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Research Papers

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## Observations on altitudinal preference in comb construction by Rock Bee *Apis dorsata* (Fabr.) at Ahmednagar (M.S.) India

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### Abstract

*The present study involved careful observation of 120 Rock Bee, *Apis dorsata* colonies at Ahmednagar (M.S.) from 2009 to 2011. The results revealed interesting trends in habitat preference by Rock Bees. The majority of Rock Bee colonies (84) within the city limits were on terrestrial support, particularly concrete and historical stone masonry structures. The remaining (36) colonies were arboreal. The preferred altitudinal range for comb building shown by 63 colonies on terrestrial support was 10-15 metres and that by 29 arboreal colonies up to 10 metres. The results of the present investigation reflect the importance of altitude and the accessory role of temperature in determining the nesting site, both on terrestrial support and the arboreal by the Rock bees*

### Introduction:

*Apis dorsata*, the indigenous Rock Bees construct their comb on a variety of terrestrial supports like forts, palaces, mausoleums etc., as well as arboreal supports. The height from ground level at which the combs are constructed in peninsular India is average 20-25 metres, with exception of some colonies observed at the height of 60 metres and above (Reddy and Reddy, 1989).

A fair amount of information on nesting behaviour of this species from North India, South India, Andaman & Nicobar Islands; and Western Maharashtra, particularly Pune is available (Nandi and Mahabal, 1974; Deodikar et al., 1977; Ahmed and Abbas, 1985; Khan et al., 2002).

Except for Pune, not much has been reported in this context from Western Maharashtra. To give a fillip to the regional observations, a systematic study on altitudinal preferences in comb construction aspect of nesting behaviour was executed in Ahmednagar region.

The investigation specifically dealt with the altitudinal preference in comb construction by the Rock Bees at Ahmednagar. Materials and Methods:

The present study was conducted on 120 *Apis dorsata* colonies, out of which 84 colonies were on terrestrial support and 36 colonies were on arboreal avenues in Ahmednagar city. Ahmednagar city is situated between 19°04' N to 19°08' N latitude and 74°44' E to 74°46' E longitude at the height of 656.54 meters from the mean sea level. The period of investigation extended for a duration of two years from January 2009 to December 2011. The height of the site of a constructed comb from ground level was recorded by means of 'Theodolite', as per the technique adopted by Deodikar et al. (1977).

### Results and Discussion:

The Rock Bees construct combs on a variety of terrestrial supports or are arboreal i.e. on branches of trees, often with large canopy. The

terrestrial combs are constructed at a height range of 05-30 metres from ground level. The most preferred altitude being 15-20 metres (57 colonies) followed by 10-15 metres (12 colonies), 20-25 metres (05 colonies), 25-30 metres (07 colonies) and the least preferred altitude range being 05-10 metres (03 colonies). Among the arboreal colonies, maximum number of combs (29 colonies) were situated in the altitudinal range of 5-10 metres followed by 03 combs at 00-05 metres and 04 combs at 10-15 metres. The distribution of Rock Bee colonies at various altitudinal ranges is given in Table 1.

Table 1. Altitudinal ranges of comb construction by *Apis dorsata* at Ahmednagar

Sr. No.	Height from ground level (metres)	Distribution of colonies		Total number of colonies
		On terrestrial support	Arboreal	
1	00.0 – 05.0	00	03	03
2	05.0 – 10.0	03	29	32
3	10.0 – 15.0	12	04	16
4	15.0 – 20.0	57	00	57
5	20.0 – 25.0	05	00	05
6	25.0 – 30.0	07	00	07
7	30.0 & above	00	00	00
	<b>Total</b>	<b>84</b>	<b>36</b>	<b>120</b>

The altitude selection among the terrestrial and arboreal colonies is as per the availability of suitable site. It is interesting to note that in our survey, no colony was observed at or below 5 metres from ground level. However, there is a published report by Khan (2007), which mentions a colony recorded below 1 metre height, almost touching the ground.

Our observations on altitude of the comb indicated that maximum number (29) arboreal colonies were found at 5-10 metres, whereas maximum number (57) among terrestrial colonies were at 15-20 metres. The geographical location, climate and surrounding flora perhaps play an important role in altitude selection. In Sunderban forests (West Bengal), the comb height from ground level varied from 1.0-7.0 metres (Chakrabarti and Chaudhari, 1972). Reports from Andamans show maximum number of combs situated at an altitude between 3.0-6.0 metres (Ahmed and Abbas, 1985).

The outcome of this study is in confirmation with the observations of Deodikar et al. (1977). It was also seen that, given a choice, bees prefer terrestrial habitat against the arboreal ones. This is in affirmation with the observations of Nandi and Mahabal (1974) and Khan et al. (2002).

### Conclusions:

Our observations lead to the conclusion that in the areas with thick vegetation, the combs are constructed at relatively low heights on arboreal supports. The colonies on terrestrial supports prefer height range of 15-20 metres. This happens to be the range in which most of the RCC and historical stone masonry structures provide suitable habitat to the Rock Bees, besides, large-sized bee flora like *Samanea saman*, *Peltoporum pterocarpum*, *Eucalyptus* spp., etc. spread just below the colony and make the shortest foraging distance for the bees. The data suggests the role of temperature in determining the altitude of comb. The ambient temperature and reflected sunrays (radiant heat) from ground constitute the total temperature in the lower stratosphere because of the shade provided by the dense canopy. Such temperature-friendly location is most appropriate for construction of comb at lower heights in arboreal colonies in comparison to the combs on terrestrial supports. The site is prone to warmth for longer duration due to terrestrial radiations. However, the temperature is significantly lower because of direct wind. It, therefore, seems to be most appropriate that the comb construction height is an adaptation with ecological pertinence.

### References:

- Ahmed, R. and S.R. Abbas (1985) Some observations on *Apis dorsata* Fab. In Andaman & Nicobar Islands, India. *Indian Bee J.*, 47: 46-47.
- Chakrabarty, K. and A.B. Chaudhuri (1972) Honey production and behaviour pattern of the honey bees. *Sci. & Cult.*, 38(6): 269-276.
- Deodikar, G.B., A.I. Ghatge, R.P. Phadke, D.B. Mahindre, K.K. Kshirsagar, K.S. Muvel and C.V. Thaker (1977) Nesting behaviour of Indian honey bees-III. *Indian Bee J.*, 39: 1-12.
- Khan, M.S., H.R. Rohilla and H.D. Kaushik (2002) Nesting behaviour of Rock bee, *Apis dorsata* at Hisar, India: Aggregation and nesting support selection. *Korean J. Apic.*, 57(2):77-82.
- Khan, Sarfaraz M. (2007) Nesting behaviour of Rock bee, *Apis dorsata* F.-II. *Indian Bee J.*, 99:23-26.
- Nandi, N.C. and A. Mahabal (1974) Nesting behaviour of *Apis dorsata* F. (Hymenoptera: Apidae) in relation to local wind direction around Poona, India. *Indian Bee J.*, 36:19-20.

Reddy, C.C., S. Reddy and S.P. Rajesh (1986)  
Studies on the colony population of *Apis dorsata*  
Fab. *Indian Bee J.*, 48:57-58.

Reddy, M.S. and C.C. Reddy (1989) Height-  
dependent nest site selection in *Apis dorsata* Fab.  
*Indian Bee J.*, 51(3): 105-106.