

**BEE CITY - INDIA**  
conserving the urban environment



**U R B A N**

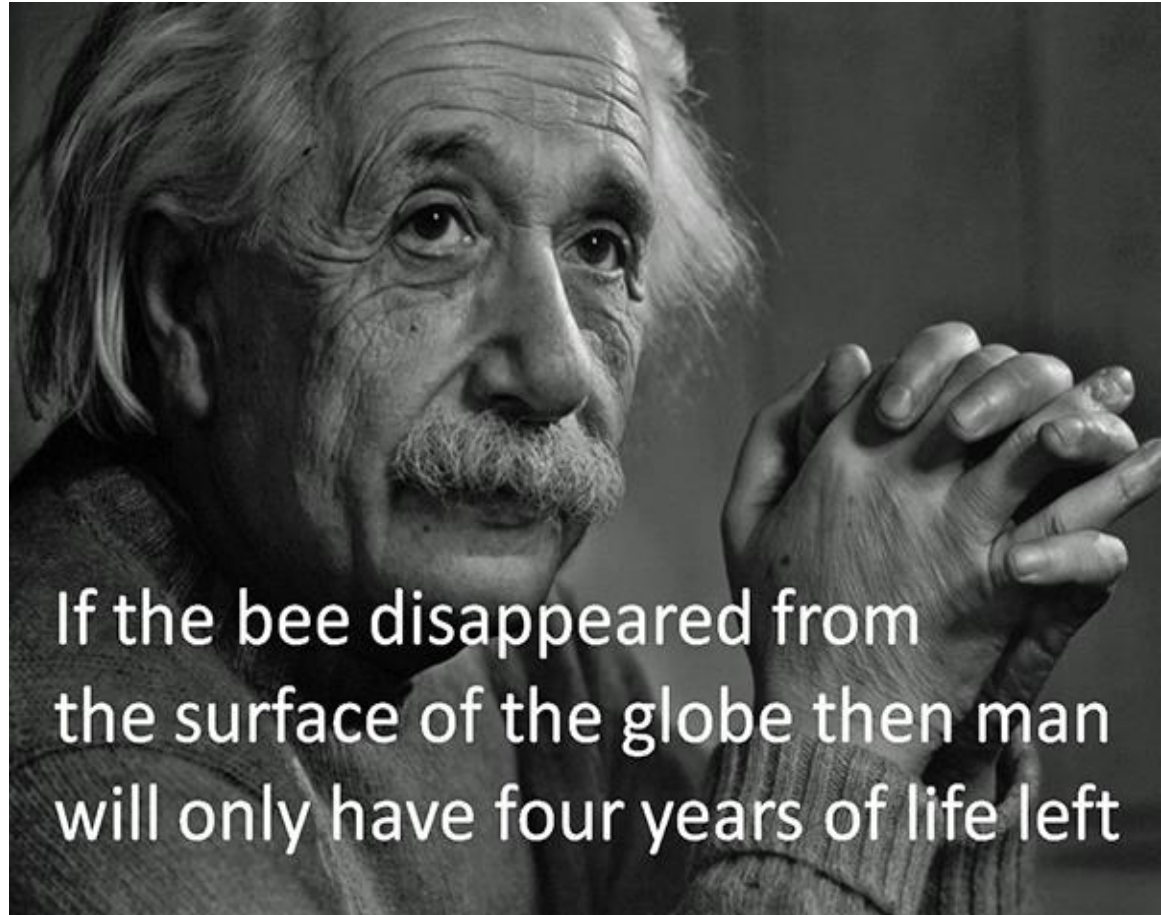
**HONEY - BEE KEEPING**



**BEE - CITY**



# ALBERT EINSTEIN



If the bee disappeared from  
the surface of the globe then man  
will only have four years of life left



# HISTORY OF BEE-KEEPING

Bees, honey and beekeeping have been mentioned in various Hindu Vedic scriptures of India like *Rig Veda*, *Atharva Veda*, *Bhagavad Gita*, *Arthashastra*,

The popular epic *Ramayana* describes a "Madhuban" (literally honey forest) that was cultivated by Sugriva.

A different Madhuban is also mentioned in the epic *Mahabharata* near the present day Mathura where Krishna and Radha used to meet. The forest was used to tame bees to make India "land of honey and milk".



# HONEY BEE PROJECTS



# ASIAN – ELEPHANT BEE PROJECT

## OBJECTIVES

- Beehive fences as a MULTIDIMENSIONAL CONFLICT-MITIGATION TOOL for farmers coexisting with elephants will reduce invasive elephant crop raids that cause trauma and often injury to farmers
- Increased yield production through reduced damage and, potentially, increased pollination of crops
- Additional income through the sale of ‘Elephant-Friendly Honey’ and bee products
- Increased quality of life with fewer conflict situations and fewer elephants being injured



# CASE STUDY ...

The Honey-Bee Project was implemented on 2<sup>nd</sup> Sept, 2018. The Honey-Bees boxes were placed at the corridor of Forest Route, where the Elephants use to enter the farm landscape. However, on 6<sup>th</sup> Sept, 2018, total 5 Wild Elephants destroyed, raided and dampened the banana crops of poor farmers but they have not raided the area where 14 Honey-Bees Boxes were implemented as a Testing tool and as expected. Elephants-Bees Project has proven to be effective at Dodamarg and worldwide as well. As the Forest Corridor is bigger covering many small wadis (villages) around the forest boundary, and hence for the successful implementation of this project Honey Bee Barrier should be implemented in larger geographical area at Dodamarg.

# रानटी हत्तींनी घेतली मधमाश्यांची धारस्ती

मधुमक्षिका पालन पेट्यांनंतर हत्तींनी बागायतीत प्रवेश करणे सोडले : आणखी चौदा पेट्या बसविल्या

प्रतिनिधी  
दोडामार्ग

तिलारी खोऱ्यातील शेती बागायतीचे कोट्यवधी रुपयांचे नुकसान करून शेतकऱ्यांची झोप उडविल्याचा जगती हत्तींना आढावा घालण्यासाठी आमदार नितेश राणे यांनी तिलारी खोऱ्यात राबविलेला एलिफंट प्रोजेक्टला यश मिळू लागले आहे. प्रायोगिक तत्वावर हत्तींच्या ज्या मागातून वावरण्याच्या मार्ग होता त्या ठिकाणी मधुमक्षिका पालनाच्या पेट्या बसविल्यानंतर हत्तींनी या मार्गाने बागायतीत प्रवेश करणे सोडले आहे. त्यामुळे आता प्रायोगिक तत्वावरील प्रकल्पाला यश मिळाल्याने आणखीन चौदा पेट्या शनिवारी बसविण्यात आल्या. मायवेट चॅरिटेबल ट्रस्ट आणि रिसर्च या संस्थेचे प्रमुख डॉ. युवराज कागिनकर व त्यांच्या टीमने वीजवर वापरण्याच्या जंगलात शनिवारी या पेट्या बसविल्या तसेच इतर मागाचाही सर्व्हे करून अशा आणखीन दोनशे ते तिनशे पेट्या बसविण्याची आवश्यकता असल्याचे त्यांनी सांगितले.

दोडामार्ग तालुक्यातील शेतकऱ्यांचे गेल्या पंधरा वर्षात हत्तीमुळे कोट्यवधीचे नुकसान झाले. त्यामुळे शेतकऱ्यांच्या ताडचा घास हिरावून घेणाऱ्या हत्तींच्या बंदोबस्तासाठी शासनाने उपाययोजना राबवाव्यात, अशी मागणी होत होती. आमदार नितेश राणे यांनी हत्ती बंदोबस्तासाठी आपण पुढाकार घेऊ, असे आश्वासन दिले होते. त्यानंतर



तिलारी : मधुमक्षिका पालनाच्या पेट्या बसविताना डॉ. युवराज कागिनकर.



तेजस देमाई

### हत्तींना रोखण्यात यश..!

- हत्ती बंदोबस्तासाठी आमदार नितेश राणेचा पुढाकार
- आणखी सुमारे दोनशे ते तीनशे पेट्या बसविणार

त्यांनी एलिफंट बी प्रोजेक्ट अर्थात मधुमक्षिका पालन करून हत्तींना आढावा घालण्यासाठी उपाययोजना करण्याची याही दिली होती. हा प्रोजेक्ट आंतरराष्ट्रीय स्तरावर हत्तींच्या उपद्रव असणाऱ्या कॅनिया, साऊथ आफ्रिका आदी देशात राबवून त्यांना यश मिळाले. त्यामुळे हा प्रोजेक्ट तिलारी खोऱ्यात राबविण्याचा निर्णय आमदार राणे यांनी घेतला. त्यानुसार

सागली येथील मायवेट चॅरिटेबल ट्रस्ट आणि रिसर्च या संस्थेच्या टीमने येऊन या मागाची पाहणी करून प्रायोगिक तत्वावर वीजवर, घाटिवडेच्या जंगलात हत्तींच्या मार्गावर मधमाशांच्या चार पेट्या बसविण्यात आल्या. मात्र या पेट्या बसविल्यानंतर गेल्या दीड महिन्यात एकदाही हत्ती या मार्गाने गेले नाहीत. उलट मार्ग बदलला. त्यामुळे

प्रायोगिक तत्वावर याला यश आल्याने इतर चौदा पेट्या शनिवारी बसविण्यात आल्या. संस्थेचे प्रमुख डॉ. युवराज कागिनकर व त्यांच्या टीमने या पेट्या बसविल्या. त्यामुळे हत्तींचा कायमचा बंदोबस्तासाठी आणखीन दोनशे ते तिनशे पेट्या बसविण्यात येणार आहेत. यासाठी सामाजिक संस्थांनी पुढाकार घ्यावा, असे ते म्हणाले.

### असा होतो हत्ती प्रतिबंध

मायवेट चॅरिटेबल ट्रस्ट अँड रिसर्च या संस्थेचे प्रमुख डॉ. युवराज कागिनकर यांनी दिलेल्या माहितीनुसार हा प्रोजेक्ट कॅनिया, दक्षिण आफ्रिका या देशात यशस्वी ठरला आहे. पेट्टीत बंद असलेल्या मधमाशा श्वास घेतानाचे संकेत रसायन अर्थात पेरामोन सोडतात. त्याचा वास दीड ते दोन किमी पर्यंत पसरतो. या वासामुळे हत्तींना धोक्याची चाहूल लागते आणि हत्ती आपला मार्ग बदलतात. त्यामुळे बागायती आणि शेतीचे रक्षण करणे शेतकऱ्यांना सोपे जाते. परिणामी हा प्रोजेक्ट यशस्वी करून शेतकऱ्यांचे होणारे नुकसानावर आढावा घालता येईल.



हत्तींच्या येण्या जाण्याच्या मार्गावर हत्ती बी चे बॉक्सस लावताना डॉ. युवराज कागिनकर व सहकारी.

# हत्ती हटाव मोहीमेतील आ. नितेश राणेची संकल्पना फळाला

‘हत्ती बी प्रोजेक्ट’ची हत्तींनी घेतली धारस्ती : ‘मायवेट ट्रस्ट’चा देशातील पहिलाच प्रयोग दोडामार्गात यशस्वी

► कुणाल मांजरेकर ( दोडामार्ग )

कर्नाटकातील हत्तींचा उपद्रव दोडामार्ग यासिऱ्यांच्या पाचवीलाच पुजला गेलाच. हत्ती हटाव साठी आजवर शासनाने इथं लाखो रुपये खर्च घालूनही हे सर्व उपाय क्षणिकच उरले. मात्र अलीकडेच आमदार नितेश राणेनी मायवेट चॅरिटेबल ट्रस्टच्या माध्यमातून हत्ती हटाव साठी दोडामार्गात ‘हत्ती बी प्रोजेक्ट’ची राबवलेली संकल्पना फळाला



आली आहे. नैसर्गिक पद्धतीने राबवल्या गेलेल्या या हत्ती हटाव मोहिमेची रानटी हत्तींनी धारस्ती घेतली असून मधुमक्षिका पालनाचे बॉक्स बसवलेल्या भागातून हत्तींनी

काढता पाय घेतला आहे. त्यामुळे मायवेट ट्रस्टचा देशातील हा पहिलाच प्रयोग कमाळीच्या यशस्वी ठरल्याची माहिती मायवेटचे सचिव डॉ. युवराज कागिनकर यांनी दिली आहे.

दोडामार्ग तालुका हा हत्तींच्या उपद्रवाच्या दृष्टीने सर्वात संवेदनशील तालुका म्हणून ओळखला जातो. कर्नाटकातून येणाऱ्या रानटी हत्तींनी आजवर येथे मोठ्या प्रमाणात (पान २ वर)



# BIODIVERSITY CONSERVATION BY HONEY BEE KEEPING

## AT TALOJA 102 – RAF CAMP





These Initiatives of Community Training, Awareness & Workshops is successfully creating the importance of management of forests and stimulating their conservation, Preservation of ecosystems by improving biodiversity through cross pollinations & pollination. The project is also directly attributing to the sustainable livelihoods programs.





**HONEY BEE KEEPING TRAINING PROGRAM**  
**FOR UPLIFTING THE AGRICULTURE**  
**PRODUCTION :**

The Honey Bee Keeping Training was conducted for 100 Women of various Self-Help Group at Nigave(K), Karveer, Kolhapur in association with Central Bee Research Institute of India as an initiative to conserve the Biodiversity of Forests & to promote agriculture in arid & Semi Arid regions.



## ➤ HARVESTING RAW HONEY AT HOME

- Helps to protect the environment
- Education & Awareness about Honey Bees.
- Community Welfare
- Helps in pollination of urban plants.
- Products from Honey Bees are good source of food supplement, instant energy, medicinal value, high protein diet.

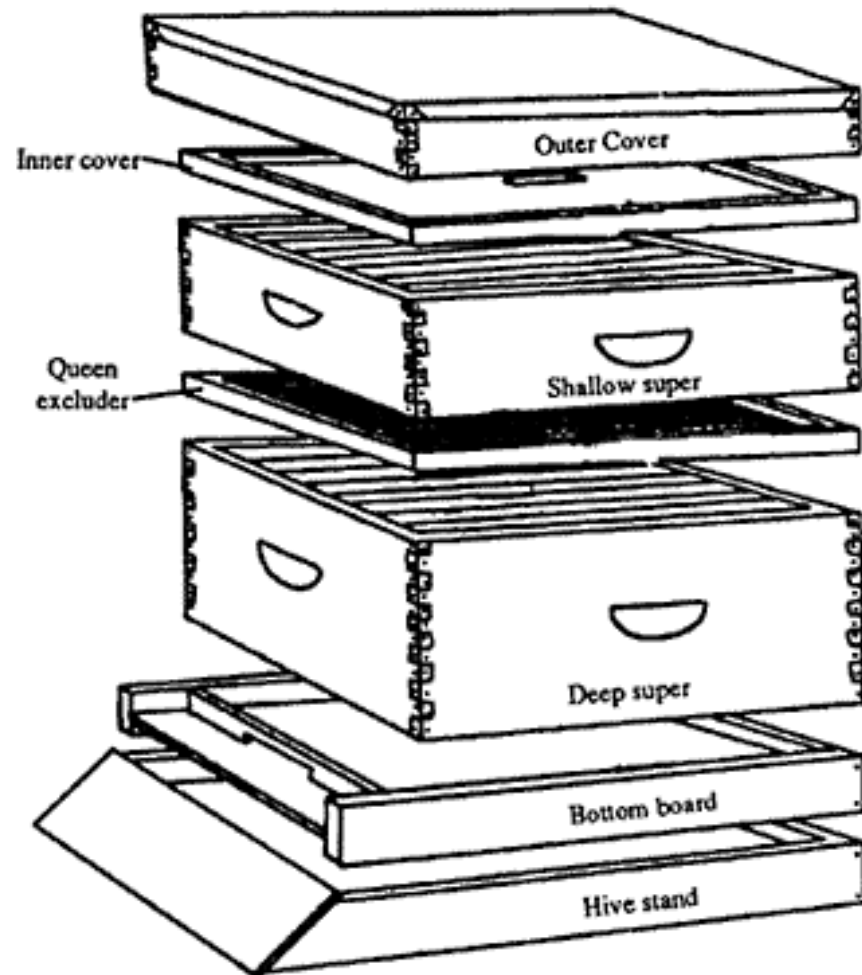
## WHY URBAN BEE-KEEPING?



The place where a beekeeper keeps his bees is called an apiary or a bee yard.

The bee colony is kept inside a hive that is made from a series of wooden boxes and frames that hold wax sheets for the bees to use as a starting point when building honeycomb.

The top box contains honey, while the bottom box is used to hold the queen bee and most of the worker bees.



Bees can be DANGEROUS, a beekeeper must take several safety precautions when working around a honey bee colony.

- 
- A hat or veil is commonly used to keep the face and neck protected from stings.
  - Gloves are another popular form of beekeeping protection, although many beekeepers complain that gloves restrict their movement.
  - A hooded suit, typically made from a light colored fabric to help distinguish the beekeeper from the honey bee's natural predators, may also be used.



While working with a honey bee colony, a beekeeper uses a smoker to help calm the bees.



- Smoke is useful in beekeeping because it masks the guard bee's alarm pheromones and encourages the other bees to feed by tricking them into thinking they'll soon need to abandon their hive.
- The smoke gives the beekeeper enough time to inspect the colony and perform any needed maintenance.



# FAMILY MEMBERS OF HONEY BEE COLONY

## European/Western Honey Bee

*Apis mellifera*



Worker



Queen



Drone



# The Queen

The queen is the only sexually developed female in the hive.

She is the largest bee in the colony.

A productive queen can lay 2,000 eggs in a single day.





# The Worker

Workers, the smallest bees in the colony, are sexually undeveloped females.

A colony can have 50,000 to 60,000 workers. The life span of a worker bee varies according to the time of year. Her life expectancy is approximately 28 to 35 days.

Workers that are reared in September and October, however, can live through the winter.

Worker bees also collect nectar to make honey.

Bees produce honey as food stores for the hive during the long months of winter when flowers aren't blooming.







## The Drone

Drones are stout male bees with large eyes and no stingers.

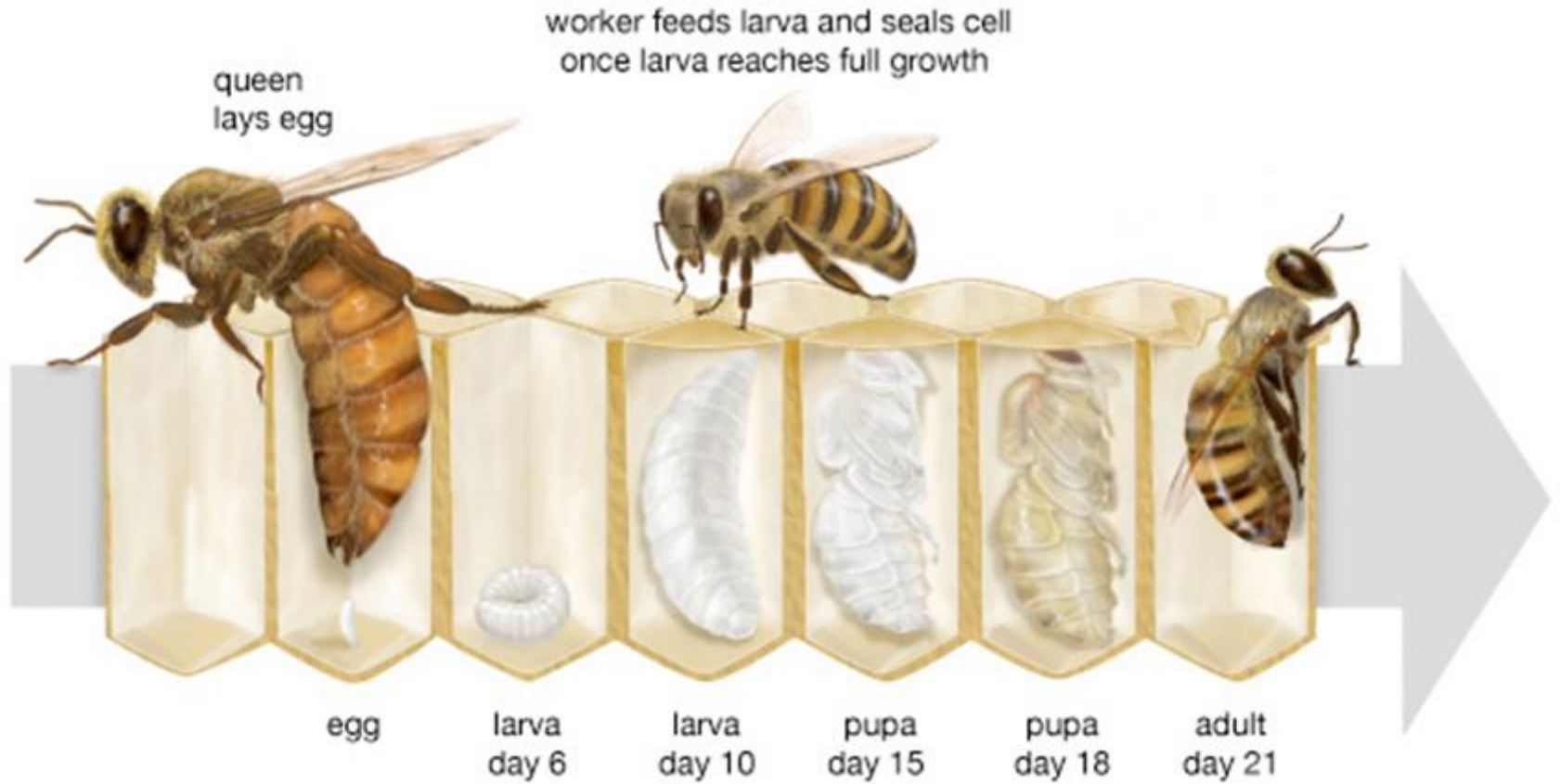
Drones do not collect food or pollen from flowers.

Their sole purpose is to mate with the queen.

They die upon mating.

If the colony is short on food, drones are often kicked out of the hive.

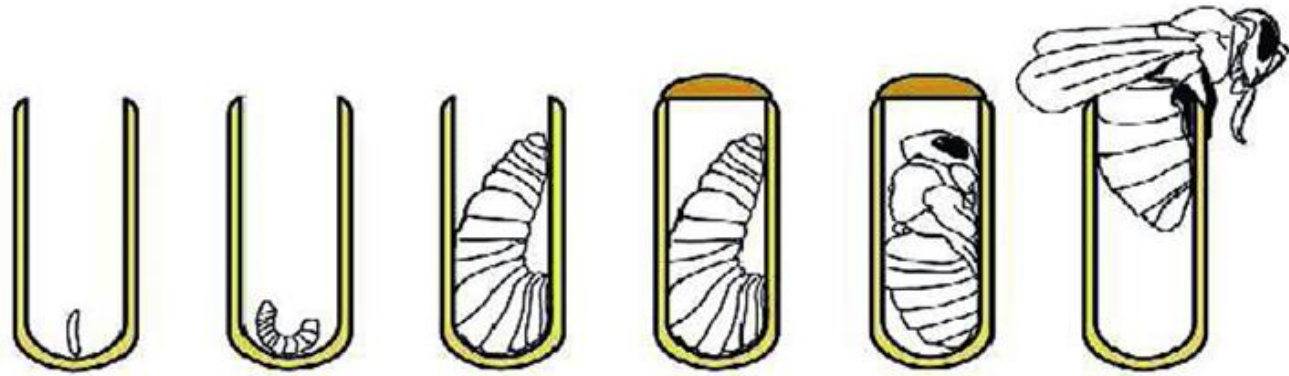
# Life Cycle of Honey Bee





## LIFE CYCLE OF HONEY BEE

# Different Stages Of Development



	Open Cells		Sealed Cell		Average days until emergence
	Egg	Larva	Pro-pupa	Pupa	
<b>Queen</b>	3 days	5 days	3 days	10 days	16 days
<b>worker</b>	3 days	5 days	2 days	6 days	21 days
<b>Drone</b>	3 days	7 days	1 days	10days	24 days



## Life Cycle of the Worker Bee



# WORKER BEE

## (Day 1-2)

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### Cell cleaning –

Brood cells must be cleaned before the next use - cells will be inspected by the queen and if unsatisfactory will not be used. Worker bees in the cleaning phase will perform this cleaning, if not clean worker bee must do it again.



# WORKER BEE (Day 3-11)

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- **Nurse bee** - Feed the worker larvae, worker jelly, secreted from the same glands that produce royal jelly.
- **Advanced Nurse** - Bees Feed royal jelly to the queen larva. Drones receive worker jelly for 1 to 3 days at which time they are moved to honey and pollen.



# WORKER BEE (Day 12-17)

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- **Wax production** - Build cells from wax, repair old cells, and store nectar and pollen brought in by other workers. Early in the worker's career she will exude wax from the space between several of her abdominal segments. Four sets of wax glands, situated inside the last four ventral segments of the abdomen, produce wax for comb construction.
- **Honey sealing** - Mature honey, sufficiently dried, is sealed tightly with wax to prevent absorption of moisture from the air by workers deputized to do same.
- **Drone feeding** - Drones do not feed themselves; they are fed by workers.





# Cont....

## (Day 12-17)

- 
- **Queen attendants** - Groom and feed the queen. They also collect QMP (Queen Mandibular Pheromone) from the queen and share it with the bees around them who also share it spreading its effects through the hive.
  - **Honeycomb building** - Workers will take wax from wax producing workers and build the comb with it.
  - **Pollen packing** - Pollen brought into the hive for feeding the brood is also stored. It must be packed firmly into comb cells and mixed with a small amount of honey so that it will not spoil. Unlike honey, which does not support bacterial life, stored pollen will become rancid without proper care and has to be kept in honey cells.



# Cont...

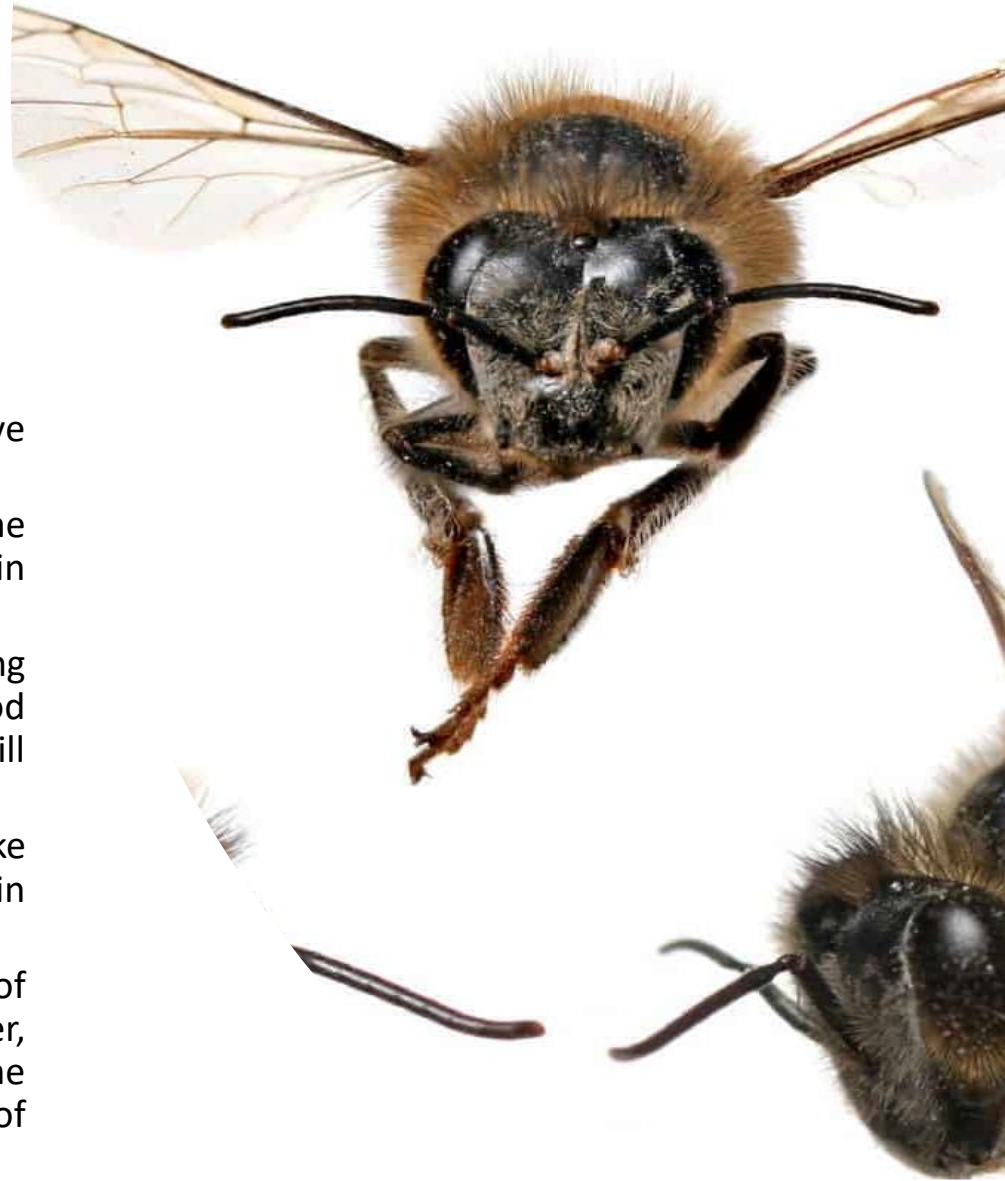
## (Day 12-17)

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- **Propolizing** - The walls of the hive will be covered with a thin coating of propolis, a resinous substance obtained from plants. In combination with enzymes added by the worker this will have antibacterial and antifungal properties. Propolis is also used to close off excessive ventilation and entrances.
- **Mortuary bees** - Dead bees and failed larvae must be removed from the hive to prevent disease and allow cells to be reused. They will be carried some distance from the hive by mortuary bees.
- **Fanning bees** - Worker bees fan the hive, cooling it with evaporated water brought by water carriers. They direct airflow into the hive or out of the hive depending on need.



# WORKER BEE (Day 18-21)



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- **Guard Bees** - protect the entrance of the hive from enemies.
  - **Soldier bees** - Soldiers hang around near the entrance and attack invaders. They work in concert with entrance guards.
  - **Entrance guard bees** - These inspect incoming bees to ensure that they are bringing in food and have the correct hive odor. Other bees will be rejected or attacked with soldier bees.
  - **Outside guard bees** - Outer guards may take short flights around the outside of the hive in response to disturbances.
  - **Water carriers** - When the hive is in danger of overheating, these bees will obtain water, usually from within a short distance from the hive and bring it back to spread on the backs of fanning bees.

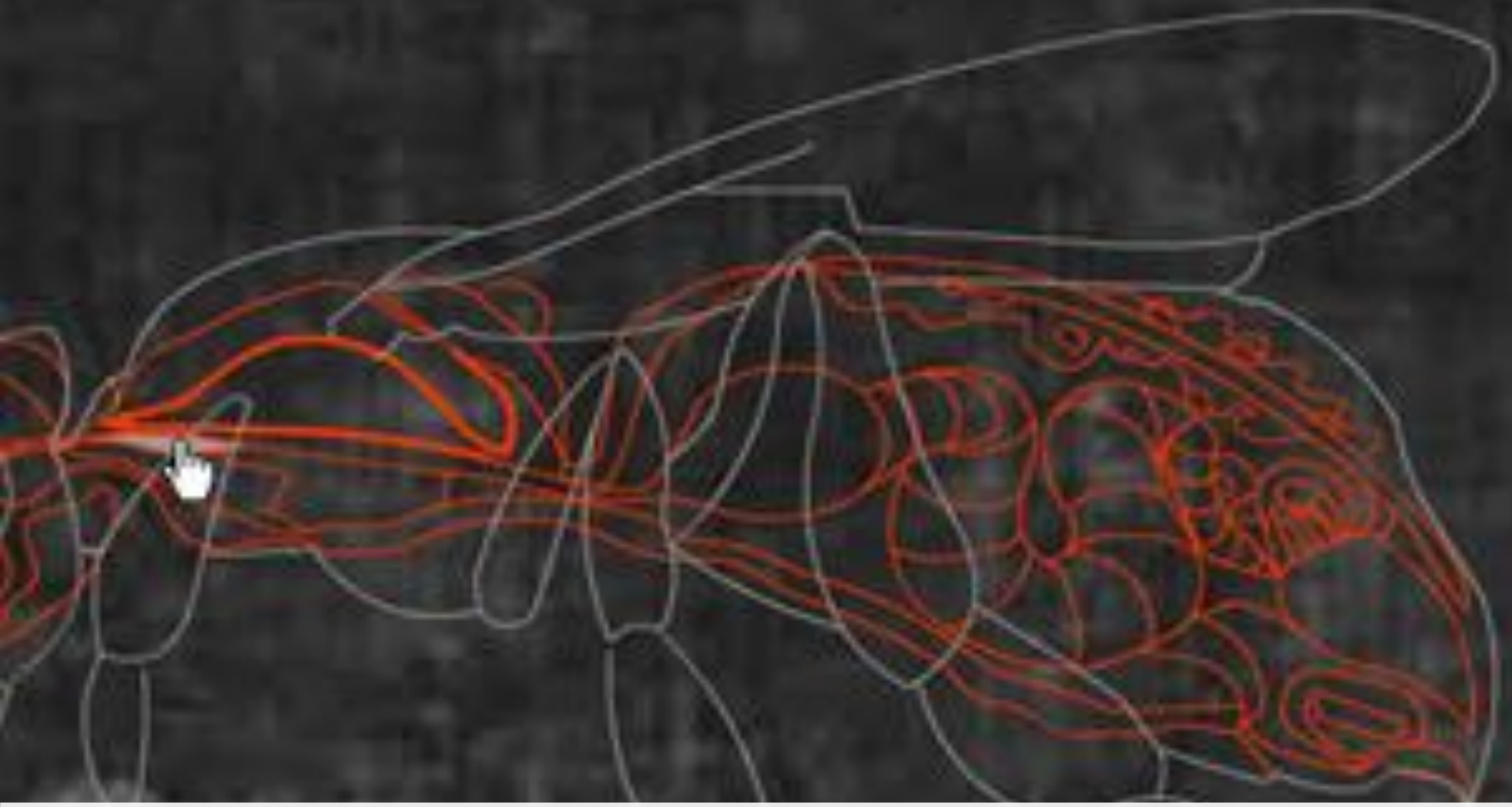


# WORKER BEE (Day 22-35+)

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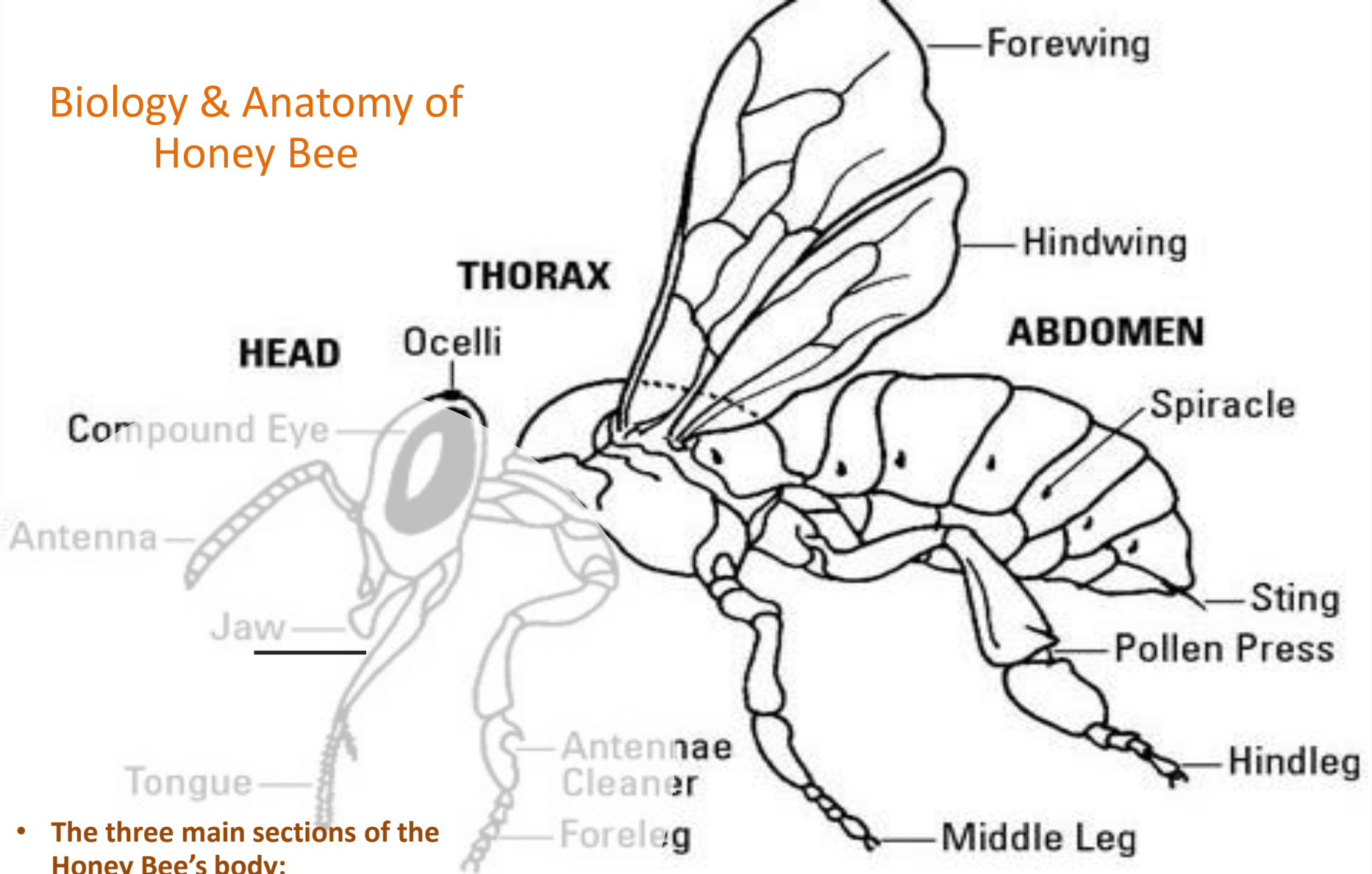
- **Foraging bees** - The forager and scout bees travel (2 to 5 miles) to a nectar source, pollen source or to collect propolis.
- **Die in field** - The life span of worker bees depend on the time of year. Most worker bees live about 28 to 35 days. However, workers that are reared in September and October can live through the winter.





**BIOLOGY & ANATOMY OF  
HONEY BEE**

# Biology & Anatomy of Honey Bee



- The three main sections of the Honey Bee's body:
  - Head
  - Thorax
  - Abdomen





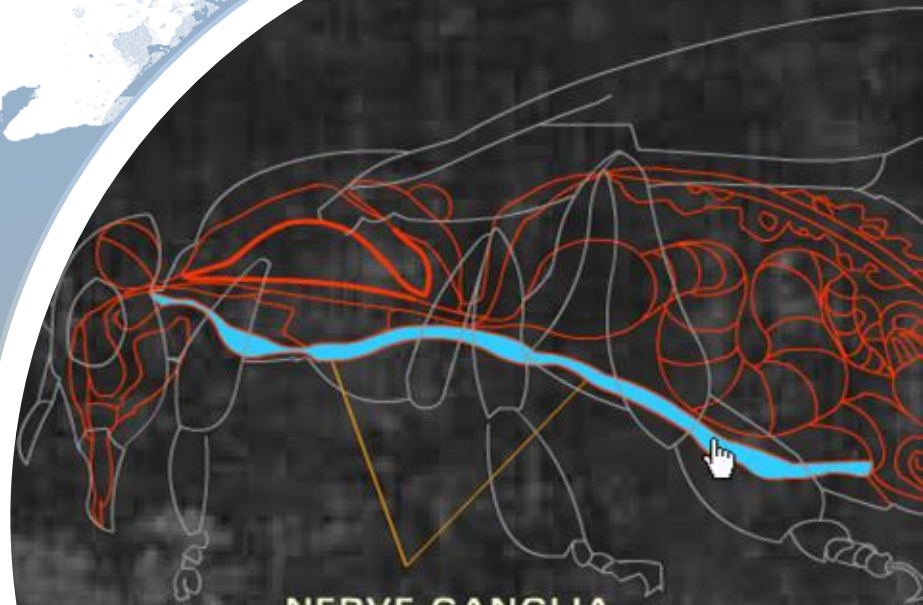
SALIVARY GLAND



Salivary gland: This organ produces saliva, which

# SALIVARY GLANDS & NERVE GANGLIA

NERVE GANGLIA



nerve ganglia transfer information to its brain at more than 9

# ABDOMEN MUSCLES

ABDOMINAL MUSCLES



As the muscles move, they help a bee breathe by expanding and

# HONEY SAC

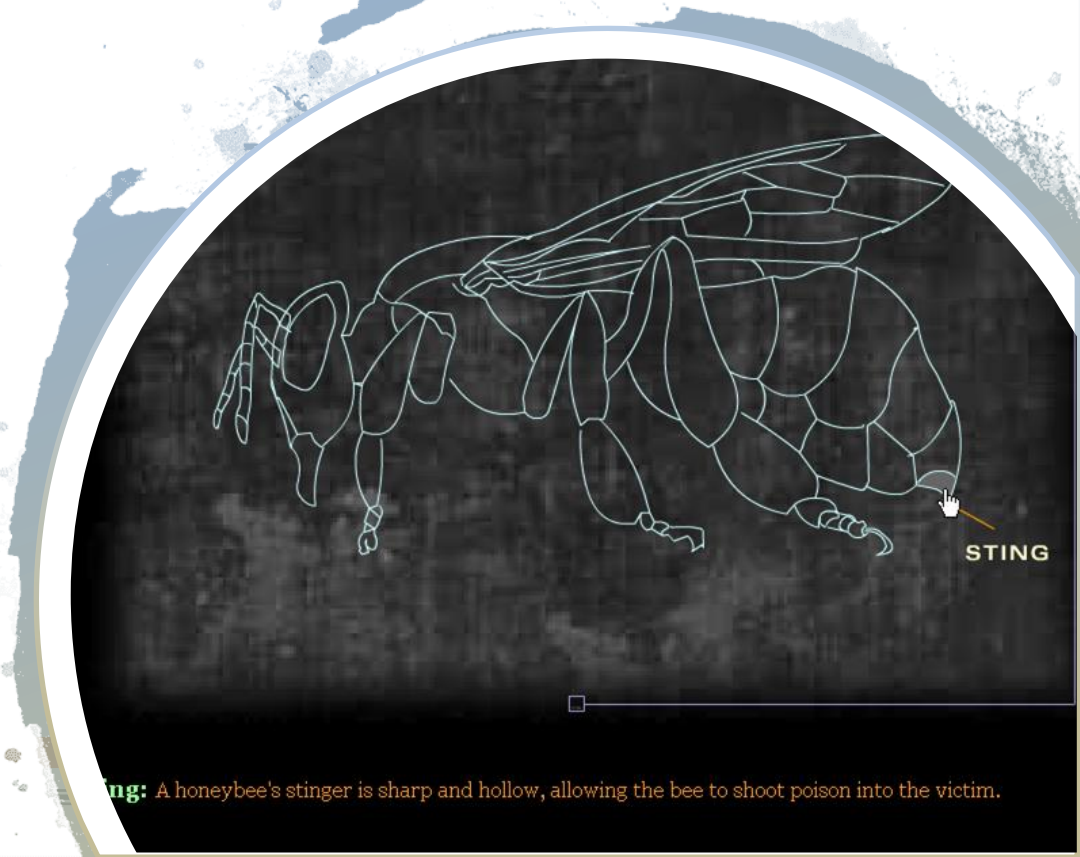
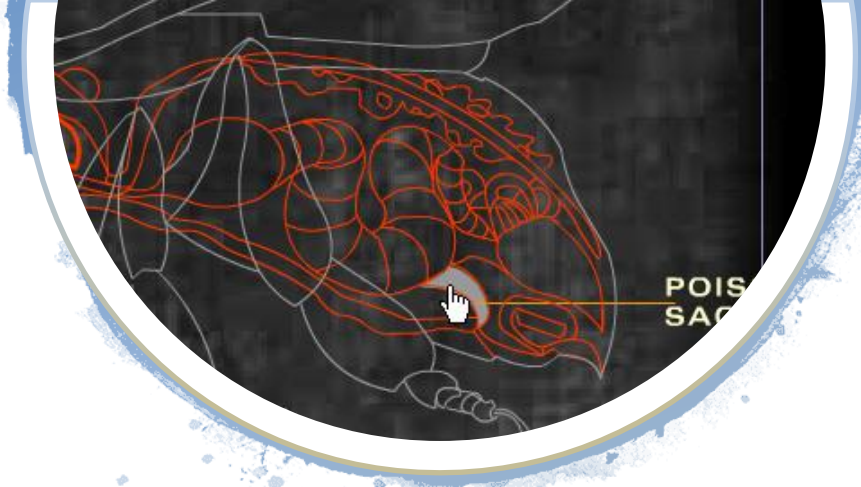
HONEY STOMACH



contains enzymes that act on flower nectar to produce th



# POISON SAC & STING



**Sting:** A honeybee's stinger is sharp and hollow, allowing the bee to shoot poison into the victim.



**DIFFERENT SPECIES OF  
HONEY BEES**

# DIFFERENT SPECIES OF HONEY BEES

1. Apis Dorsata
2. Apis Florea
3. Apis Cerana Indica
4. Apis Mellifera
5. Trigona & Melipona



# *APIS DORSATA* (Rock Bee)

## Characteristic Features:

1. Giant Bee found all over the India
2. Construct giant single comb in open about 6 feet long and 3 feet deep.
3. They shift the place of the colony often
4. Although they produce highest amount of honey, 40 Kg per comb per year



# *Apis Florea*



## Characteristic Features:

1. Smallest bees among four Apis Species
2. They build single vertical combs in open of the size of palm in branches of bushes, hedges, building, caves, empty cases, etc.
3. They produce about  $\frac{1}{2}$  to 1 Kg of honey per comb per year.
4. They are not domesticated species as they frequently change their place.



# *Apis Cerana Indica*

## Characteristic features:

1. They are cultivated for commercial production of honey and other by products
2. Domesticated species that build multiple combs.
3. They are more prone to swarming and absconding
4. The average yield of honey is 7 – 10 Kg per year.



# *Apis Mellifera*

## Characteristic Features:

1. Imported species from Europe and slowly adopted to India.
2. They are bigger than all other honey bees except *Apis Dorsata*.
3. They are less prone to swarming and absconding.
4. They stay in dark and have parallel combs.



# Melipona & Trigona

## Characteristic Features

- Their size are much smaller than true honey bees.
- They build irregular combs of wax and resinous substance in hollow tree trunks.
- The comb is made up of a dark material called CERUMEN, which is a mixture of wax and earth or resin
- They have good pollinating power of various crops.
- They produce only 100 – 250 gm of honey per comb per year.
- They can be domesticated.
- They are incapable of stinging.





**DISEASES OF  
HONEY BEES  
&  
PREVENTION**



# DISEASES IN HONEY BEES

- A. Ticks
- B. Fungal
- C. Wax Moths
- D. White Choke
- E. European Brood Disease



# CHARACTERISTIC & USES OF HONEY BEE PRODUCTS



# HONEY



## Characteristic:

• Water	16 – 20%
• Fructose	52%
• Glucose	20%
• Sucrose	1 – 3%
• Other Sugars	4%
• Protein	0.3 – 1%
• Nitrogen	0.04%
• Minerals	02%
• Others	3.5%

## Uses:

- Prevent the risk Muscle fatigue
- Helps you to Better Sleep
- Treat the indigestion problem
- Enhance immunity strength and regulate blood sugar Level



# BEE POLLEN



## Characteristic:

Protein	7 – 45%
Sugars	15 – 50%
Fats & Lipids	5%
Minerals	3%
Vitamins	B1 to 12/ A/C/D/E
Enzymes & Amino Acids	

## Uses:

- As a health/natural food.
- Medicine for protein deficient and energy revival.
- As tonic, tablets, capsules, cosmetics paste, lotion, etc.



# WAX



## Characteristic:

Specific gravity 0.95 – 0.98

Melting point 59 – 66

Saponification Value 85 – 105

Acid Value 8 – 10

Iodine Value 10

## Uses:

Mainly use in comb sheets, cosmetics, cream, lotions, gel, polish, etc.



# BEE VENOM

Single bee sting inject @ 0.015 to 0.30 mg per sting

Water	80 – 90%
Protein & Peptides	50% (dry venom)
Apmin	3%
Mast cell Degranulating Peptide	2%
Histamine, Dopamine	0.5%
Amino acids	1%

## Uses:

In treatment of rheumatism & arthritis and others

WRITTEN AND DIRECTED BY STEVEN MURSASHIGE

**VENOM THER**



# BEES ARE USEFUL FOR ENVIRONMENT

Pollination. ... **Bees** earn their reputation as busy workers by pollinating billions of plants each year, including millions of agricultural crops.

In fact, pollinators like **bees** play a key role in one out of every three bites of food we eat. Without them, many plants we rely on for food would die off.

- **According to the USDA, the % of crop plants pollinated by bees::**

- **100% Almond**
- **90% Apple**
- **90% Broccoli**
- **90% Blueberry**
- **90% Onion**
- **80% Cherry**
- **80% Celery**

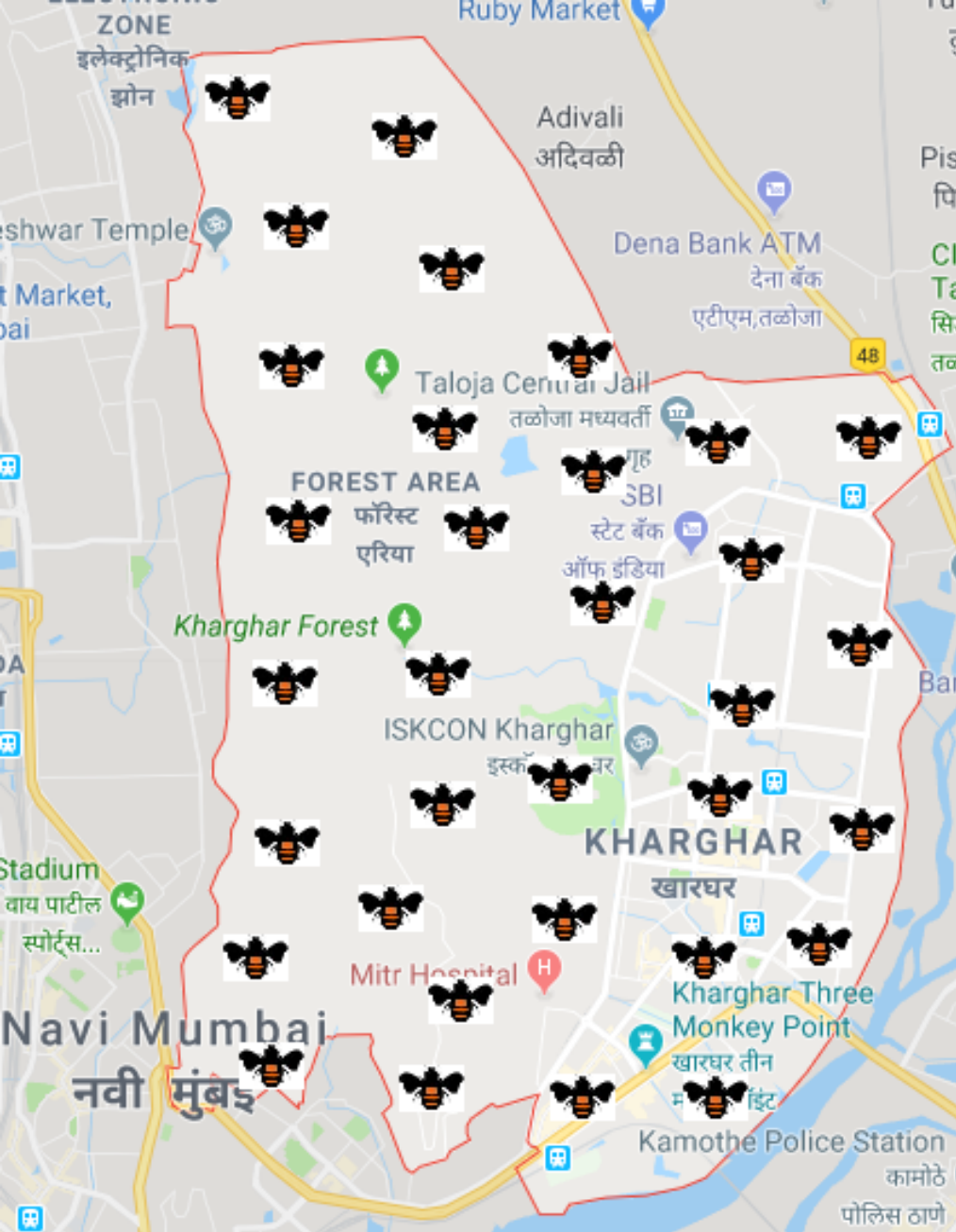




**BEEES HELP THE ECOSYSTEM:** As pollinators, **bees** play a part in every aspect of the **ecosystem**. They support the growth of trees, flowers, and other plants, which serve as food and shelter for creatures large and small. ... But we should also remember the other reasons **bees** are important to the environment.

**EXTINCTION OF BEES WILL AFFECT:** plants, animals, availability of fuels, topography, clothing and of course, human life. Some plants **are** pollinated by wind, but that rate is very slow. Insects **are** the primary pollinators on the planet. ... If **bees** went **extinct**, there **would** be a massive decline in the production of crops.





# BEE CITY – Kharghar MODEL

Target to implement  
50 – Honey Bee Boxes  
of  
*Apis Cerena Indica*



# URBAN HONEY BEE KEEPING

1. Harvest raw organic honey at home.
2. Help to protect environment.
3. Help to balance the eco-system.



# REGISTRATION

Sr. No.	Particulars	Rate/Unit
1.	Honey Bee Box	5000
	<b>TOTAL</b>	<b>5000</b>



Thank You

