

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

Namaskar!

Good Morning and Welcome



Khem Raj Neupane (PhD in Apiculture)
Assoc. Prof. Tribhuvan University,
Chitwan, Nepal
Email: krneupane@hotmail.com
Website: www.gorkhabee.com



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Laboriosa



Dorsata



Cerana

INTRODUCTION:

Nepal is one of the richest country in honey bee species diversities.

The native bee *Apis laboriosa* at > 1200m above, different ecotypes of *A. cerana* throughout the country, *A. dorsata* at terai region and *A. florea* and *Trigona* in lower mid hills are the natural boon to Nepal.

The exotic bee *A. mellifera* now is taking its place in terai of Nepal as commercial honey production.

The productive and service potentiality of these native wild honey bees might be many fold higher than the domesticated bee.

However, to exploit these potential we need series of experiments.



Florea



Trigona



Meliffera

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Single large comb



Brood and Honey area



Open nests

INTRODUCTION:

1. *A. dorsata* honey bees are the second largest bees in the world which build single large comb in an open space.
2. Honey and pollen is stored in one of the upper most corner of the comb and brood is reared below it.
3. They migrate several miles away in search of suitable nesting sites and forage.
4. They live in one place, rear brood, store honey and pollen until good forage and suitable climate is available.
5. Dorsata bees is the source of livelihood for poor in Nepal.
6. Role of the dorsata honey bees to enhance the socioeconomic status of Nepalese farmers can be much higher if their potential is exploited.



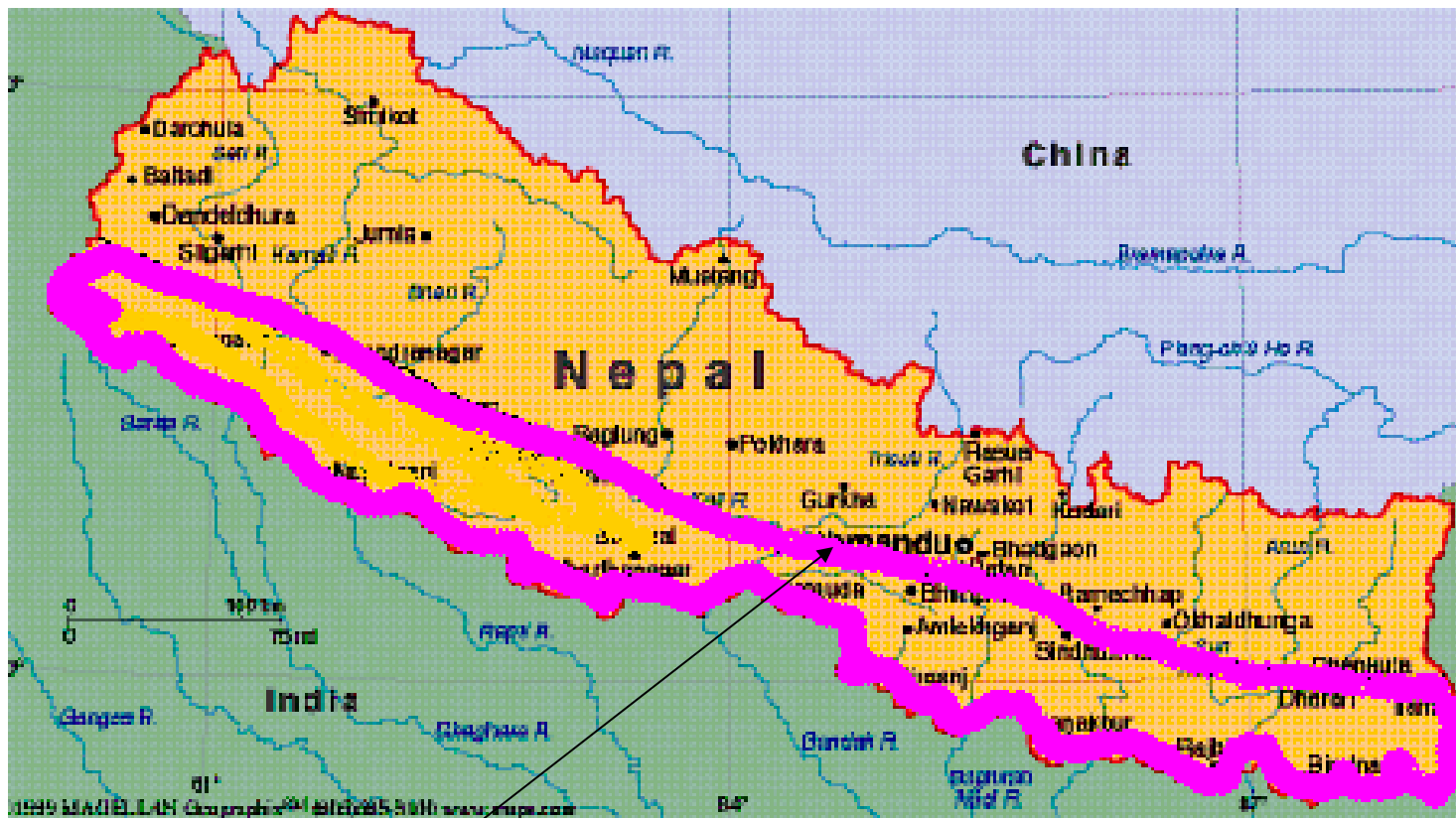
Workers



Worker

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DISTRIBUTION OF GIANT HONEY BEE *Apis dorsata* IN NEPAL



RAMPUR, CHITWAN

27 39` N, 84 21` E, 191.35 asl

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METHODOLOGY:

- ❑ All possible nests and nesting sites of *dorsata* were searched throughout the Chitwan district. More than 500 sites were identified.
- ❑ Potential nests and nesting sites in 6 water tower, 6 residential buildings and 6 in trees were selected for their nesting site preference and behavior study.
- ❑ The number of nests and their stay duration was regularly observed in all these selected experimental sites.
- ❑ The size and shape of the nest and cells of worker, queen and drone bees were measured.
- ❑ The color and texture of the nest structure was studied and identified.
- ❑ Nesting site preference to different objects was evaluated from the number of live nests and old nest and on the length of their stay period.



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FINDINGS: SITE PREFERENCE

Highest preference was given to water tower followed by residential buildings and trees.

They preferred highly the previous year's spot to rebuild their nest.

The texture of the nesting structure was coarse while the color was creamy white or ash color or pink.

More than 90 % colonies were faced towards eastern sunny direction.



Small water towers,
Rampur campus



Big water tower,
Rampur campus



Water tower, Yagyapuri



Residential building,
Saradanagar



Residential building,
Deughat



Residential building, 10-
Family, Rampur



Bombax tree,
Mangalpur



Bombax tree, Bus park,
Narayangarh

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FINDINGS: SIZE AND SHAPE OF THE NEST

- ❑ Size and shape of the colony varied as per the growth of the comb.
- ❑ At the beginning, the shape was round to conical which later became elliptical.



At arrival



At arrival



Within 1 week



After 1 week



After 2 weeks

- ❑ The smallest size of the colony was $10 \times 2 \times 5 \text{ cm}^3$ when arrived at the nesting site and largest was $130 \times 30 \times 60 \text{ cm}^3$ as length, breadth and height respectively when it was fully developed during April month.
- ❑ The growth of the comb took place both in height and length.
- ❑ *A. dorsata* colonies can live together friendly sometimes even touching each other



3 different colonies



2 colonies touching each other



3 colonies almost touching each other



3 colonies rightfully touching each other

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FINDINGS: CONDITIONS WHEN *A. dorsata* DICONCLUDED TO REBUILD NESTS ON PREVIOUS YEARS' NEST SPOT

- The nesting structure became old i.e. not strong enough to support the load of their nest
- The nesting site was treated with chemical(s) or enamel painted
- The nesting site/colony was burnt in fire



Old residential building where dorsata left building nests



Old residential building where dorsata discontinued building nests



Dead trees where dorsata left building nest



Dead trees where dorsata left building nests



Old water tank where dorsata left building nests

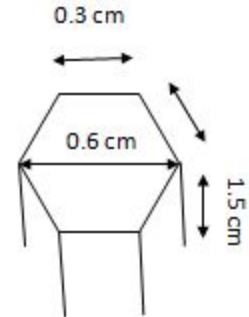


Residential house where dorsata left building nests

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FINDINGS: SIZE AND SHAPE OF THE CELLS

- ❑ The size and shape of worker and drone cells were similar measuring each side 0.3 cm long, 1.5 cm deep and 0.6 cm wide containing 100 cells per 5 cm square.
- ❑ The shape of the swarm queen cells was round with a diameter of 8mm at the opening point.
- ❑ The depth of swarm queen cell is measured 15mm and thickness of the wall 18mm.
- ❑ The cells of honey store were long cylindrical pipes which were very soft and thin
- ❑ The maximum size of the honey store was 30 x 15 x 15 cm³ as length, breadth and height



Worker and
drone cells



Queen cells



Capping of worker
and drone brood



Remains of cells at
attachment point



Honey pipes with
thin foundation

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Findings: Size of comb and type of cells

- ❑ The size of the nest varied from 2 to 30 cm in height and 5 to 150 cm in length
- ❑ The thickness of the comb at the attachment point and bottom end was 7 and 3 cm respectively
- ❑ The cells at attachment point were hard and gritty where as in brood area were soft.
- ❑ The maximum size of the honey store was 30 x 15 x 15 cm³ as length, breadth and height
- ❑ Honey and pollen was stored always at upper most corner
- ❑ Brood cells were raised from the thicker foundation where as honey pipes were raised from thin foundation.



Length of comb



Height of comb



Thin foundation in honey portion



Brood area with hard foundation



Hard and gritty wax cells at attachment point



Length of honey store

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CONTRIBUTION OF DORSATA BEES

HONEY:

- ❑ Honey is the most important product from dorsata bees
- ❑ Dorsata bee are highly potential for honey production
- ❑ Honey from the wild bees dorsata is peculiar and might be highly nutritional and medicinal
- ❑ Because dorsata bees can forage farther than 10 km and has wider foraging preference.

POLLEN/BEE BREAD:

- ❑ Dorsata collects higher amount of pollen and store as bee bread at one upper most corner of the nest
- ❑ Sometime 2/3 kg of bee bread is obtained in one single harvest
- ❑ The bee bread collected by dorsata bees is much more tasty and might be more nutritional and medicinal.

BEE WAX:

The wax from dorsata bee has become one of the source of livelihood of poor in Nepal.

POLLINATION SERVICES:

- ❑ The pollination services provided by dorsata honey bees is vital in Terai of Nepal
- ❑ One of the causes in the decline of crop productivity in Nepal is sharply declining pollinators ‘dorsata being one of the important one’.



DORSATA HONEY BEES IN ASIA ARE UNDER DANGER ZONE

Loss of nesting sites



Unscientific use of pesticides

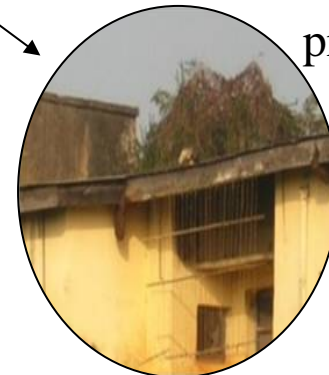


Dorsata under endanger

Unscientific Honey harvest



Pests and predators



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CONCLUSION:

A. dorsata bees gave the highest preference to buildings to build their nests. Perhaps the bees are able to detect the safe site and the strength of the supporting object to support the load of their nests.

A. dorsata bees built nest very close to each other and live friendly together. One established colony attracts the other colonies to settle on the same nesting site

Dorsata bees showed a strong tendency for the choice of previous year nest site for selecting nesting spot. The bees preferentially selected the nesting spot that was creamy white or light yellow.

Honey and pollen was stored at one upper most corner and brood is reared below it when the colony was vertically expanded.

The nest was attached tightly to the nesting structure by the hard wax cells .

The hexagonal shape of worker and drone brood was similar in size measuring each side 3mm in length and 15mm in depth and 6mm in diameter containing 100 cells per 5 cm square.

The findings can be a helpful tool for the further domestication study of dorsata bees.

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RESEARCH NEEDS

Nepal being one of the richest country in honey bee species diversity in the world , has facilitated to do many useful experiments and developmental works.

The potential of the largest honey bee *A. laboriosa* and *A. dorsata* might be many folds higher than the native hive bee *A. cerana* and the exotic bee *A. mellifera*.

However, very less work has been done and hence their potential remains unexploited.

Therefore, there is a need to develop suitable technology to manage these highly valuable honey bee species to enhance their productivity.

So, lets give your hands to collaborate and work together with these wonderful honey bee species.

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