# NESTING SITE PREFERENCE AND BEHAVIOR OF GIANT HONEY BEE *Apis dorsata*

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**ABSTRACT**

A study was done to investigate the nesting site preference and nesting behavior of giant honeybee *Apis dorsata* in Chitwan, Nepal from May 2010 to 2012, June. More than 500 live and left nests at several nesting sites were studied. The annual mean number of *A. dorsata* nests was the highest at water towers followed by residential buildings and the lowest at trees. The colony remained for longer duration at residential buildings (6.2 months / year) followed by at water towers (5.8 m / y) and trees (3.3 m / y).The bees preferred highly to build the nest on buildings that were safer from enemies and bad weather followed by trees and rarely on rocks. Highest preference was given to the previous year's nesting site. The bees never built the nests on old and weak buildings and dead trees that were not strong enough to support the load of their nest and also on the remnants of a previous colony if it was burnt, treated with chemical(s) or painted with enamels. Several swarms built their nest even touching to each other and lived friendly together. The size of the nest varied from 2 to 30 cm in height and 5 to 150 cm in length with a shape variation of round to elliptical. The nest was tightly attached to the nesting structure by hard, rough and gritty wax cells to support the colony load. The thickness of the comb at the attachment point and bottom end was 7 and 3 cm respectively. The size and shape of worker and drone cells were similar measuring each side 0.2 cm long, 1.5 cm deep and 0.5 cm wide. The long, soft and spongy honey cells developed at the both sides of a thin wax foundation increased considerably with the availability of nectar, pollen and suitable climate.

Key words: *Apis* dor*sata*, nesting behavior, building, tree

## Introduction

Nepal is a small mountainous agricultural country with highly diversified agro ecological zones and honeybee species. The giant honeybee (*Apis dorsata*), the rock bee (*Apis laboriosa*), the Asiatic hive bee (*Apis cerana*) and the little bee florea (*Apis florea*) are the native honeybee species commonly found and distributed at different ecological regions of Nepal influencing both crop and bee hive productions. The colonies of giant honey bee *A. dorsata* are distributed widely across the plains and foothills of Nepal. The bees migrate several miles away in search of food and safe shelter (Koeniger, 1980). Thousands of *A. dorsata* colonies come to Chitwan every year during the month of October and stay for about 6 -10 months till the availability of sufficient food, safe shelter and favorable weather is available. During this period, the bees build large single open nest to store honey, pollen and rear brood. The *A. dorsata* bees leave their nest with empty combs when situation becomes unfavorable and migrate to other places in search of better resources. However, the nesting behavior and nesting site preference of giant honeybee, *Apis dorsata* is poorly known. Aggregation of several colonies very close to each other and criteria for site selection to build nest are the significant but unknown features of dorsata bees. Therefore,

this study was carried out to investigate the nesting site preference and behavior of giant honeybee *A. dorsata* at Chitwan district from May 2010 to June 2012. The findings of this study will be helpful tools for the further study towards the management and domestication of *A. dorsata* bees.

## Materials and methods

### Geographical location of the study area*:*

The study was carried out at Chitwan, Nepal between longitudes $83^{o}$ 58' to $84^{o}$ 40'east and latitude $27^{o}$ 21' to $27^{o}$ 46' north covering an area of about 2510 square kilometer with an altitude range of 240 to 1500 m asl. Chitwan has tropical to subtropical type of climate with a temperature range $6^{o}$ (winter) to $42^{o}$ C (summer). Humidity rises from May (Average 50%) and reaches to its extreme (100%) in December and January. April and May are the hottest parts where as June, July and August months are the hot and humid months with more rains and cloud. October, November, February March and parts of April months are the warm, sunny months suitable for bees.

### Observation on nests and nesting sites:

Old nests (left combs), old nesting sites (only nesting spots) and live nests of *A. dorsata* bees were observed and studied for the nesting behaviors throughout Chitwan from May 2010 to June 2012. All potential nesting sites were observed and listed for experiment. More than 500 nesting sites including live and old from water tower, residential buildings and trees were studied. The time for arrival and departure of the colonies were also recorded to study the period of their stay on such nesting structures. Also, the reason(s) for departure from the sites was assessed at weekly visits to the colonies.

Nesting site preference of the bees to different structures was evaluated from the number of live and old nest and on the length of their stay period on such structures. The characteristic of nesting sites such as color and texture of the surface, height from ground level, type of building materials were also studied by frequent visual observations at different nesting sites. The color of the surface of nesting objects was identified by visual observations, texture by feeling methods. The size and shape of the nests and their orientation was also studied by frequent visual observations and measurements. Similarly, the size and shape of the brood cell and honey and pollen store was also assessed and recorded. The number of nesting years on a particular nesting object was recorded by interviewing with the owner of the buildings and trees or nearby residents.

The data thus obtained were statistically calculated and discussed.

## Results and Discussion*:*

### Nesting site preference:

Preference of *A. dorsata* bees to sites for building their nests differed highly at different structures and objects. The bees preferentially built the nest on water tower followed by residential buildings and with less preference on the trees. The number of live nests was highest (80) at big water tower close to Rampur campus office in 2010 followed by 37 at water tower of cancer hospital, Yagyapuri; 35 at Rampur hostel buildings; 34 at big water tower, Rampur campus; 29 at Sukranagar residential building; 27 at water tower, Rampur,

livestock farm and 25 at Rampur campus apartments in the same year. The lowest number of nest was observed at silk cotton tree (*Bombax ceiba,)* Yagyapuri, water tower, Rampur horticulture Farm and Ficus *benjamina* tree at Bagesori. However, the bees did not build any comb on trees in the year 2012 (Table 1).

The total number of *A. dorsata* nests varied highly in the year 2010, 2011 and 2012 at water tower, residential buildings and trees. The total number of nests of the year 2010, 2011 and 2012 were higher at water towers (165, 73 and 49) than that of total number of nests of residential buildings (121, 32 and 18) and total number of nests of trees (13, 13 and 0.0). The grant total number of nests of 3 years (2010 to 2012) was highest at water tower (287) followed by residential buildings (171) and trees (26) (Table 1).

The overall annual mean number of *A. dorsata* nest was highest (43.7 ± 32.6) at big water tower Rampur, campus office followed by water tower, cancer hospital, Yagyapuri (21.3 ± 15.0); water tower livestock farm Rampur (17.3 ± 10.0); Rampur hostel buildings (13.3 ± 18.8); ten family building, Rampur (11.3 ± 14.5) and Rampur campus apartments (11.0 ± 12.2). The overall mean number of *A. dorsata* nest was recorded lowest at swami tree (*Ficus benjamina*), Bagesori (0.3 ± 0.6) followed by silk cotton tree, Livestock farm (0.7 ± 1.2); silk cotton tree, Mangalpur (1.0 ± 1.0); silk cotton tree *(Bombax* ceiba*),* Narayangarh (1.3 ± 1.2); water tower, Legume Development Program, Rampur (1.7 ± 6.0) and Baniya house, Mangalpur (1.7 ± 1.5) (Table 1).


1. Ten family Residential building, 2. Maize research station; 3. Residential building, Saradanagar; 4. Deughat temple; 5. Residential building Sukranagar; 6. Water tower cancer hospital; 7. Old water tower, Rampur; 8. Water tower, livestock Rampur; 9. Water tower, Maize station, Rampur; 10. Water tower, Horticulture farm, Rampur; 11. Bombax tree at Mangalpur; 12. Bombax tree, Narayangarh.

Figure 1. Some of the nesting sites of *A. dorsata* bees under experiment

Table 1. Number of *A. dorsata* nests at water tower, residential buildings and trees, 2010 to 2012, Chitwan, Nepal

| Nesting place | Number of live nests | | | Overall annua mean | Length of stay duration | Nesting years |
|---|---|---|---|---|---|---|
| | 2010 | 2011 | 2012 | | | |
| **I. Water Tower** | | | | | | |
| IAAS, Rampur office (Big tower) | 80 | 34 | 17 | 43.7 ± 32.6 | Nov-June (8 months) | 20 |
| IAAS, Rampur office (old tower) | 14 | 8 | 2 | 8.0 ± 6.0 | Nov-June (8 months) | 40 |
| IAAS, Rampur, livestock farm | 27 | 18 | 7 | 17.3 ± 10.0 | Nov-April (6 months) | 20 |
| Cancer hospital, Yagyapuri | 37 | 7 | 20 | 21.3 ± 15.0 | Nov-June (8 months) | 10 |
| IAAS, Rampur Horticulture farm | 2 | 2 | 1 | 1.7 ± 6.0 | Nov-Dec (2 months) | 5 |
| Maze Research Station, Rampur | 5 | 4 | 2 | 3.7 ± 1.5 | Nov- Jan (3 months) | 5 |
| **Grant Total** | **165** | **73** | **49** | **287** | | |
| **Overall mean** | **27.5 ± 28.9** | **12.2 ± 12.0** | **8.2±8.3** | **15.9 ± 15.6** | **5.8±2.7** | **16.7 ± 13.3** |
| **II. Residential Buildings** | | | | | | |
| IAAS Rampur Ten family, Rampur | 28 | 2 | 4 | 11.3 ± 14.5 | Oct-April (7 months) | 40 |
| IAAS Rampur Hostel, Rampur | 35 | 3 | 2 | 13.3 ± 18.8 | Nov-April (7 months) | 20 |
| IAAS Rampur Apartments | 25 | 5 | 3 | 11.0 ± 12.2 | Nov-Dec (2 months) | 20 |
| Temple, Gaindakot, Tanahau | 2 | 2 | 4 | 2.7 ± 1.2 | Oct-July (10 months) | 5 |
| Sukranagar (Gurung house) | 29 | 17 | 5 | 17.0 ± 12.0 | Nov-Aril (6 months) | 10 |
| Mangalpur (Baniya house) | 2 | 3 | 0 | 1.7 ± 1.5 | Nov- April (6months) | 4 |
| **Grant Total** | **121** | **32** | **18** | **171** | | |
| **Overall mean** | **20.2 ±14.4** | **5.3 ± 6.8** | **3.0±2.8** | **10.0 ± 7.1** | **6.2±2.6** | **16.5 ± 13.5** |
| **III. Trees** | | | | | | |
| *Bombax ceiba, (Silk cotton))* Deughat | 5 | 5 | 0 | **3.3 ± 2.9** | Oct-April (6 months) | 10 |
| *Bombax ceiba,* Narayangarh | 2 | 2 | 0 | **1.3 ± 1.2** | Oct -Dec (3months) | 7 |
| *Bombax ceiba,* Yagyapuri | 2 | 1 | 0 | **1.0 ± 1.0** | Oct-Dec (3 months) | 5 |
| *Bombax ceiba,* Mangalpur | 3 | 3 | 0 | **2.0 ± 1.7** | Oct-Dec (3 months) | 10 |
| *Bombax ceiba,* Livestock farm, Rampur | 0 | 2 | 0 | **0.7 ± 1.2** | Feb –April (3months) | 4 |
| *Ficus benjamina (Swami tree), Bagesori* | 1 | 0 | 0 | **0.3 ± 0.6** | April-May (2months) | 1 |
| **Grant Total** | **13** | **13** | **0** | **26** | | |
| **Overall mean number at trees** | **2.2 ± 1.7** | **2.2 ± 1.7** | **0.0 ± 0.0** | **1.4 ± 1.1** | **3.3 ± 1.4** | **6.2 ± 3.5** |

The overall mean number of nest during the year 2010 was highest at water towers (27.5 ± 28.9) followed by residential buildings (20.2 ± 14.4) and lowest at trees (2.2 ± 1.7).

Similarly, the overall mean number of nest in the year 2011 and 2012 were also higher at water towers (12.2 ± 12.0 and 8.2 ± 8.3) than that of residential buildings (5.3 ± 6.8 and 3.0 ± 2.8) and tress (2.2 ± 1.7 and 0.0). The overall mean number of nests of 3 years was highest at water tower (15.9 ± 15.6) followed by residential buildings (10.0 ± 7.1) and the lowest at trees (1.4 ± 1.1) (Table 1).

**Colony stays duration:**

The length of stay period of *A. dorsata* colony differed highly at different nesting sites. *A. dorsata* colonies were observed for longest period (Oct to July :10 months) at Gaindakot temple, Tanahau followed by big water tower, Rampur office (Nov-June : 8 months) ; old water tower, Rampur office, (Nov-June : 8 months); water tower, cancer hospital, Yagyapuri (Nov-June : 8 months); Ten family building, Rampur (Oct-April : 7 months) and Rampur hostel buildings (Nov-April :7 months).The duration of colony stay was lowest at water tower, Legume Development Program, Rampur (Nov-Dec : 2 months); Rampur campus apartments (Nov-Dec : 2 months) and swami tree, Bagesori (April-May : 2 months). However, the overall mean of colony stay duration was highest (6.2 ± 2.6) at residential buildings than that of water tower (5.8 ± 2.70 and tress (3.3 ± 1.4) (Table 1).

*A. dorsata* bees were continuously building their nest since last 40 years at old water tower, Rampur office and ten family building,Rampur and since last 20 years at water tower, Rampur office (big), water tower, Rampur; livestock farm; Rampur hostel buildings; Rampur campus apartments. The overall mean number of nesting years was highest (16.7 ± 13.3) at water towers followed by residential buildings (16.5 ± 13.5) and lowest at trees (6.2 ± 3.5) (Table 1).

**Characteristic of nest and nesting sites:**

Several swarms of bees shared the space of the same structure and built the nest very close even touching to each others and lived friendly together (Figure 2). The bees raised the cell over the thin wax foundation for brood rearing (Figure 2).

Figure 2. Three colonies living together

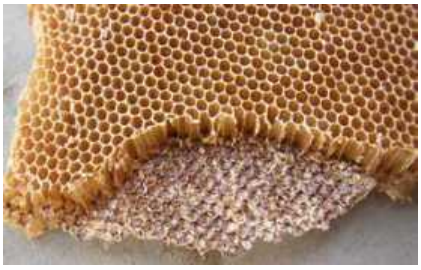


Figure 3. Thin wax foundation

Out of 18 sites identified as the potential nesting places of *A. dorsata* bees in western Chitwan and Gaidakot Parasi district, 11 were on cemented structures, 6 on big horizontal branches of trees and one wooden plank of water tank. The colour of the nesting sites varied highly according to the nesting structures. The numbers of nesting sites were higher (9) with ash color followed by creamy white (7) and lowest with pink (1) and dark brown (1) color. However, the texture of all water towers, residential buildings and trees was course.

Table.2: Characteristic of nesting sites of *A., dorsata* bees 2010 to 2012, Chitwan, Nepal.

| Nesting place | Type of nesting sites | Color of nest attachment surface | Texture of nest attachment surface | Height (m) from GL | Continue or left | Reason(s) |
|---|---|---|---|---|---|---|
| **I. Water Tower** | | | | | | |
| IAAS, Rampur office (Big tower) | Cemented building | Ash color | Course | 30-32 | Continued | Safe and strong |
| IAAS, Rampur office (old tower) | Cemented building | Creamy white | Course | 8-10 | Continued | Safe and strong |
| IAAS, Rampur, livestock farm | Cemented building | Ash color | Course | 30-32 | Continued | Safe and strong |
| Cancer hospital, Yagyapuri | Cemented building | Pink color | Course | 3-20 | Continued | Safe and strong |
| IAAS, Rampur Horticulture farm | Wooden plank | Dark brown | Course | 15 | Continued | Safe and strong |
| Maize Research Station, Rampur | Cemented building | Ash color | Course | 10 | Left | Not known |
| **II. Residential buildings** | | | | | | |
| IAAS Rampur Ten family | Cemented building | Creamy white | Course | 10-15 | Continued | Safe and strong |
| IAAS Rampur Hostel | Cemented building | Creamy white | Course | 10 | Continued | Safe and strong |
| IAAS Rampur Apartments | Cemented building | Creamy white | Course | 8 | Irregular | Not known |
| Temple, Gaindakot, Tanahau | Cemented building | Creamy white | Course | 8 | Continued | Safe and strong |
| Sukranagar (Gurung house) | Cemented building | Creamy white | Course | 5 | Continued | Safe and strong |
| Mangalpur (Baniya house) | Cemented building | Creamy white | Course | 10 | Left | Burning and white washed |
| **III. Tree** | | | | | | |
| *Bombax ceiba*, Deughat | Big branch | Ash color | Course | 35 | Left | Dead |
| *Bombax ceiba*, Narayangarh | Big branch | Ash coor | Course | 20-22 | Irregular | Not known |
| *Bombax ceiba*, Yagyapuri | Big branch | Ash coor | Course | 10 | Irregular | Not known |
| *Bombax ceiba*, Mangalpur | Big branch | Ash coor | Course | 15-17 | Irregular | Not known |
| *Bombax ceiba*, Livestock farm | Big branch | Ash coor | Course | 15-16 | Irregular | Not known |
| *Ficus benjamina* | Big branch | Ash coor | Course | 2 | Left | Not known |

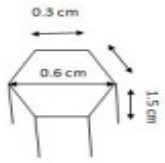
GL: Ground level

The height of the nest from ground level differed highly for different nesting structures. Among all the nesting structures, the highest (35 m) and the lowest (2 m) heights of the dorsata nest from ground level were observed on Bombax and *Ficus benjamina* trees

respectively (Table 2). However the highest height at which the nest was built at buildings was 32m (Big water tower, Rmpur) and lowest at water tower of cancer hospital (3 m) from ground level. Out of 6 nesting sites at water towers, 5 were regular and 1 was left. Similarly, out of 6 nesting sites studied at residential buildings, 4 were regular, 1 irregular and 1 was left for building the nests. Similarly, out of 6 nesting sites studied at trees, 4 were irregular and 2 were left for constructing their nest (Table 2).

**Size and shape of *A. dorsata* colony and cells:**

The smallest size of the colony was 10 x 2 x 5 cm as length, breadth and height respectively when small swarm arrived at the nesting site and the largest was 130 x 30 x 60 cm as length, breadth and height respectively when it was fully developed during April month. The shape of the colony was round to conical or oblong at arrival to new location which gradually changed to elliptical.



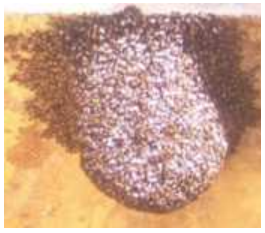

i. Hexagonal shape

ii. Worker and drone brood cells

iii. Capping of worker and drone brood

iv. Size and shape of queen cells

v. At arrival



vi. Within 1 week

vii. Within 2 weeks

viii. After 3 weeks

Figure 4. Size and shape of *A. dorsata* brood and colony/nest

The hexagonal shape of worker and drone brood was similar in size measuring each side 0.3 cm long, 0.6 cm wide and 1.5 cm deep. The shape of the swarm queen cells was round with a diameter of 0.8 cm at the opening point. The depth of swarm queen cell was measured 1.5 cm and thickness of the wall 0.1 cm (Figure 4).

The hard cells at attachment point remained tightly attached to the structure even after falling the nest and looked like a cobra snake (Figure 5). The length of the brood area was almost 3 times more than the honey area. The thickness of the brood comb at the attachment point to the structure and at the lowest edge was 7 and 3 cm respectively and remained almost constant (Figure 6). However the size of honey and pollen store increased considerably with the availability of nectar and pollen and suitable weather condition. The maximum size of the honey store was 30 x 15 x 15 cm as length, breadth and height. The cells of honey store were long cylindrical pipes which were very soft and thin measuring up

to 10 cm in length (Figure 7). The width of the nest was maximum at the honey and pollen store portion and smallest at the lowest edges of brood area.

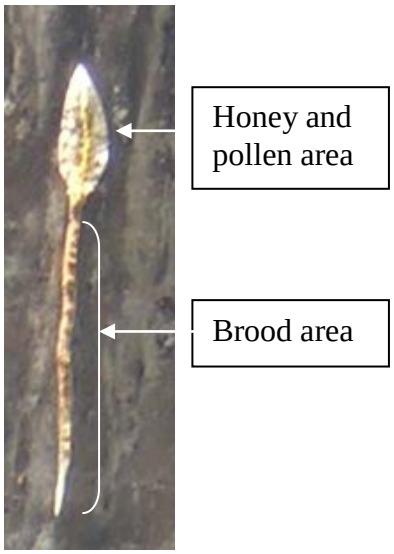



Figure 5. Size and shape of *A. dorsata* brood and food store after falling comb from structure.

Figure 6. Size of the comb at attachmen point

**Figure 7.** Length and breadth of honey and pollen store

The cells at attachment point were raised from the thick and hard wax foundation where as cells for brood rearing was raised from the thin and soft wax foundation. Honey and pollen was also stored just below the attachment point up to 6 cm.

**Discussion**

The giant bee *A dorsata* gave the highest preference to men made buildings than to trees to build the nests. Flat slabs of residential building are safer than water tower and trees from bad weather such as heavy rain, high wind, hail stones and scorching sun during summer and also from predators and enemies. Perhaps the bees are able to detect the safe site and

the strength of the supporting object to support the load of their nests. Therefore, *A. dorsata* honey bees selected preferentially outer vertical flat of the strong-cemented water tower and then flat slab of residential buildings made out of bricks, iron rod and cement.

The *A. dorsata* bees built the nest within a height range of 3 m to 32 m from ground level. This has shown that the height is not a crucial factor for dorsata bees to select sites for nest building. The nests built underneath of flat slab of residential buildings were higher in number as they were safer from bad weathers and also from enemies than any other nesting tructures. Most often they reoccupy the nesting sites of previous year to build their new nests in subsequent seasons. This finding has also supported by Singh, 1962; Deodikar et. al. 1977. However, it is poorly known whether they were the same race or other to reoccupy the same old nesting spot. *A. dorsata* bees did not prefer to build their nest on the spots of previous years if it was painted with enamels or washed with chemicals or nest was burnt in fire. Probably, these activities were responsible for removing the dorsata pheromones from the nest spots. Dorsata bees also did not prefer to build the nest on buildings having tin or thatch roof as tin increased the temperature under the roof and thatch roof did not provide enough platform to hang the big combs under thatch roof.

In absence of such building *A. dorsata* bees built their nests on the strong and big horizontally stretched live branches of Simal (*Bombax cebia*) trees. Only one nest was observed on Swami (*Ficus benjamina*) tree for about 2 months during the whole entire periods of study. Not a single colony was observed on other plant species even they were big and strong enough and easily available very close to their nests. The peculiarities of *Bombax cebia* trees to attract *A. dorsata* bees to build the nests are of great interest. The sizes of branches at which *A.dorsata* bees preferred to build nests varied from 10 to 60 cm in diameter. The bees selected the wider smooth and clean surface of the branches that looked somewhat ash in color with tight barks. None of the colony was seen built on the surface having black, green or blue colors. This has indicated that the bees have a strong tendency for the choice of color for selecting nesting spot. They never built the nests on dead and weak branches and old buildings. This has indicated that *A. dorsata* bees are able to detect the strength of the structure to carry the load of their nests.

The *A. dorsata* bees built nest horizontally (lengthwise) when the nesting structures was extended horizontally with honey and pollen load in one of the corner of the nest. However, the bees built their nests vertically (lengthwise) when the nesting structure was extended vertically with the pollen and honey load at the upper most point to give the proper balance to the load of the nest. The projection of the comb's edge was towards the ground when comb was built on horizontally extended structure and at right angle to the nesting structure when comb was built at vertically extended structures.

Large number of colonies come to Chitwan during October and November and April and built their nests. The bees sometimes build nests very close to each other sometimes even touching to each other's nest and live friendly together. This is a very interesting mutual relationship between queen right colonies which is highly fatal in other species of honey bees. This kind of aggregation of colonies in *A. dorsata* might be for better defense and shearing of experiences. This finding is also supported by Wongsiri et. al., 1996 and Thapa, 1998. They observed aggregation of 69 colonies of these bees on a single tree in Thailand and 72 colonies on a water tower in Nepal.

The number of colonies started to migrate from May and all colonies migrated at middle of July month from Chitwan. However, there were few exceptions where dorsata colonies were seen throughout the months of June, July, August and September. Again new colonies started to come to Chitwan in October and reached maximum at November and April. The length of their stay period was longer on residential buildings followed by water tower and trees (Table 1). The longer stay duration on residential buildings was because of more protection from bad weather and enemies. The findings of the study have revealed that bees are aware of different weather conditions and manage their colony accordingly.

The bees vary scientifically partitioned the single comb for honey and pollen store and brood rearing. One of the upper most corners was used to store honey and pollen (as super) and part below this attachment was used for brood production. Only one nest was found with the honey and pollen store at the center of the attachment point. The shape of the nest varied from round to conical or oblong at the beginning which changed to elliptical after few days of nest construction. The elliptical shape of the nest could be of plain or flat, curved, bent or angular indicating different shape and size depending upon the nature of the available nesting sites and honey bee population. The orientation of most of the colonies was towards the eastern direction especially to receive early sun in the morning which stimulated workers early foraging in the morning.

The size and texture of the cells at nest attachment point to the nesting site, brood production and honey and pollen storage area were different. The cells at the nest attachment location were very hard, rough and gritty. This hardiness of the cells was to keep adhered the nest tightly to the structure and also to support the load of the nest below it. As this part of the nest was very strong, it remained attached even after falling of the brood nest. The cells for honey and pollen store were long cylindrical horizontally extended pipes raised to both sides of a thin wax foundation. These pipes were spongy, thin and very soft that contained either honey or bee bread. *A. dorsata* bees reared worker and drone brood in the same size of cells. The shape of worker and drone brood cells were hexagonal measuring each side 0.3 cm in length and 1.5 cm in depth with a diameter of approximately 0.6 cm containing 100 cells per 5 cm sq. The shape of the swarm queen cells was round with a diameter of 0.8 cm at the opening point and depth and thickness of wall being 1. 5 cm and 0.1cm respectively. The shape of brood cells was same as found in other species of honey bees. However, the size of the *A. dorsata* brood as well as honey and pollen cells differed from other species of honey bees. Storage of honey and pollen ( as super of other domesticated honey bee species), separately from brood portion has facilitated to harvest it easily without disturbing the brood.

**Conclusion**

The bees gave the highest preference to buildings to build their nests. Flat slab of the residential buildings made out of bricks, iron rods and cement are strong enough to support many colonies. Also, colonies built on such slab are much safer from storms, heavy rains, hailstones that occur frequently. Similarly, residential buildings are safer from predators like wild birds, insects and animals that attacks bees several times. Perhaps the bees are able to detect the safe site and the strength of the supporting object to support the load of their nest. The findings of the study have also revealed that the *A. dorsata* honey bees are able to detect the coming situation in advance and manage accordingly. This has been also noted that A. *dorsata* bees can live many years on the same nest or nesting site if they have

sufficient food and are not disturbed. This can be an important feature of this bee species for the possibility of domestication.

The findings have reveled that bees have a strong tendency towards the choice of color for selecting nesting spot. The bees preferentially selected the nesting sites that had color similar to that the color of tree branches. *A. dorsata* bees are found highly social as they built nests touching to each other and live friendly together. This characteristic of *A. dorsata* bees can be the interest of further study towards its domestication and management.

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