

Melittopalynological investigations on *Pterolobium hexapetalum* (Rath.) Sant. & Wagh honeys of rockbees, *Apis dorsata* F., from Andhra Pradesh, India

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Pterolobium hexapetalum (Rath.) Sant. & Wagh, a common scrambler in scrub jungles, was represented in 4 honey samples of rockbees, *Apis dorsata* F. collected in June and July 1994 from the Chittoor district of Andhra Pradesh, India. One sample was found to be unifloral with *P. hexapetalum* pollen as the predominant (60.94%) pollen type. It was secondary pollen type in two samples (34.49% and 40.36%) and an important minor (15.39%) type in the fourth sample. Other pollen types associated with *P. hexapetalum* were *Flacourtia* sp., *Syzygium cumini* and *Terminalia* spp. as secondary pollen types, while *Ageratum conyzoides*, *Albizia* sp., *Cassia* sp., *Clerodendron* sp., *Cocos nucifera*, *Delonix alata*, *Delonix regia*, *Dolichandrone* sp., *Helianthus annuus*, *Lannea coromandelica*, *Phyllanthus* sp., *Stachytarpheta jamaicensis*, *Sterculia urens*, *Tamarindus indica*, *Tridax procumbens*, Asteraceae and Poaceae as important minor or minor pollen types.

The studies revealed that *P. hexapetalum* is an important nectar source for *A. dorsata* during June in deciduous forests of Andhra Pradesh. This is the first report of unifloral honey of *P. hexapetalum* from rockbees.

Key-words—*Pterolobium hexapetalum*, *Apis dorsata*, Honey, Pollen, Andhra Pradesh.

INTRODUCTION

THE Central Bee Research and Training Institute has been undertaking botanical and melittopalynological investigations in India. Forest honeys from Andhra Pradesh, a central eastern coastal state of India, were studied during 1992-1994, as a part of these investigations: Rockbees migrate from one place to another place following the flowering of the predominant species in different seasons. Appearance of rockbee *Apis dorsata* Fabr. colonies in the Chittoor district starts in March or April. The major flow season in the area is May-July when a maximum number of forest plants are in bloom. The tribal people of the area start harvesting of rockbee honey in May. It was felt that detailed melittopalynological analysis of rockbee honeys would help in identification of important nectar sources and further in assessing the relative potential for the harvest of rockbee honeys in this district. Results of the melittopalynological analysis of *Pterolobium hexapetalum* (Rath.) Sant. & Wagh honeys from Chittoor district of Andhra Pradesh are presented in this communication.

Four samples of honey were obtained from the honey combs of *A. dorsata* from the Chittoor district during June and July 1994 (Map 1). Each sample consisted of about 200 g honey. The aroma and flavour of honey were noticed immediately after collection of the sample. Details of the samples are given in Table 1.

OBSERVATION

The honeys were bright yellow in colour with strong aroma, similar to that of the flowers (Fig. 1). The total dissolved solids ranged from 78.5



Map 1. Showing places of honey samples collected in Chittoor district of Andhra Pradesh.

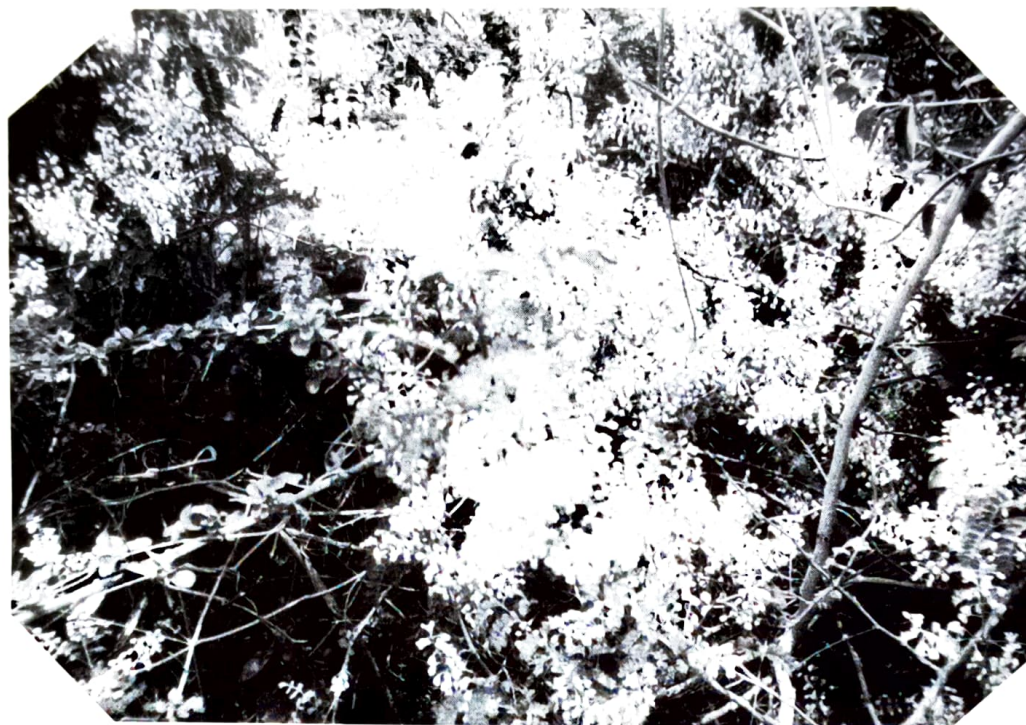


Fig. 1. *Pterolobium hexapetalum* in full bloom in the Chittoor district, Andhra Pradesh, India.

to 79.9 per cent. The absolute pollen count (number of pollen grains per 10g of honey) was between 442,660 and 1,123,990 (Table 1). Honey was partially granulated after one year of storage. Information pertaining to the numerical status of *Pterolobium hexapetalum* pollen and its associates in each honey sample is incorporated in Table 2.

Pollen of *P. hexapetalum* was present in all the four samples, its percentage ranging from 15.39 (sample No. CH-94-4) to 60.94 (Sample No. CH-94-3). The last was the unifloral honey of *P. hexapetalum* (Fig 2.). The other three were multifloral honeys. In two honey samples, Nos. CH-94-5 and CH-94-11, *P. hexapetalum* pollen was of secondary type and in the sample No. CH-94-4, it was an important minor pollen type. *Flacourtia* sp.,

Cocos nucifera, *Syzygium cumini* and *Albizia* sp., were the important pollen types associated with *P. hexapetalum* in all the samples.

Pterolobium hexapetalum pollen grains are medium, oblate spheroidal, trizonocolporate and brevicolpate. Equatorial axis 33.6 to 39.5 μm , av: 36.6 μm , polar axis 25.8 to 31.6 μm , av: 31.5. Colpi margin lined by 2.9 μm broad margo, membrane reticulately encrustate. Os lolongate, 9.0 μm long, and 4.9 μm wide. Exine 2.8 μm thick, baculate. Ornamentation reticulate, more or less homobrochate, brochi 1.6 μm broad; muri 0.7 μm , lumina 1.1 μm broad (Fig 3 a, b).

A total of 21 pollen types were recorded in the four samples except Poaceae, all being from melliferous plant species. The samples had

Table 1 : Details of the honey samples

Sample No.	Date of Collection	Locality	Colour	Total dissolved solids	Absolute* Pollen Count
CH-94-3	19-6-94	Nolukonda	Yellow	78.5	1,123,990
CH-94-4	22-6-94	Vempalli	Yellow	79.6	916,665
CH-94-5	28-6-94	Nolukonda	Yellow	79.9	442,660
CH-94-11	3-7-94	Amudalakona	Yellow	79.7	816,000

* Absolute pollen count: number of pollen grains per 10g of honey

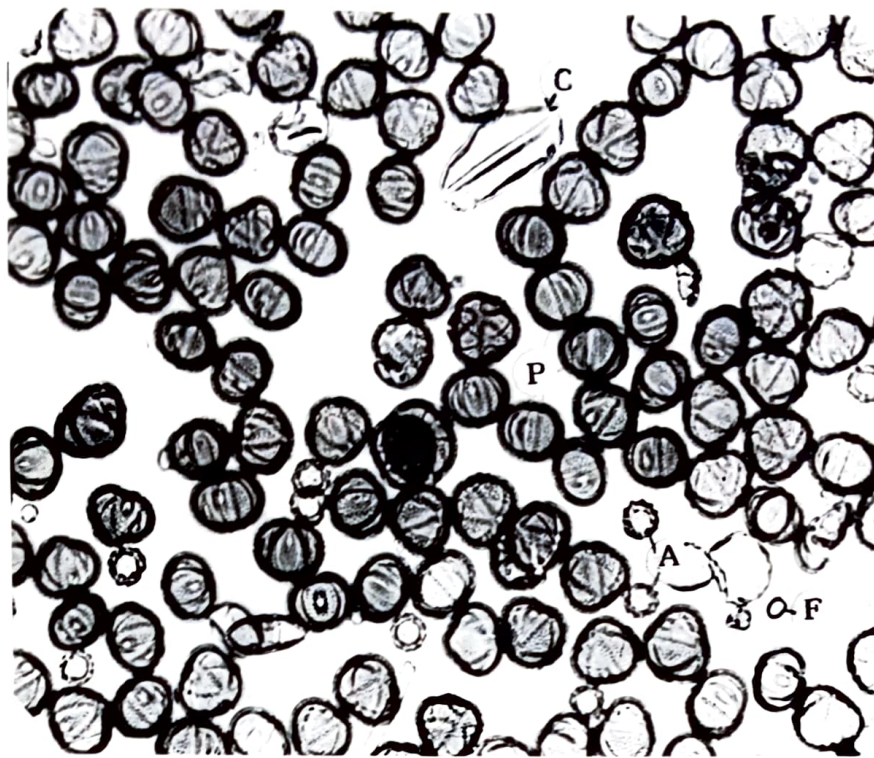


Fig. 2. Photomicrographs of pollen in unifloral honey of *Pterolobium hexapetalum* x 250; A-*Ageratum conyzoides*, C- *Cocos nucifera*, F- *Flacourtia* sp., P- *Pterolobium hexapetalum*.

Table 2 : Frequency of *Pterolobium hexapetalum* pollen and its associates in honeys from Chittoor district, Andhra Pradesh.

Sample No	<i>Pterolobium hexapetalum</i> pollen (%)	Associated pollen types (%)
CH-94-3	60.94	<i>Flacourtia</i> sp. (10.85) <i>Ageratum conyzoides</i> (9.88), <i>Syzygium cumini</i> (8.27), <i>Cocos nucifera</i> (3.38), <i>Albizia</i> sp. (1.96), <i>Tamarindus indica</i> (2.05), <i>Stachytarpheta jamaicensis</i> (0.89), Asteraceae (0.71), Poaceae (0.62) and unidentified (0.45)
CH-94-4	15.39	<i>Flacourtia</i> sp. (34.35), <i>Terminalia</i> sp. (31.04), <i>Syzygium cumini</i> (4.96), <i>Cocos nucifera</i> (5.91), <i>Stachytarpheta jamaicensis</i> (4.17), <i>Phyllanthus</i> sp. (1.04), <i>Tridax procumbens</i> (0.87), <i>Albizia</i> sp. (0.87), <i>Cassia</i> sp. (0.70) and <i>Tamarindus indica</i> (0.70).
CH-94-5	34.49	<i>Flacourtia</i> sp. (34.94), <i>Ageratum conyzoides</i> (11.14), <i>Syzygium cumini</i> (6.48), <i>Tamarindus indica</i> (6.48), <i>Albizia</i> sp. (3.46), <i>Cocos nucifera</i> (2.11) and <i>Clerodendron</i> sp. (0.90).
CH-94-11	40.36	<i>Syzygium cumini</i> (20.67), <i>Helianthus annuus</i> (6.94), <i>Flacourtia</i> sp. (5.72) <i>Sterculia urens</i> (3.84), <i>Lannea coromandelica</i> (3.27), <i>Terminalia</i> sp. (5.64), <i>Phyllanthus</i> sp. (6.45) <i>Delonix regia</i> (3.35), <i>Albizia</i> sp. (1.14), <i>Dolichandrone</i> sp. (1.06) <i>Cocos nucifera</i> (0.82), <i>Delonix alata</i> (0.74).

Terminalia spp., *Flacourtia* sp. and *Syzygium cumini* as secondary pollen types, while *Stachytarpheta jamaicensis*, *Albizia* sp., *Ageratum conyzoides*, *Helianthus annuus*, *Lannea coromandelica*, *Delonix regia*, *Delonix alata*, *Dolichandrone* sp., *Cocos nucifera*, *Clerodendron* sp., *Cassia* sp., *Phyllanthus* sp., *Sterculia urens*, *Tamarindus indica*, *Tridax procumbens*, Asteraceae and Poaceae represented important minor or minor pollen types (Table 3).

DISCUSSION

The absolute pollen count of *Pterolobium hexapetalum* unifloral honey was 1,123,990/10g. This is quite high compared to the other three honeys. The low pollen count in the other samples, inspite of having *Flacourtia* sp. and *Syzygium cumini* which are major pollen producers, points to the fact that *P. hexapetalum* is also a major pollen producer.

Presence of pollen of *P. hexapetalum* in honeys produced during the blooming of major sources of nectar-like *Syzygium cumini*, *Tamarindus indica*, *Terminalia* spp. and *Flacourtia* sp., indicates the preference to *P. hexapetalum* by the rockbees.

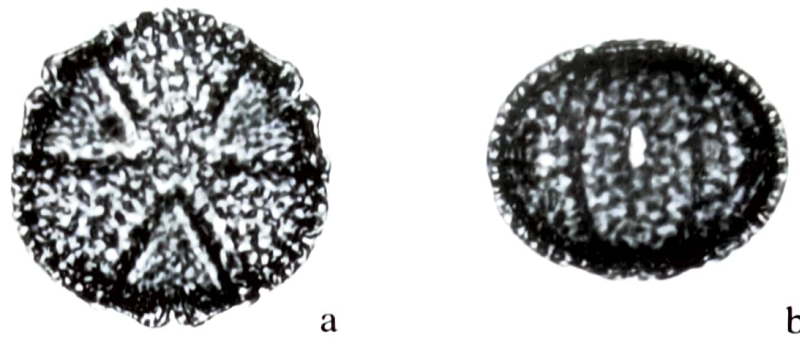


Fig. 3. Photomicrographs of pollen of *Pterolobium hexapetalum* (x1000).
a) Polar view, b) Equatorial view.

Table 3 : Frequency classes* of pollen types encountered in *Pterolobium hexapetalum* honeys from Chittoor district, Andhra Pradesh.

Taxon	CH-94-3	CH-94-4	CH-94-5	CH-94-11
Anacardiaceae				
<i>Lannea coramandelica</i> (Houtt.) Merr.	-	-	-	I
Arecaceae				
<i>Cocos nucifera</i> L.	I	I	M	M
Asteraceae	M	-	-	-
<i>Ageratum conyzoides</i> L.	I	-	I	-
<i>Helianthus annuus</i> L.	-	-	-	I
<i>Tridax procumbens</i> L.	-	M	—	-
Bignoniaceae				
<i>Dolichandrone</i> sp.	-	-	-	M
Caesalpiniaceae				
<i>Cassia</i> sp.	-	M	-	-
<i>Delonix elata</i> (L.) Gamble	-	-	-	M
<i>Delonix regia</i> (Boj) Rafin.	-	-	-	I
<i>Pterolobium hexapetalum</i> (Rath.) Sant. & Wagh	P	I	-	S
<i>Tamarindus indica</i> L.	M	M	I	-
Combretaceae				
<i>Terminalia</i> sp.	-	S	-	I
Euphorbiaceae				
<i>Phyllanthus</i> sp.	-	M	-	I
Flacourtiaceae				
<i>Flacourtia</i> sp.	I	S	S	I
Mimosaceae				
<i>Albizia</i> sp.	M	M	I	M
Myrtaceae				
<i>Syzygium cumini</i> (L) Skeels	I	I	I	S
Poaceae				
Verbenaceae				
<i>Clerodendron</i> sp.	-	-	M	-
<i>Stachytarpheta jamaicensis</i> (L.) Vahl	M	I	-	-
Sterculiaceae				
<i>Sterculia urens</i> Roxb.	-	-	-	I
Unidentified	M	-	-	-

*P- Predominant (>45%), S-Secondary (16-45%),

I- Important minor (3-15%), M-Minor (<3%),— not represented

This is the first report of unifloral honey of *P. hexapetalum* from *A. dorsata* or from any other

honeybee species. Ramanujam *et al.* (1992) studied 164 honey samples and 5,046 pollen stores from different places of Andhra Pradesh, but did not find *Pterolobium hexapetalum* in any of them. Pollen of *P. hexapetalum* resembles *Caesalpinia bonduc* (L.) Roxb. *C. bonduc* was found by Ramanujam *et al.* as a secondary type.

Pterolobium hexapetalum (Caesalpiniaceae) is a prickly climbing shrub, common to scrub jungles (Fig. 1). Leaves bipinnate, pubescent with shorter prickles, pinnae 6-8 pairs, leaflets 5-7 pairs, oblong obtuse. Flowers in axillary racemes. Calyx rosy in colour, corolla yellowish white with brown streaks. Stamens 10, produce huge amounts of pollen. *P. hexapetalum* is particularly gregarious with its conspicuous dark pink, prickly branches and obliquely winged, 1-seeded legumes and is abundant in the forests of Mahaboobnagar, Kurnool, Prakasam, Nellore, Chittoor and Cuddapah districts of Andhra Pradesh. It is an important nectar source for *A. dorsata* during June-July. Presence of *Flacourtia* sp., *Syzygium cumini*, *Albizia* sp. and *Cocos nucifera* in all the four samples indicates that flowering of these plant species coincided or overlapped with that of *P. hexapetalum*. Though *Cocos nucifera* and *Helianthus annuus* are not regular members of forests, their cultivation in the nearby farms and orchards explains their presence in these forest honeys.

REFERENCE

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