

Studies on De-Colonization by Rock Bee, *Apis dorsata* F. Under Dharwad Condition*

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Abstract: The de-colonization study on rock bee, *Apis dorsata* F. was conducted during 1994-95 and 1995-96 at UAS, dharwad revealed that the rate of de-colonization on terrestrial nesting sites was highest during December (37.13%) followed January (17.33 %). It was least during March. Similar results were obtained on arboreal nesting sites, wherein, it was maximum (22.73 %) during December and minimum (0.66%) during March.

Introduction

As the rock bee, *Apis dorsata* F. is highly nomadic in nature, they migrate from place to place quite oftenly depending upon the flora available and weather factors. In the process of migration, they desert their nest and go to next place with suitable surroundings. The migration pattern varies from place to place depending upon various factors. Though, the de-colonization is studied by various scientists from different parts of the world including some parts of Karnataka (Raddy, 1983 and 1988; Reddy *et al.*, 1986; Reddy and Reddy, 1987 and 1993; Soman and Kshirsagar, 1991 and Dyer and Seeley, 1994) but very little is being studied in this area (Sattigi *et al.*, 1996). Hence, to know the detailed de-colonization pattern in transition belt of Karnataka, the present study was undertaken. Departure or leaving of the colony from a nesting site due to any reason is called de-colonization.

Material and Methods

Eleven terrestrial (buildings, structures, rocks, etc.) and ten arboreal (trees) perennial nesting sites were selected in and around Dharwad to determine the rate of De-

colonization of the rock bee colonies. Observations on total number of deserted and live colonies on each of the nesting site were recorded every week. Later, number of deserted and live colonies recorded in previous week was deducted from present week observation and so also the live colonies. Then the balance in deserted colonies further added with difference in live colonies, if any, to get the newly left or deserted colonies during the week.

Total de-colonization per month was calculated by adding weekly observations and two years data for respective months and site was pooled and averaged. Per cent and mean de-colonization for every month and site was worked out and presented in tables under terrestrial and arboreal types of nesting sites. The transformed data were subjected to DMRT and original data to student's 't' test for statistical interpretation.

Results and Discussion

The de-colonization rate on terrestrial nesting sites was highest during December with the mean of 27.27 (37.13%) colonies deserting followed by January which recorded the mean

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Table 1. De-colonization of *A. dorsata* F. on terrestrial nesting sites (Average of two years)

Nesting Site No.	No. of colonies deserted during different months											
	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.
T ₁	05	01	03	04	34	27	05	00	03	07	02	02
T ₂	01	04	06	08	46	15	00	00	10	07	07	03
T ₃	02	00	03	01	13	10	01	00	03	01	01	01
T ₄	04	03	03	04	07	04	01	00	00	03	01	02
T ₅	00	02	04	06	15	10	01	00	01	10	04	04
T ₆	01	06	09	13	14	05	00	00	01	05	06	01
T ₇	00	01	02	04	10	03	00	00	00	01	01	01
T ₈	01	07	05	07	88	25	11	02	05	20	13	02
T ₉	01	02	03	07	42	30	01	02	11	10	15	00
T ₁₀	01	00	04	00	09	02	02	00	00	01	02	01
T ₁₁	02	05	03	03	22	09	04	00	07	07	04	01
Total	18	31	45	57	300	140	26	04	41	72	56	18
percentage	2.23	3.84	5.57	7.05	37.13	17.33	3.22	0.50	5.07	8.91	6.83	2.23
Mean	1.63 ^{dc}	2.82 ^{cde}	4.09 ^{cd}	5.18 ^{cd}	27.27 ^a	12.73 ^b	2.63 ^{cde}	0.38 ^e	3.73 ^{cd}	6.55 ^{ed}	5.09 ^{cd}	1.64 ^{de}

Note: Means followed by the same alphabets indicate statistical parity (p=0.05) by DMRT

Table 2. De-colonization of *A. dorsata* F. on terrestrial nesting sites (Average of two years)

Nesting Site No.	No. of colonies deserted during different months											
	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.
A ₁	00	00	00	00	01	01	00	00	01	04	03	00
A ₂	01	00	00	00	01	04	00	00	00	02	00	00
A ₃	00	00	00	00	01	02	00	00	00	01	00	00
A ₄	01	00	00	00	01	03	00	01	01	02	01	00
A ₅	01	01	03	09	13	11	01	00	00	07	05	02
A ₆	01	00	01	00	01	02	00	00	00	02	01	00
A ₇	02	01	01	03	09	03	00	00	00	07	02	01
A ₈	01	01	00	01	02	01	00	00	01	01	00	01
A ₉	01	00	01	00	03	01	03	00	00	02	01	01
A ₁₀	01	01	00	00	02	01	00	00	00	01	02	00
Total	09	04	06	13	34	29	04	01	03	29	15	05
percentage	5.92	2.63	3.95	8.55	22.37	19.08	2.63	0.66	1.97	19.08	9.87	3.29
Mean	0.90 ^{bc}	0.40 ^{bc}	0.60 ^{bc}	1.30 ^{bc}	3.40 ^a	2.90 ^a	0.40 ^{bc}	0.10 ^c	0.30 ^c	2.90 ^a	1.50 ^b	0.50 ^{bc}

Note: Means followed by the same alphabets indicate statistical parity (p=0.05) by DMRT

of 12.73 colonies accounting for 17.33 per cent and both differed significantly with each other but were significantly high over de-colonization during other months. The rate of de-colonization was significantly low during March which recorded the mean of 0.36 colonies out of total colonies de-colonization in a year. But, it was at par with de-colonization during February, July, August, September, October and November (Table 1).

The highest de-colonization during December followed by January is mainly due to the lowest temperature leading to cold weather coupled with scarcity of flora. The moderate to high de-colonization during April, May, June, September and October was because of high temperature from April to June and slightly low temperature, heavy rains and severe wind during September-October. Significant less de-colonization was mainly due to the availability of flora and ideal weather conditions throughout the remaining period.

On arboreal nesting sites, the rate of de-colonization was maximum during December with the mean of 3.40 (22.37%) colonies deserting which was significantly more than other months but was at par with the rate of de-colonization during January and May. Next highest rate of de-colonization was recorded during June with the mean of 1.50 colonies deserting and at par with July, August, September, October and November. On the contrary, the minimum de-colonization rate was noticed during March with the mean of 0.10 (0.66%) colonies deserting which was significantly low but at par with the de-colonization during February, April, July, August, September, October and November (Table 2).

The comparative rate of de-colonization on terrestrial and arboreal nesting sites indicated by the Student's "t" test that the de-colonization pattern followed more or less same

trend but they differed significantly from each other. Further, it was significantly high on terrestrial nesting sites (6.14) as compared to the arboreal (1.27) nesting sites.

The highest de-colonization during December and January on arboreal sites was mainly due to the cold weather whereas, the lowest de-colonization during March and other months was because of sufficient availability of flora in nature and optimum weather conditions. The results of the present study on both terrestrial and arboreal nesting sites are in line with the findings of the Anon. (1967 and 1968) and Sattigi *et al.* (1996). But, the present results disagree with the findings of Reddy (1983 and 1988), Reddy *et al.* (1986), Reddy and Reddy (1987 and 1993), Ahmad (1989), Venkatesh and Reddy (1989) and Viraktamath (1989). This may be due to change in locality and climatic conditions which ultimately leads to the change in availability of flora. The temperature which normally went beyond 38°C during these months as most of the reports are from dry belts as against present study area which fell in transition zone of Karnataka.

According to Soman and Kshirsagar (1991), de-colonization on terrestrial nesting sites was maximum during August -September. The variation with present findings may be due to the change in locality which ultimately leads to the change in availability of food and weather conditions which are the main deciding factors for bees to remain at a place or to migrate. Since, this report is from hill stations like foothills of Himalaya and Western ghat area where rainfall recorded was high during August and September coupled with low temperature, the reported de-colonization is high prior to the November to January as compared to the present study.

Further, de-colonization by rock bees was significantly higher on terrestrial nesting sites as compared to the arboreal nesting sites through

the year. The present study is not in agreement with the findings of Reddy *et al.* (1986) and Reddy and Reddy (1987) who reported that the rate of de-colonization was slightly higher on arboreal nesting sites as compared to terrestrial nesting sites. This variation may be due to the basic difference that the colonization itself was high on

arboreal nesting sites at Bangalore which naturally led to the higher rate of de-colonization from arboreal nesting sites. In the present study, the rate of colonization was significantly higher on terrestrial nesting sites leading to the higher rate of de-colonization.

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