mentioned all Figures x 300)

1. *Lagerstroemia parviflora*
2. *Aegle marmelos*
3. *Terminalia* sp.
4. *Woodfordia fruticosa*

5. *Gardenia lucida*
6. *Albizia lebbek*, x 100
7. *Capparis grandis*
8. Malvaceae type, x 100

Table 3. Break-up of unifloral and mixed comb-pollen loads (PL)

S.No.	Comb code	No. of PL examined	No. of unifloral PL	No. of mixed PL
1.	RR-A-AD-C ₁	175	163	12
2.	RR-M-D-AD-11	100	92	8
3.	RR-M-D-AD-12	200	188	12
4.	RR-M-D-AD-C ₂	130	120	10
5.	RR-N-E-AD-14	200	194	6
6.	RR-N-K-AD-C ₃	130	124	6
Total		935	881	54

Pollen source- Of the 935 comb-pollen loads recovered from six combs, 881 (94.22 %) were found to be unifloral and 54 (5.78%) mixed. Two kinds of mixed loads could be recognized in the present study; one with two and the other with three pollen types, the former represented by 47 loads and the latter by 7 loads. Table

Table 4. The nature and break-up of unifloral comb-pollen loads in individual comb.

Pollen types/Comb code,	AD-C ₁	AD-11	AD-12	AD-C ₂	AD-14	AD-C ₃
<i>Lagerstroemia parviflora</i>	12	38	164	99	19	-
<i>Terminalia</i> sp.	78	-	-	-	8	60
<i>Aegle marmelos</i>	-	-	5	-	127	-
Malvaceae type	-	-	-	-	20	45
<i>Gardenia lucida</i>	-	32	12	13	-	-
<i>Capparis grandis</i>	20	-	-	-	-	-
<i>Albizia lebbek</i>	48	-	-	-	-	-
<i>Woodfordia fruticosa</i>	-	22	7	8	-	-
<i>Syzygium cumini</i>	-	-	-	-	15	-
<i>Acacia nilotica</i>	-	-	-	-	5	16
<i>Morinda tomentosa</i>	5	-	-	-	-	-
<i>Mimosa rubicaulis</i>	-	-	-	-	-	5
Total	163	92	188	120	194	124

3 shows the break-up of unifloral and mixed loads from each individual comb. Table 4 providing detailed analysis of the unifloral comb-pollen loads clearly brings to light that *Lagerstroemia parviflora* generally constitutes the widespread and reliable source of pollen forage. The totality of the comb-pollen load analysis encompassing unifloral and mixed loads highlights that the chief and alternate sources of pollen are not the same in all the three mandals. In Mominpet mandal, *Lagerstroemia parviflora* and *Gardenia lucida* represent the chief and alternate sources. In Nawabpet mandal, *Aegle marmelos* provided the chief source and *Terminalia* sp. and an unidentified Malvaceae taxon constitute the alternate source. In Vikarabad mandal, however, *Terminalia* sp. provided the chief source and *Albizia lebbek* and *Capparis grandis*, the alternate source of pollen.

Plate 1, Figures 1-8 show pollen types recorded from some of the unifloral pollen loads.

DISCUSSION

This study which was primarily designed to recog-

nize the chief and alternate sources of forage for Rock bees (*Apis dorsata*) during May to July in the deciduous forests of Ranga Reddy District, A.P., has brought to light that only a limited consortium of taxa were actually involved in this context.

Lagerstroemia parviflora and *Aegle marmelos* commonly encountered in these forests provided the chief source of nectar resulting in the production of their unifloral honeys. *Woodfordia fruticosa*, a widely distributed taxon, on the whole, furnishes the alternate source of nectar. The chief sources of pollen, however, are traceable to *Lagerstroemia parviflora*, *Aegle marmelos* and *Terminalia* sp. depending upon the frequency of these taxa in the three mandals.

The information recorded in the present study may profitably be utilized in the prospective bee-keeping ventures in Ranga Reddy District.

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