

Full Length Research Paper

The bee fauna of Vanaparvam biodiversity park, Kerala, India (Hymenoptera: Apoidea)

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The bee fauna of Vanaparvam Biodiversity Park, Kerala, India was studied during August 2015 to July 2016. Among the 21 collected species, the identified 18 species belong to 9 genera and 3 families. The identified three families were Apidae, Halictidae and Megachilidae. Maximum number of species recorded belonged to the family Apidae. *Apis cerana* Fabricius, *Ceratina heiroglyphica* Smith and *Apis dorsata* Fabricius were the mostly observed species. In the present study all the bees showed a seasonal trend, the bees were abundantly seen during March, April and May, however a decline in population was observed during June and July. All the bees recorded were good pollinators and were seen in plants such as *Sida acuta*, *Calotropis gigantea*, *Caesalpinia pulcherrima* and *Lantana camara* were present in the study area. The study indicated a rich and diverse bee fauna in the Vanaparvam Biodiversity Park.

Key words: Hymenoptera, Apoidea, Apidae, Halictidae, Megachilidae, bee fauna, pollinators, conservation, native vegetation.

INTRODUCTION

The present bee fauna dates back to cretaceous period which is more than 10 million years ago, when flowering plants became established and many bees were found to be associated with plants. Bees are of inestimable value as agents of cross pollination and plants are entirely dependent on bees for their reproduction (Michener, 2000). Most of the tree species of tropical forests are insect-pollinated and that usually means bee-pollinated (Frankie et al. 1990). Many kinds of bushes, small trees and herbaceous plants including many wild flowers are bee-pollinated. Conservation of these plants is essential in preventing soil erosion, in providing food and cover for wildlife. Therefore conservation of many habitats depends upon preservation of bee populations. Many cultivated plants are either directly bee-pollinated or they are horticultural varieties of bee-pollinated plants.

Maintenance of the wild, bee-pollinated populations is thus important for the genetic diversity needed to improve the cultivated strains (Michener, 2007).

There are approximately 20,000 described species of bees in the world (Ascher and Pickering, 2014). Some of them are Bumble bees (the large bees over an inch long covered with yellow and black bands of hairs), Carpenter bees (resemble Bumble bees, but are recognized by their dark shiny hairs), Sweat bees (small, often metallic coloured, solitary nesters, but show a degree of social behavior), Leaf cutting bees (have interesting trait of chewing leaves and using these to construct nests. They are dark in colour with bands of whitish hairs across the abdomen) and Mason bees (small bees related to the leaf cutter bees, have a brush of hairs on the underside of the abdomen) (Michener, 1965).

Nowadays it has been observed that human activities such as destruction of habitats, destruction of nesting sites (often in soil) by agriculture, roadways etc, and over use of insecticides for agricultural pest control all are having the unwelcome side effect of killing bees.

Such stresses and several species of parasitic mites have devastated bee population. National and International organizations are now seriously considering and publicizing the need to conserve native pollinators (mostly bees) to maintain agricultural production as well as survival and well being of native vegetation.

Not much detailed information is available regarding the bee fauna of Kerala. In India remarkable works on bees were done by Bingham (1897, 1903). Subsequent to this, some studies have been made specifically on species found in different regions of India (Suresh et al. 1999; Jobiraj 2002; Mathew et al. 2004, 2005, 2007; Singh et al. 2010; Anita et al. 2013). Apart from these works, the Kerala part of the Western Ghats remains unexplored as far as bees are concerned. The present paper forms part of a study which was carried out in the bee fauna found in Vanaparvam Biodiversity Park, Kerala, India.

STUDY AREA

Vanaparvam Biodiversity Park is located at Kakkavayal, Kozhikode District in Kerala. It is a part of Western Ghats with latitude 11.4988 N and longitude 75.9722 E. The park includes 2300 species of plants spread over 111.4 hectares of land, 150 species of herbal plants, 23 species of bamboo saplings and 20 orchid varieties. The vegetation is a combination of natural and manmade forests.

MATERIALS AND METHODS

The study was carried out from August 2015 to July 2016. Sampling of bees was done at monthly intervals. The adult bees were collected alive from the field by using small hand net. The net used in this study is a modified model designed by Noyes (1982). The small hand net consists of a circular mouth, a handle and a net bag. The circular mouth is made up of aluminium wire with a diameter of 17cm. The handle is also made up of aluminium and having a length of 1m. The net bag measures 35cm in length and is made up of linen cloth, which allows the easy passage of air. After blowing, the bees collected were transferred to a jar. The bees were preserved and subsequently identified by comparing with the collections of the Zoological survey of India at Kozhikode, with the help of keys and referring to experts.

RESULTS AND DISCUSSION

The bees recorded from Vanaparvam Biodiversity Park, Kerala, India represent 3 major families with Apidae, Halictidae and Megachilidae. The observed species

count was 18. They belong to 9 genera. Similar findings were also reported by Mathew et al. (2004) with 12 species of bees and wasps from Shendurny Wildlife Sanctuary, Kerala. Lesser number of bee species were recorded by Mathew et al. (2004) at Peppara Wildlife Sanctuary, Mathew et al. (2005) at Peechi-vazhani Wildlife Sanctuary, Mathew et al. (2007) at Neyyar Wildlife Sanctuary, Kerala, Singh et al. (2010) at Kane Wildlife Sanctuary and Anita et al. (2013) in a deciduous forest from South India.

Out of 18 species identified, 12 species belonged to the family Apidae, 4 species to the family Megachilidae and 2 species to the family Halictidae. The dominance of the family Apidae was noted in the study area. *Apis cerana* Fabricius, *Ceratina heiroglyphica* Smith and *Apis dorsata* Fabricius were the most observed species. List of bee species recorded from Vanaparvam Biodiversity Park is given in Table 1.

In the present study, all the bees showed a seasonal trend. Some species like *Apis dorsata* Fabricius, *Apis cerana* Fabricius, *Ceratina heiroglyphica* Smith, *Braunsapis cupulifera* Vachal were most abundant during March, April and May. The month wise representation of bee species recorded from Vanaparvam Biodiversity Park is given in Table 1. In Kerala, the temperature gradually increases from February to April and many trees bloom during this season and this might be the reason for the abundance of bees during this season. A low population was maintained during June and July. This might be due to the south west monsoon and unavailability of pollen. All the bees recorded were good pollinators and were seen in plants like *Sida acuta*, *Lantana camara*, *Calotropis gigantea* and, *Caesalpinia pulcherrima* present in the study area. Itioka et al. (2001) reported that the number of honey bee colonies rapidly increases generally during the flowering period. The seasonality of insects depends upon the floral species diversity (Sparks and Parish, 1995).

The present study indicated a rich and diverse bee fauna in Vanaparvam Biodiversity Park. As this study covered only the bee fauna, all the other hymenopterans remain unrecorded. Further faunistic studies are recommended for the area to discover its rich diversity.

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Table 1. The month wise representation of Bee species from Vanaparvam Biodiversity Park, Kerala, India.

S / N	Family	Aug-2015	Sep-2015	Oct-2015	Nov-2015	Dec-2015	Jan-2016	Feb-2016	Mar-2016	Apr-2016	May-2016	Jun-2016	Jul-2016	Total
I Family Apidae														
1	<i>Apis dorsata</i> Fabricius	3	5			5	5	5	7	12	15	4	3	64
2	<i>Apis cerana</i> Fabricius	5	6	6	4	8	7	6	12	14	11	5	3	87
3	<i>Apis florea</i> Fabricius	2		4	4	2	3	3	8	8	9	2		45
4	<i>Apis mellifera</i> Linnaeus	2	5	4	3	2	3	1	5	6	5			36
5	<i>Trigonisca irridipennis</i> Smith		3		5			6	8			3	1	26
6	<i>Amegilla pilipes</i> Fabricius	3	4	3	2	2			6	8	9	2		39
7	<i>Ceratina heiroglyphica</i> Smith	5	6	5	6	4	5	4	9	12	10	2	1	69
8	<i>Xylocopa violacea</i> Fabricius		4	3			5		6	8	7	3		36
9	<i>Xylocopa aestuans</i> Linnaeus	5	3	4	4	3	5	5					1	30
10	<i>Xylocopa dissimilis</i> Lepeletier	2							6	6			1	15
11	<i>Xylocopa fenestrata</i> Fabricius	4	3	4			3	4	4	5	7	3		37
12	<i>Braunsapis cupulifera</i> Vachal	5	4	4				4	9	10	8	3	1	48
II Family Halictidae														
1	<i>Nomia chalcea</i> Cockerell			2	1		2	1	3	2				11
2	<i>Lasioglossum nathanae</i> Pauly	2	1			1	3		3	5		1		16
III Family Megachilidae														
1	<i>Megachile centuncularis</i> Linnaeus	3	4	2	5	5	4	3	3	5	6	2	1	43
2	<i>Megachile lanata</i> Fabricius		2		3			3		5		1		14
3	<i>Megachile carbonaria</i> smith	2	1	3		4	4		4	6	8	2	1	35
4	<i>Megachile quartinae</i> Gribodo		4	4	5		4	4	5	7	6	2	1	42

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