



## Comparative Performance of *Apis Mellifera* and *Apis Cerana* Under Punjab Conditions

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ABSTRACT

Study conducted on relative performance of *Apis mellifera* and *A. cerana* under Punjab conditions, revealed that as far as honey collection, pollen load, egg laying capacity, sustainability under adverse conditions (dearth period), ability to regain strength after deteriorating environmental conditions etc. were concerned, *A. mellifera* was the best performer as compared to other species. Phenomena of absconding and swarming was more in case of *A. cerana* while absconding was not observed and swarming was easily controllable in case of *A. mellifera*. Thus Italian honeybees were more suitable and beneficial as compared to *A. cerana*.

### KEYWORDS

*Apis mellifera*, *Apis cerana*, swarming, absconding, foraging behaviour of honeybees.

### Introduction

Biology of *Apis mellifera* and *A. cerana* is similar in many ways. Both types make parallel combs in dark. Performance of these honeybee species may differ in different geographical areas and various agro-ecosystems. Mostly *A. cerana* is reared in hilly areas whereas *A. mellifera* in plains. The former species starts foraging in early hours (morning) at low temperature in winter as compared to the latter one. But average foraging hours of *A. mellifera* are more with respect to second bee species. A comparative study of both the species was done on the basis of honey yield, pollen load carrying capacity, number of eggs laid per day by queen, swarming, absconding, survival during dearth period, strength limit etc., to reveal, which of the two species is the best performer under Punjab conditions.

### Material and methods

Some colonies of *A. cerana* were procured and managed in the vicinity of a already running apiary of *A. mellifera*. Stationary beekeeping was done in both cases. Observations were taken twice in a month for one year. Foragers with pollen loads in their pollen baskets were captured with help of forceps at entrances of hives of both bee species. Their pollen loads were removed with the help of camel hair brush in watch glasses ( fig 3 and 4 ) with electronic balance. Record of honey extracted from test colonies was kept to calculate honey yield/colony/year of the different species under investigation. Egg laying capacity of queens per day was noted by 1 square centimeter grid made on a comb frame (method given by Al-Tikrity et al., 1971) Swarming and absconding was also noted. Aggressive (stinging) behaviour was also observed by opening and disturbing bee colonies. Maximum number of workers/colony in both bee species was observed. Ability of different types of honeybees to tolerate dearth period was also examined. Data collected was consolidated, tabulated (table 1.)and conclusions were drawn.

### Results and Discussion

Study revealed that average pollen load recorded per bee was more than double in case *A. mellifera* (22.2 mg) as compared to that of *A. cerana* (10.5 mg). This difference might be due to different morphological, behavioural and innate characteristics of two species of honeybees. Similar type of results were given regarding pollen carrying capacities of these species by Mishra and Kumar (1998). Average honey yield was noted 25kg. and 6.5 kg/colony/year in case of *A. mellifera* and *A. cerana* respectively. These results are in line with those given by Mishra and Kumar (1998).

Mean egg laying capacity of queen/day was 900 in *A. mellifera* while 310 in *A. cerana*. Similar type of observations had been taken by many workers (Atwal and Sharma, 1968 ; Hameed and Adlakha, 1973) that the egg laying capacity of

*A. mellifera* queen was much higher than that of *A. cerana* (Table-1).

Swarming and absconding took place more frequently in *A. cerana*. No absconding was recorded in *A. mellifera* even during dearth period (May to July). Average 45 per cent colonies absconded while 21 per cent colonies dwindled in case of *A. cerana* while no absconding took place and 2 per cent colonies deteriorated in case of *A. mellifera* under adverse conditions. Strength of colonies decreased in both type of colonies but on returning of honey flow season, *A. mellifera* colonies regained strength and recovered quickly as compared to those of *A. cerana*. During honey flow season it was very difficult to control swarming from *A. cerana* colonies. Many workers (Atwal and Sharma, 1968 ; 1971 ; Dhaliwal and Sharma, 1974 ; Singh, 1975 ; Woyke, 1976 ; Goyal, 1978) have verified similar results that absconding was very common in *A. cerana* during unfavourable conditions while it was little known in *A. mellifera* and it was very difficult to check swarming in populous colonies of *A. cerana*.

*A. cerana* was more aggressive as compared to *A. mellifera*. Colonies of *A. cerana* became furious on disturbing and number of stings on gloves and cloths were much more as compared to *A. mellifera* colonies. Hissing and more aggressive behaviour of *A. cerana* has already been explained (morse et al., 1967 ; Rana, 1989 ; Mishra and Kumar, 1998 ; Suryanarayana and Rao, 1998).

*A. mellifera* survived successfully at high temperature and under deteriorating conditions of summer as compared to *A. cerana*. Verma and Edwards (1971) reported similar type of results that *A. mellifera* could tolerate higher temperature than *A. cerana*. The latter was unable to thrive in the areas with much hot summers.

From above results and discussion it may be concluded that *A. mellifera* is the best performer because it has capacity to survive under deteriorating conditions without absconding, more efficiency to collect nectar and pollen, more egg laying capacity of queen, its swarming can easily be checked, Number of workers per colony was much more (about double) as compared to *A. cerana*. *A. mellifera* colonies maintain their strength very efficiently. Therefore this honeybee species is recommended for beekeeping in Punjab.

**Table-1 Relative performance of *A. mellifera* and *A. cerana***

Sr.No.	Parameter	<i>A. mellifera</i>	<i>A. cerana</i>
1	Pollen load	22.2 mg	10.5 mg
2	Honey yield	25 kg/colony/year	6.5 kg/colony/year

3	Egg laying capacity of queen/day	900	310
4	Swarming	Less and easily manageable	Frequent and difficult to manage in populous colonies.
5	Abscending	Not observed	Frequent during dearth period (45% colonies absconded)
6	Aggressiveness	Calm	More aggressive and showed hissing behaviour
7	No. of stings on disturbance	3/colony	10/colony
8	Recovery after dearth period	Very fast	Slow
9	Tolerance during dearth period	2% colonies deteriorated	21% colonies deteriorated

Note : Values given in table are averages.



Fig 1. *A.mellifera* foraging on marigold (*Tagetes erecta*) flowers



Fig. 2. *A. cerana* foraging on marigold (*Tagetes erecta*) flowers



Fig.3 Pollen load is being removed from *A.mellifera* forager



Fig 4. Pollen load is being removed from *A. cerana* forager



Fig. 5 *A. cerana* colony managed in a hollow log.

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