

Studies on pollen and nectar sources to *Apis mellifera* L. honey bees at Kadasikadavu, Idukki, Kerala

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Studies on pollen and nectar sources to *Apis mellifera* L. honey bees were undertaken at Field Observation Station (F.O.S.) of Central Bee Research and Training Institute, Pune located at Kadasikadavu, Idukki District, Kerala. A total 466 samples of pollen loads and some samples of honey were collected from *Apis mellifera* L. honey bee colonies. *Elettaria cardamomum* (L.) Maton, *Bidens pilosa* L. and *Cocos nucifera* L. were the major pollen sources to *Apis mellifera* L. and contributed 39.2 per cent of the total loads. *Helianthus annuus* L. and *Vitis vinifera* L. were the medium pollen sources to honey bees and contributed 12.6 per cent of the total loads. Among the minor pollen sources, 36 taxa provide pollen to *Apis mellifera* L. and contributed 48.2 per cent. Several plant species also provide nectar to *Apis mellifera* L. The analysis shows that forage is available throughout the year in Kadasikadavu areas. September to October is the best period for multiplication of honey bee colonies and also for honey production.

Key-words—Pollen loads, Honey bees, *Apis mellifera* L., Kadasikadavu, Kerala.

INTRODUCTION

TO make successful beekeeping programme in an area, it is essential to know the major and minor nectar and pollen sources to honey bees. Bees collect nectar and pollen from the flowers. Nectar is a carbohydrate source from the floral and extra floral nectaries and Pollen is a proteinaceous food to honey bees. The identification of pollen is important for identifying the geographical and botanical origin of honey and also about any contamination of honey with broods, dust, etc. (Louveaux *et al.*, 1978).

Several studies on pollen and nectar sources have been made to evaluate the sources of pollen and nectar to honey bees in other parts of the country but present area is lacking in identification of pollen and nectar sources to *Apis mellifera* L. The study is undertaken to identify pollen and nectar sources and forage value to *Apis mellifera* L. in Kadasikadavu, District Idukki, Kerala.

MATERIAL AND METHOD

The investigations were carried out at the Field Observation Station (F.O.S.) of Central Bee Research and Training Institute (C.B.R.T.I.), Pune during 1996-97 located at Kadasikadavu, District Idukki, Kerala.

At this centre *Apis mellifera* L. honey bees colonies were maintained for different studies of honey bees. Fortnightly samples of bees pollen loads were collected from incoming forager bees into the hive by using pollen trap in front of the hive at two hour interval throughout the period. The loads were collected on clean white paper with colour of loads, date and time of collection, frequency per minute, etc. were noted. These samples were brought to the laboratory of CBRTI, Pune for microscopical examination. Each sample of pollen load and nectar stores was examined after preparation of slides to identify the plant species to which the pollen grains belonged (Erdtman, 1960; and Louveaux *et al.* 1978).

OBSERVATION AND DISCUSSION

Altogether 466 samples of pollen loads and some samples of nectar stores were collected periodically from the hives of incoming *Apis mellifera* L. honey bees and its combs. The result of the microscopical analysis of pollen loads and stores indicates that a total of 41 plant species belonging to 26 plant families served as pollen and nectar sources to honey bees in Kadasikadavu and its nearby areas.

Elettaria cardamomum (L.) Maton, *Bidens pilosa* L. and *Cocos nucifera* L. were the major pollen

Table-1. Analysis and frequency occurrence (%) of pollen loads collected by *Apis mellifera* L. at Kadasikadavu, Dist. Idukkl, Kerala.

Sr. No.	Taxon	Total no. of pollen loads	% of pollen loads	Pollen Forage Value
1.	<i>Bidens pilosa</i>	63	13.5	Major
2.	<i>Eleffaria cardamomum</i>	62	13.3	Major
3.	<i>Cocos nucifera</i>	58	12.4	Major
4.	<i>Helianthus annuus</i>	38	8.1	Medium
5.	<i>Vitis vinifera</i>	21	4.5	Medium
6.	<i>Ageratum conyzoides</i>	19	4.0	Minor
7.	<i>Amaranthus</i> sp.	7	1.5	Minor
8.	Anacardiaceae	1	0.2	Minor
9.	Apiaceae	2	0.4	Minor
10.	Asteraceae	7	1.5	Minor
11.	Caesalpinaceae	19	4.0	Minor
12.	<i>Canna</i> sp.	10	2.4	Minor
13.	<i>Citrus</i> sp.	4	0.9	Minor
14.	<i>Coffea arabica</i>	15	3.2	Minor
15.	<i>Commelina</i> sp.	1	0.2	Minor
16.	<i>Cucurbita</i> sp.	4	0.9	Minor
17.	<i>Eucalyptus</i> sp.	1	0.2	Minor
18.	<i>Erythrina indica</i>	9	1.9	Minor
19.	<i>Eupatorium</i> sp.	10	2.1	Minor
20.	Euphorbiaceae	6	1.3	Minor
21.	Fabaceae	4	0.9	Minor
22.	<i>Flacourtia</i> sp.	3	0.6	Minor
23.	<i>Grewia asiatica</i>	1	0.2	Minor
24.	<i>Impatiens balsamina</i>	6	1.3	Minor
25.	<i>Lagerstroemia indica</i>	12	2.6	Minor
26.	Lamiaceae	1	0.2	Minor
27.	Malivaceae	8	1.7	Minor
28.	Melaceae	1	0.2	Minor
29.	<i>Melilotus</i> sp.	4	0.9	Minor
30.	Mimosaceae	1	0.2	Minor
31.	<i>Mimosa pudica</i>	11	2.4	Minor
32.	<i>Peltophorum pterocarpum</i>	1	0.2	Minor
33.	Poaceae	9	1.9	Minor
34.	Rutaceae	6	1.3	Minor
35.	<i>Sida</i> sp.	4	0.9	Minor
36.	Solanaceae	1.	0.2	Minor
37.	<i>Syzygium cumini</i>	1	0.2	Minor
38.	<i>Tridax procumbens</i>	4	0.9	Minor
39.	<i>Vernonia</i> sp.	18	3.9	Minor
40.	<i>Parthenium hysterophorus</i>	6	1.3	Minor
41.	<i>Zea mays</i>	7	1.5	Minor
Total :		466		

Pollen Forage Value : No. of loads

1 - 20 Minor Pollen Source

21 - 50 Medium Pollen Source

< 50 Major Pollen Source

Table-2. Bee floral calendar of Kadasikadavu area, District Idukki, Kerala.

Sr. No.	Taxon	Flowering period		Utility to honey bees	Local/Vernacular name
1.	ASTERACEAE				
	<i>Ageratum conyzoides</i> L.	March - May	P1	N1	Kaliamman
	Asteraceae	January, December	P1		—
	<i>Bidens pilosa</i> L.	January-December	P3	N1	Pakkatti
	<i>Eupatorium</i> sp.	February-May	P1		Shembaganur
	<i>Helianthus annuus</i> L.	April-June	P2	N2	Suryagandi
	<i>Parthenium hysterophorus</i> L.	March-August	P1		Parthenimumgrass
	<i>Tridax procumbens</i> L.	August-October	P1		Tridax
	<i>Vernonia</i> sp.	November-December	P1	N2	Vernonia
2.	AMARANTHACEAE				
	<i>Amaranthus</i> sp.	April-July	P1		Amaranthus
3.	ANACARDIACEAE				
	Anacardiaceae	November	P1		-
4.	APIACEAE				
	Apiaceae	September	P1		-
5.	ARECACEAE				
	<i>Cocos nucifera</i> L.	January-December	P3		Thennai
6.	BALSAMINIACEAE				
	<i>Impatiens balsamina</i> L.	March-April	P1	N1	Balsam
7.	CAESALPINACEAE				
	Caesalpinaceae	January, June, Nov.-Dec.	P1		--
	<i>Peltophorum pterocarpum</i>	March-April	P1	N2	Copper pod
8.	CANNACEAE				
	<i>Canna</i> sp.	March-December	P1		Canna
9.	COMMELINACEAE				
	<i>Commelina</i> sp.	September	P1		--
10.	CUCURBITACEAE				
	<i>Cucurbita</i> sp.	April, May	P1	N1	Vellari
11.	EUPHORBIACEAE				
	Euphorbiaceae	September	P1		--
12.	FABACEAE				
	<i>Erythrina indica</i> L.	January-February	P1		Marnujat
	Fabaceae	July-September	P1	N2	--
	<i>Melilotus</i> sp.	March-April	P1	N2	Keppai
13.	FLACOURTIACEAE				
	<i>Flacourtia</i> sp.	April, September	P1		Flacourtia
14.	LAMIACEAE				
	Lamiaceae	November	P1		--
15.	LYTHRACEAE				
	<i>Lagerstroemia indica</i> L.	September-October	P1	N1	Seenapoo, Machur
16.	MALVACEAE				
	Malvaceae	November	P1		--
	<i>Sida</i> sp.	August-October	P1		--
17.	MELIACEAE				
	Meliaceae	January	P1		--
18.	MIMOSACEAE				
	Mimosaceae	November	P1	N1	--
	<i>Mimosa pudica</i> L.	January-July	P1		Thotan Sinungi

Sr. No.	Taxon	Flowering period	Utility to honey bees	Loca/Vernacular name
19.	MYRTACEAE			
	<i>Eucalyptus</i> sp.	February, March, Sept. P1 Oct.	N2	Nilgiri
	<i>Syzygium cumini</i> (L.) Skeels	March-May P1	N3	Nave
20.	POACEAE			
	Poaceae	June- July, November P1	--	--
	<i>Zea mays</i> L.	April-June, August P1		Makka
21.	RUBIACEAE			
	<i>Coffea arabica</i> L.	April-May P1	N2	Kappee
22.	RUTACEAE			
	<i>Citrus</i> sp.	March-April P1	N3	Elumichi
	Rutaceae	February-September P1	N3	--
23.	SOLANACEAE			
	Solanaceae	July P1		--
24.	TILIACEAE			
	<i>Grewia asiatica</i> L.	May-June P1		--
25.	VITACEAE			
	<i>Vitis vinifera</i> L.	March-June P2		Thirastrhi
26.	ZINZIBERACEAE			
	<i>Elettaria cardamomum</i> (L.) Maton	May, August P3	N2	Elekkai

N = Nectar; P = Pollen; 1- Minor; 2- Medium and 3 - Major Source.
Relative importance as assessed visually and palynologically.

sources to *Apis mellifera* L. and represent 39.2% of the total pollen loads. *Helianthus annuus* L. and *Vitis vinifera* L. were the medium pollen sources to *Apis mellifera* L. honey bees. These contributed 12.6% of the total pollen loads (Table 1).

Among the minor sources, 36 taxa provide pollen forage to the honey bees and contributed 48.2% of total pollen loads. The minor pollen sources to *Apis mellifera* L. were *Coffea arabica* L., *Cucurbita* sp., *Ageratum conyzoides* L., *Caesalpinaceae*, *Canna* sp., *Eupatorium* sp., *Erythrina indica* L., *Lagerstroemia indica* L. and *Mimosa pudica* L. Several plant species also provide nectar forage to *Apis mellifera* L. honey bees (Table 2).

The analysis of pollen loads and nectar stores show that forage is available throughout the year in the locality. September to October is the best pe-

riod for beekeepers in this region. Beekeepers of this region can utilise the maximum floral wealth through multiplication of bee colonies and honey extraction due to availability of bee forage in this region.

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