

ASSESSMENT OF DEARTH PERIODS FOR HONEY BEES (*APIS MELLIFERA*) IN GWALIOR (M.P.), INDIA

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ABSTRACT: Management of honeybees for the production of various value added products require complete knowledge & understanding of beekeeping practices. Honeybee colonies should be evaluated for their performance during dearth periods so that appropriate measures can be opted to successfully overcome dearth periods. In the present study, various colony parameters viz. egg laying area, brood area, honey and pollen storage area were observed and recorded. Values obtained for all the parameters viz. egg laying (1712 cm²), brood area (1302.7 cm²), pollen stores (1090.7 cm²) and honey stores (1476 cm²) were maximum in the April month when sufficient bee flora was available. The values decreased for all the parameters and reached minimum (0.0) in June month when the food sources were in scarce.

KEY WORDS: Honeybee, beekeeping, dearth periods, Gwalior, brood.

During summer season, natural food sources (pollen and nectar) of honeybee become scarce. In India, summer seasons are getting prolonged and so also the dearth period due to huge industrialization and global warming. Periodical dearth periods results into depletion of food stores & nutritional reserves inside the bee hives. Due to deficiency of protein rich food, egg laying frequency of queen bee decreases. Worker bees stops brood rearing resulting into weakening of colony performance & colony strength. Sometimes prolonged dearth of bee flora may lead to perishing of the bee colonies. Poor bee colonies may sometimes be attacked by bee enemies such as wasps, ants, bee eater birds, wax moth and robbing by wild bees. Therefore management of bee colonies is getting more and more difficult. Quite often beekeepers harvest excess amount of honey before dearth period so that colonies cannot sustain due to the shortage of food. All these reasons forces the beekeepers have to follow the concept of colony migration which involves a lot of labor, time and money. Several colonies may perish during transportation due to accidents, improper timing and improper site selection. In addition to colony migration, study related to colony parameters during dearth period may help in variety of ways in successful beekeeping management. Study of various colony parameters during dearth periods may help in calculating the severity and effect of dearth period and amount of pollen substitute to be provided to bee colonies during different time intervals of the dearth period. Mishra (1995) reported the dearth of bee flora from May to September and emphasized the necessity of feeding artificial diets to bee colonies during this period to strengthen their stores. The present study was conducted to assess the severity of dearth periods and their effect on bee colonies so that suitable arrangements can be done for proper bee management to help tide the colonies of *Apis mellifera* over the dearth periods.

MATERIAL AND METHODS

Required number of disease free *Apis mellifera* colonies of almost equal strength were procured from Navdarshnam Bee Farm and maintained at Jiwaji University Campus, Gwalior (M.P.) during summer 2010. Egg laying area, brood area, pollen and honey stores in the colonies was measured after every 21 days interval with the help of wire grid measuring frame consisting of squares of the size of one inch² (Seeley & Mikheyev, 2003; Amir & Peveling, 2004) (Fig. 1). This value denotes the area in inch² which was then converted into cm² by multiplying with a factor of 6.45. Data thus obtained was tabulated and subjected to randomized block design (Gomez & Gomez, 1984).

RESULTS

Results obtained during the study were depicted in figures 2 & 3.

Egg laying area was observed to be 1712 cm² per colony in April month which decreased to 317.4 cm² per colony in May followed by 58 cm² per colony in late May. No any egg laying was observed in the June month. Fresh egg laying (112.7 cm²) was observed in July and after that it started increasing and recorded to be 357 cm² and 486.3 cm² on 5th August & 26th August respectively (Fig. 2).

Brood area was observed maximum 1302.7 cm² per colony in beginning of study which decreased to 640 cm² on 22nd April. Brood area further decreased to 112.7 cm² in the May month and no any brood was observed in June month. With the onset of monsoon season, brood reappeared as value recorded for brood area was 30 cm² on 15th July. Brood area further increased to 114 cm² as on 5th August and reached 266.3 cm² at the end of August month (Fig. 2).

Reserved food stores in form of pollen and honey were also observed & recorded in the colonies to assess the severity of dearth period. The pollen stores were observed to be 1090.7 cm² per colony on 1st April followed by 805 & 389 cm² per colony on 22nd April and 13th May. No any pollen stores were observed in June month as values recorded to be 0.0. After that with the fresh showers of monsoon, bee flora started reappearing and fresh pollen was observed in the bee hives as 67 cm², 112.7 cm² & 167.3 cm² on 15th July, 5th August and 26th August respectively (Fig. 3).

Similarly honey stores were also observed in the colonies. No sealed/unsealed honey was found in the colonies in the month of June. Fresh honey (45.0 cm²) was observed in July month which increased to 82.7 cm² on 5th August. Honey storage area reached 110 cm² at the end of study i.e. on 26th August (Fig. 3).

DISCUSSION

The results obtained during the study were more or less similar to the observations of Standifer et al. (1973), Doull (1980), and Mishra (1995) who reported that dearth period for honeybees starts in May and end in September month. Also they emphasized the necessity of feeding protein rich artificial diets to bee colonies during this period to strengthen their stores. During the study, it was also observed that egg laying & brood area started recovering with the first showers of monsoon (July onwards). The inferences drawn from the study were in accordance with that of Singh (1943); Thakar & Shende (1962); Shah & Shah (1976) who reported an increase in the rate of egg laying by queen bee and brood rearing with the first income of pollen after dearth period. Thus the study on control colonies was of prime significance as it gives an idea about the severity of

dearth period for honey bees. Also, the study was helpful in determining the amount of artificial protein rich diet to be provided to bee colonies during different time intervals of the dearth period. At the end of study, it can be concluded that intensive care of bee colonies is required only during severity of dearth periods. Proper bee management practices must be followed to overcome dearth period successfully.

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LITERATURE CITED

- Amir, O. G. & Peveling, R.** 2004. Effect of tri-flumuron on brood development and colony survival of free flying honeybee, *Apis mellifera* L. *Journal of Applied Entomology*, 128: 242-249.
- Doull, K. M.** 1980. Relationships between consumption of pollen supplement honey production, and brood rearing in colonies of honeybees (*Apis mellifera* L.). I. *Apidologie*, 11 (4): 361-365.
- Gomez, K. A. & Gomez, A. A.** 1984. *Statistical Procedures for Agricultural Research*, John Wiley & Sons, New York. pp. 680.
- Mishra, R. C.** 1995. Social behavior of bees and related management practices, pp. 44-59, In: *Honey bees and their management in India*. Kriski Anusandhan Bhawan, Pusa, New Delhi, pp. 168.
- Seeley, T. D. & Mikheyev, A. S.** 2003. Reproductive decisions by honey bee colonies: tuning investment in male production in relation to success in energy acquisition. *Insects Society*, 50: 134-138.
- Shah, F. A. & Shah, T. A.** 1976. A note on the bee activity and bee flora of Kashmir. *Indian Bee Journal*, 38: 29-33.
- Singh, S.** 1943. Bee management: Management of bees during the honey-flow. *Indian Bee Journal*, 5: 41-44.
- Standifer, L. N., Waller, G. D., Levin, M. D., Haydak, M. H. & Mills, J.** 1973. Value of three protein ratios in maintaining honey bee colonies in outdoor flight cages. *Journal of Apicultural Research*, 12: 137-43.
- Thakar, C. V. & Shende, S. G.** 1962. Management pattern for experimental apiaries. *Indian Bee Journal*, 24: 92-101.



Figure 1. Frame sized wire grid used to measure various colony parameters.

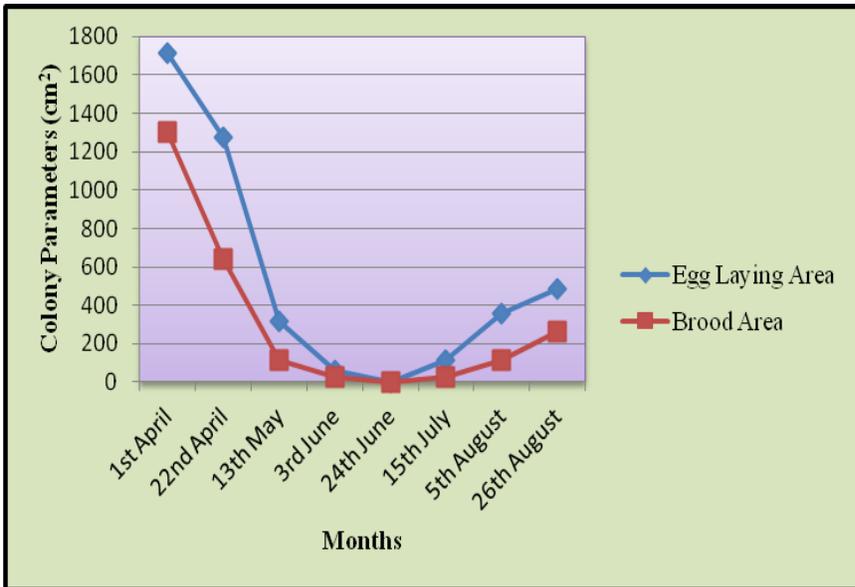


Figure 2. Showing variation trend in egg laying & brood area during dearth period.

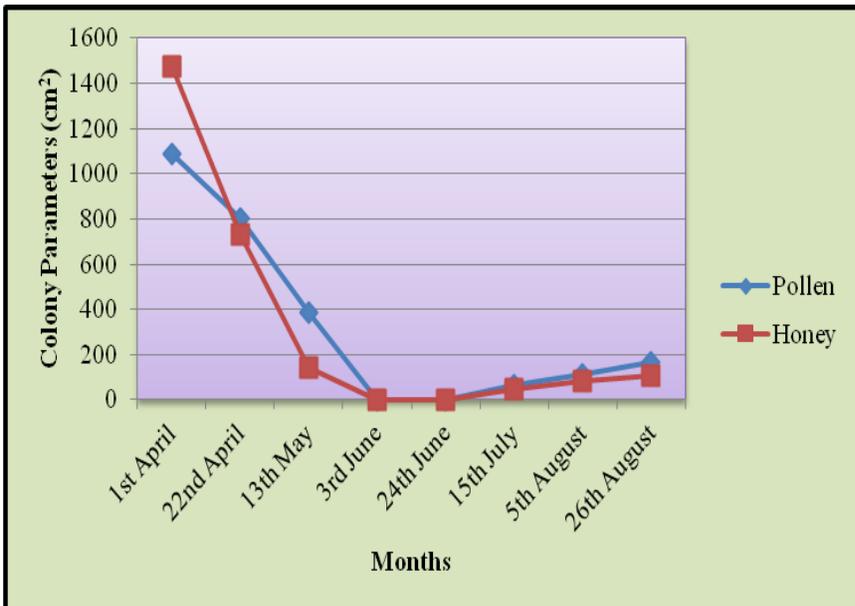


Figure 3. Showing variation trend in honey & pollen area during dearth period.