OP-192 [Beekeeping for Rural Development]
Biodiversity of Apis dorsata and its conservation strategies in India

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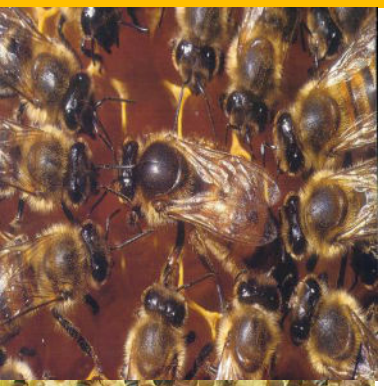
The Wild honey bees are distributed throughout the Asia including the Indian sub-continent. In India has eleven honey bee species have been identified, the domesticated are three species (Apis cerana cerana, Apis cerana indica, Apis cerana himalaya), Amongst the wild bees two little bees(Apis florea, Apis andreniformis) and there are four wild and giant honey bees (Apis dorsata dorsata, Apis dorsata bingami, Apis dorsata breviligula, Apis laboriosa), introduced European honey bee species Apis mellifera and Stingless bee Trigona species are well distributed in plains, forest and hill areas of India. The study on the Biodiversity of Apis dorsata, distribution, honey production, people involved in honey harvesting/hunting and its economics has been undertaken. The nest population ranges from solitary both in terrestrial and arboreal habitats to as many as 610 in a single Banyan tree Ficus bengalensis. As these bees are migratory in nature move from one region/area to other region/area by leaving remnants on rock cliffs, tree branches, buildings due to change in the cropping pattern and environmental condition. These remnants act as attractants to bees to construct nests for the next season. There is manifold increase in crop yield of Agriculture, horticulture and forest produce.
The details of sustainable honey harvesting from these giant bees and the conservation strategies are documented. The production of the honey ranges from 25 to 60 kgs and beeswax from 5-8 kgs per year per colony. As these A. dorsata nests on man-made structures such as tall buildings, underneath bridges, these bees are the excellent pollinators, the pollination efficiency was also documented. Three fourth of the honey produced in India is from these wild bees. Many people particularly tribal communities are largely dependent upon for their livelihood and sustain the nests through scientific honey harvesting and colony management for pollination service and ultimately for the conservation. Different regions and geographical areas have adopted different methods of conservation strategies. The details will be discussed.

Keywords: Apis dorsata wild bees, rock bees, biodiversity, conservation

BIODIVERSITY OF *APIS DORSATA* AND ITS CONSERVATION STRATEGIES IN INDIA



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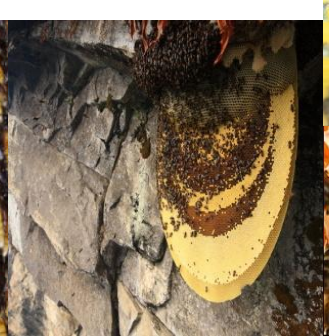

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Apis mellifera

Apis dorsata

Apis florea

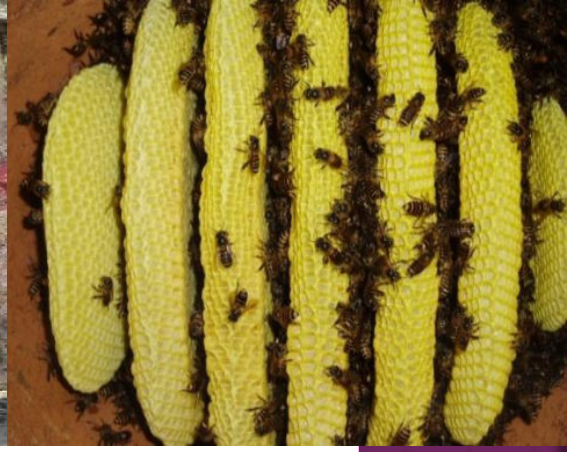
Apis cerana forager

Feral colony of *Apis cerana*

Apis dorsata

Apis florea

Apis mellifera



Apis cerana

Single comb, exposed nests

Giant Honey bees

Apis dorsata (3 sub-species)

i. Apis dorsata dorsata

ii. Apis dorsata binghami

iii. Apis dorsata breviligula

Apis laboriosa

Dwarf or Small Honey bees

Apis andreniformis

Apis florea

Multi comb, enclosed nests

Cavity nesting bees

Apis cerana (6 sub-species)

(1) *Apis cerana koschevnikovi*

(2) *Apis cerana nigrocincta*

(3) *Apis cerana nuluensis*

(4) *Apis cerana cerana*

(5) *Apis cerana indica*

(6) *Apis cerana himalaya*

Introduced species

Apis mellifera (24 sub-species)

Apis mellifera ligustica (In India)

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Introduction

- The Wild honey bees are distributed throughout the Asia including the Indian sub-continent.
- In India has eleven honey bee species have been identified, the domesticated are three species (*Apis cerana cerana, Apis cerana indica, Apis cerana himalaya*)
- Amongst the wild bees two little bees(*Apis florea, Apis andreniformis*) and there are four wild and giant honey bees (*Apis dorsata dorsata, Apis dorsata bingami, Apis dorsata breviligula, Apis laboriosa)*
- Introduced European honey bee species *Apis mellifera* and Stingless bee *Trigona* species are well distributed in plains, forest and hill areas of India.

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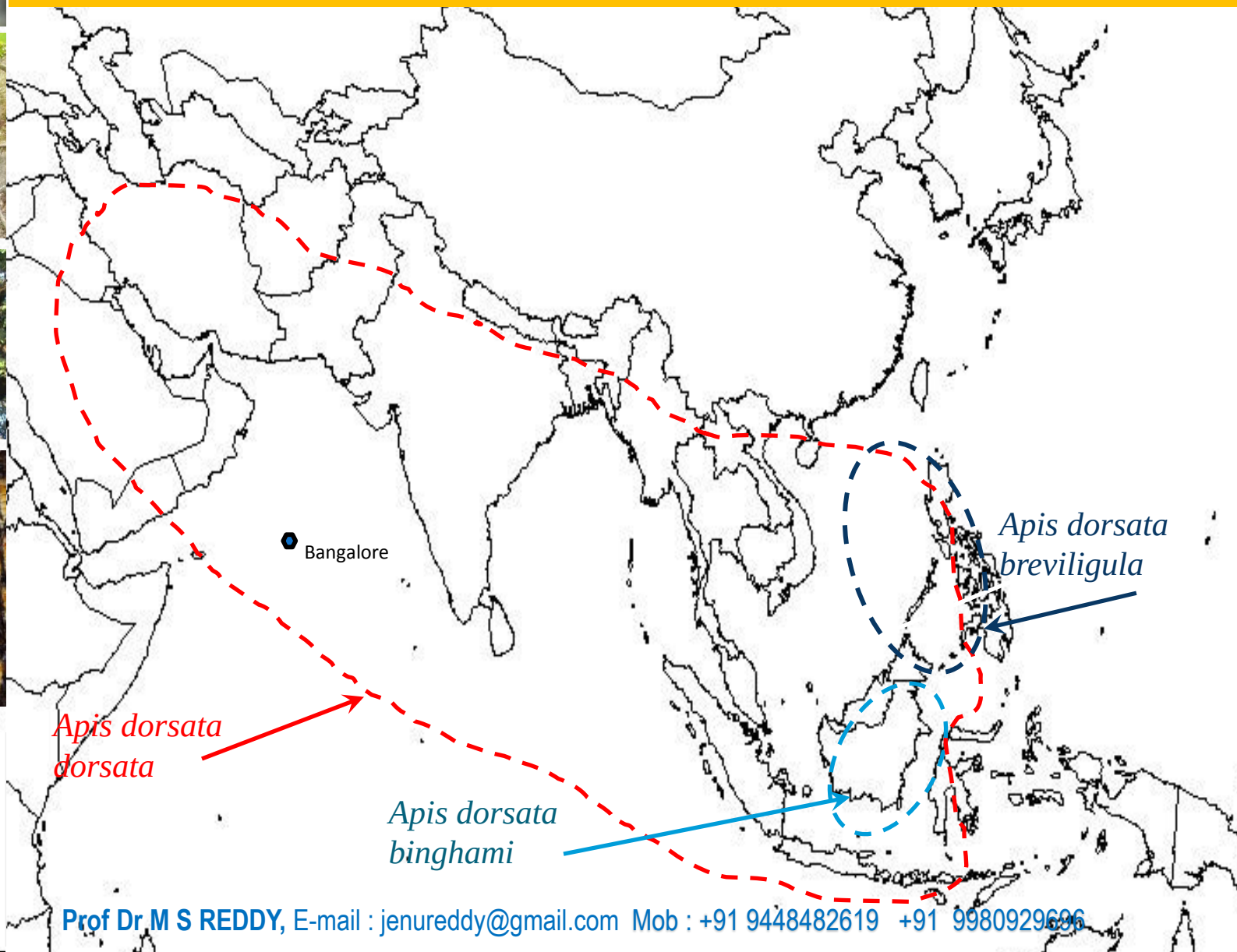
Distribution of *Apis dorsata* sub-species in Asia



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Objectives

- To study the Biodiversity of *Apis dorsata*
- Its distribution, honey production, people involved in honey harvesting/ hunting and its economics and
- Conservation strategies have been undertaken.

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Giant honeybees

- Biggest among honeybee species.
- *Apis dorsata* is found on the branches of trees, rocks and ceilings of buildings.
- *Apis laboriosa* nests only in Himalayan regions
- Produce 20-60 kgs of honey per annum.

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Nesting habitats of *A.dorsata*

- The nest population ranges from solitary both in terrestrial and arboreal habitats to as many as 630 in a single Banyan tree *Ficus bengalensis*.
- As these bees are migratory in nature move from one region/area to other region/area by leaving remnants on rock cliffs, tree branches, buildings due to change in the cropping pattern and environmental condition.
- These remnants act as attractants to bees to construct nests for the next season. There is manifold increase in crop yield of Agriculture, horticulture and forest produce.

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Apis dorsata on a window cliff

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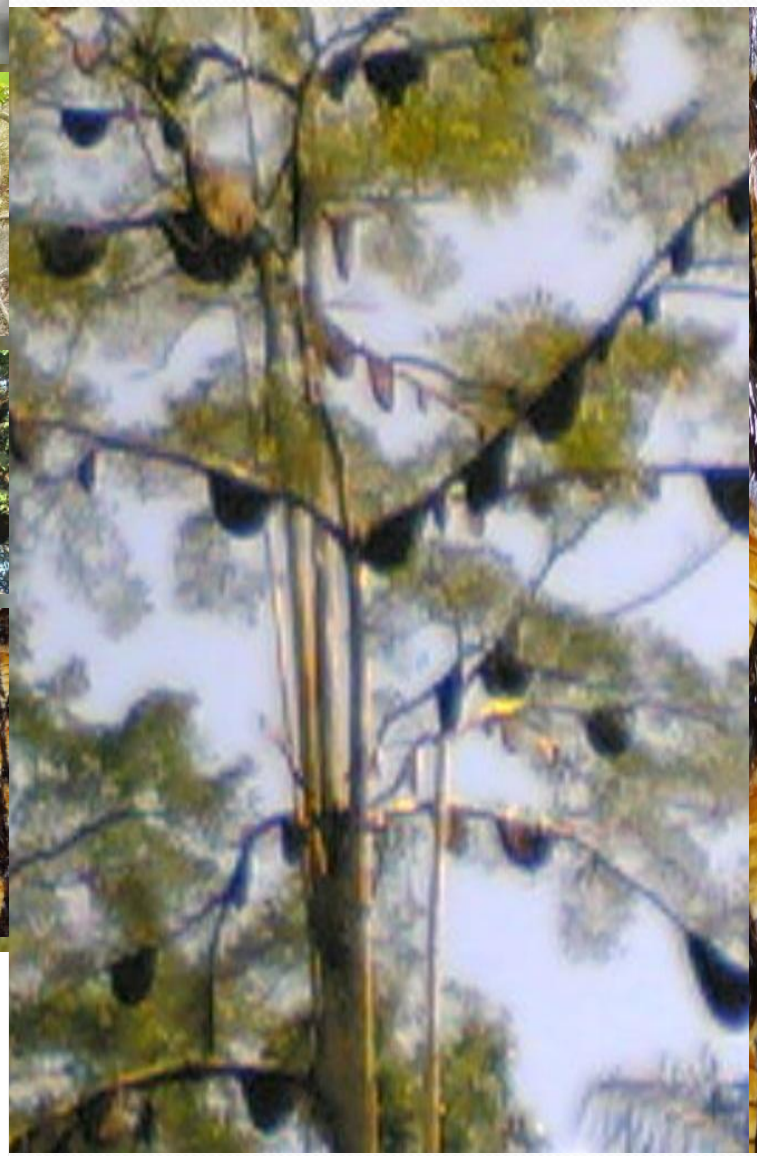
Apis dorsata – are most typically found in aggregated nesting sites in emergent trees



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THEY FREQUENTLY NESTS ON MAN-MADE STRUCTURES; APARTMENT BUILDINGS, BILL BOARDS AND WATER TOWERS

Water tank, ITI

Water Tank, Air Force Station

Bill board, Airport Road

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The village of Ramagovindapura; a unique aggregation of *Apis dorsata* colonies.

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World record number of 630 wild bee (Rock bees) *Apis dorsata* bee colonies have been recorded in a Banyan tree, *Ficus bengalensis* during January 2020 at Ramagovindapura near Nandagudi (36th Km on Bangalore- Chintamani Road), India

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In January, 2020 there were at least 630 colonies Nesting in one tree in the center of Ramagovindapura village

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RESULTS

- The details of sustainable honey harvesting from these giant bees and the conservation strategies are documented.
- The production of the honey ranges from 25 to 60 kgs and beeswax from 5-8 kgs per year per colony.
- As these *A. dorsata* nests on man-made structures such as tall buildings, underneath bridges, these bees are the excellent pollinators, the pollination efficiency was also documented.

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RESULTS

- Three fourth of the honey produced in India is from these wild bees.
- Many people particularly tribal communities are largely dependent upon for their livelihood and sustain the nests through scientific honey harvesting and colony management for pollination service and ultimately for the conservation.
- Different regions and geographical areas have adopted different methods of conservation strategies.

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Colonies monitored in Ramagovindapura tree

Year	Number of *Apis dorsata* bee colonies	Number of colonies harvested	Income generation	Remarks
2008	252	70	Rs. 12,000=00	During the study period, farmers report that there has been a tremendous increase in the productivity of agriculture, horticulture and the forest produce in the study area. The villagers are selling their farm products in the local market at a premium price.
2009	310	110	Rs. 21,000=00	
2010	370	150	Rs. 32,000=00	
2011	410	150	Rs. 32,000=00	
2012	432	170	Rs. 34,000=00	
2013	410	160	Rs. 30,000=00	
2014	442	165	Rs. 32,000=00	
2015	475	150	Rs. 30,000=00	
2016	566	160	Rs. 34,000=00	
2017	570	180	Rs. 36,000=00	
2018	625	200	Rs. 38,000=00	
2019	617	*	*With a view to conserve the populations of *Apis dorsata,* the harvesting of honey has been stopped.	
2020	630	*		
2021	620	*		
2022	622	*		
2023	618 (average # of nests over 15	*		

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CONSERVATION OF HONEY BEES

- **Conserve indigenous species of bees which have adapted to this environment through centuries of natural selection**
- **Conservation and propagation of important bee forage plants**
- **Encourage mixed plantations to increase biodiversity**

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CONSERVATION STRATEGIES

- **Importance of *Apis dorsata***
- **The Giant honey bee *Apis dorsata* plays a crucial role in pollination and ecosystem balance in India**
- **Conservation is vital for the biodiversity and livelihoods**

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CONSERVATION STRATEGIES

- **Threats to *Apis dorsata***
- **Habitat loss and fragmentation- Encourage mixed plantations to increase biodiversity**
- **Pesticide use and poisoning- Advocating safe methods**
- **Climate change impacts and disturbances of nesting sites**

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CONSERVATION STRATEGIES

- **Protecting and restoring the natural habitats**
- **Promotion of sustainable agriculture practices (by reducing the pesticide use)**
- **Creating bee friendly zones and native flora**
- **Awareness and community involvement**

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CONSERVATION STRATEGIES

- **Engaging local communities in *Apis dorsata* conservation through awareness, sustainable practices and benefit sharing can enhance protection efforts**
- **Research on *Apis dorsata* ecology and its behavior and collaboration between communities, researchers and policy makers**
- **Policy support for habitat protection**

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CONSERVATION STRATEGIES

- **Establish new curriculum in beekeeping at basic and advanced levels**
- **Development of species specific bee management practices**
- **Documentation of ecosystem service rendered by bees**

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THANK YOU

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