

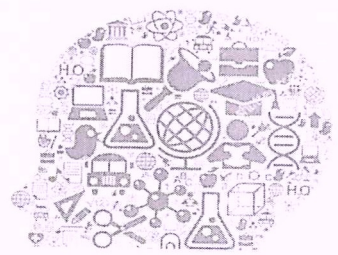
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**Pest and predators of honeybee- a review**

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**Abstract**

At least nine honeybee species live on the planet, including the invasive *Apis mellifera*. *A. mellifera* and *Apis cerana* is frequently used for commercial beekeeping, but the remaining non-managed species have important ecological and economic roles on the continent as well. The majority of honeybee species have different distributions. Species overlap all around the globe. This increases the risk of pests and predators spreading between species. Human translocation has allowed them to spread to other parts of the earth. Honeybee population reduction is a major concern. There is a concern all throughout the world. *A. mellifera* colony losses are thought to be caused, in part, by parasites, predators, and pests are all caused in part by parasites, predators, and pests. Important pests and predators are discussed in this overview.

**Keywords:** honeybee, pest, predators, beekeeping

**Introduction:**

Every beekeeper wants to keep their colonies healthy and productive. This is accomplished by minimising the frequency and prevalence of disease in beehives. Many diseases affect honeybees. They are preyed upon by a variety of pests, predators, and other adversaries. Brood diseases including American foulbrood, European foulbrood, Thai sacbrood, and adult bee diseases are prevalent in India. Acarine, Nosema, and Clustering Disease have all been documented. In the hive bees Wax moths, wasps, birds, ants, and other insects are prominent bee enemies. hive beetles, mites, mice, and bears, who eat the elevated combs and destroy the hives and hive parts, capture and kill bees, colony formation, eat away at the honeycomb food stores and annoy the bees, resulting in fewer bees. Returns per colony and colony productivity. As a result, continuous monitoring and surveillance of colonies are necessary for the early detection of diseases and enemies, as well as the employment of non-chemical means to keep pest population densities under control. For the management of economic injuries, a level of injury that is below the economic injury level should be used. Diseases that affect bees and their enemies. Diseases of the brood; diseases that solely affect adult bees; insect enemies of the adults and the comb; and other adversaries such as toads, reptiles, birds, mice, skunks, and other pests as well as bears.

**Pests:**

*Galleria mellonella*, the bigger wax moth, is a lepidopterous bug that destroys combs in its larval stage. It does not target adult bees, but it may begin destroying a poor colony's combs long before the bees arrive. are no longer there. It's also capable of destroying honeycombs that have been kept. When the larvae have matured, when they're ready to pupate, they'll seek a location to weave their cocoons in the sun. The beehive's softwood causes damage to the frames and other hive elements. The best way to combat this issue is to keep colonies healthy. Combs that have been stored are fumigated, kept in a chilly environment, or piled in a way that a strong air current passes through them They are surrounded by draught. The lesser wax moth larvae, *Achroia grisella*, produce identical damage to stored combs as the greater wax moth larvae. *Anagasta kuehniella*, a Mediterranean flour moth larva, feeds on pollen. the combs and inflicts some harm Both of these moths can be controlled. The greater wax moth is the same as the greater wax moth. *Braula caeca*, often known as the bee louse, is a small, wingless fly that is infrequently discovered on bees. It feeds on nectar or honey from its host's mouthparts. Its larvae dig into the cappings of trees and shrubs. Ants occasionally infiltrate hives, disrupting or killing the bees. Termites can harm or destroy hive sections that are buried in the ground. Dragonflies (Odonata), robberflies (Diptera), and praying mantises are examples of other insects (Orthoptera), ambush bugs (Hemiptera), and several wasps and yellow jackets (Orthoptera). Honeybees' natural enemy are jackets (Hymenoptera). (NBU Source).

**Predators:**

Mice frequently enter the hive during the winter when the bees congregate, or they get inside stored combs and despoil or damage them by eating the frames and combs to build their nest. Skunks eat a lot of people. a swarm of bees near the entrance to the hive, generally at night Traps, fences, and other

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obstacles They are hunted down and poisoned. Honeybees and their brood are eaten by bears. Usually, the hive and its contents are destroyed in the process. In the case of the bear to safeguard bee hives in the country, electric fences and traps are deployed. Bees can sometimes become their own worst enemy. Honey will be fought over by bees from various colonies if it is presented to them while no flowers are in bloom and the weather is mild. Occasionally, this combat, or Robbery becomes fiercer and spreads in a moblike fashion from hive to hive. When all of the bees in a colony are destroyed, the honey is quickly depleted. The bees were abducted and taken to other colonies. The robbery becomes much more intense as a result of this. that a cluster that had been transporting honey into its hive just a few minutes before is assaulted, all of its people are slaughtered, the honey is stolen once more, and the honey is stolen again. The procedure was repeated. When robbing turns serious, only darkness is left. or bad weather will put a halt to it. (Muhammad S, 2016).

#### **Insect Enemies of Honeybee:**

##### **The Greater wax moth (*Galleria mellonella*):**

In tropical and sub-tropical Asia, the larger wax moth is known to inflict damage to honey bee colonies and bee products. It can be seen all year, but it is most common from July through August, October, November, and December are the best months to visit. Combs that have been emptied, wax that has been rendered If not properly preserved and left, comb foundation and pollen obtained by bees would deteriorate. Wax-moth damage is almost usually severe when left untreated infestation. The wax moth, according to numerous reports, is a major pest of *Apis cerana*, driving colonies to flee. The adult female of a wax-moth attack on a colony enters the hive at night, through the entrance or via openings in the walls, she lays her eggs directly on the combs or in the fissures tiny fissures that allow the ovipositor to work and provide protection from predators Worker bees were used to remove the hive. Each batch lays between 50 and 150 eggs; They're cemented together and securely stick to the surface they're on are positioned. *Galleria* larvae feed on honey and pollen as they hatch, then burrow into pollen storage cells or the outer edge of cell walls, eventually expanding their tunnels to the comb's midrib. At this point, the developing larvae are relatively protected from worker bees at this time. As a result, as they move further into the combs, they leave a trail of web and debris in their wake detritus; neglected combs are generally completely destroyed. within ten to fifteen days in addition to pollen and beeswax stored in the hive, larvae of When the bigger wax moth runs out of food, it will attack bee brood. The *Galleria* larvae growth time is determined by two factors: diet and environment temperature and availability. In tropical regions, larvae only need 18-20 days to spin cocoons and become pupae; but, in cooler climates, this time can be extended. When colonies are feeble, when infected, the 'galleries' sign is usually seen: the developing Adult worker and drone bees are unable to exit their cells due to their lack of ability to fly. *Galleria* larvae created silken threads that were used to bind the corpses. (Lalita et.al, 2019)

##### **The Lesser wax moth (*Achroia grisella*):**

Except when the latter is dwarfed due to poor food during its larval stage, the lesser wax moth is normally smaller than the greater wax moth. *Achroia grisella* adults are silver-grey in color and have a unique odor. The Head color is yellow. The insect has a thin body and is extremely small: a healthy body Adult female and male lengths are around 13 and 10 mm, respectively. The adult female's life span is roughly seven days, during which she may lay between 250 and 300 eggs the lesser wax moth is frequently the source of infestation. occurs in honey bee colonies that aren't doing well. The larvae prefer to eat dark foods. pollen comb or brood cell comb They are frequently found at the bottom of the ocean a board amidst the wax shards. The brood is lifted because larvae prefer to build little canals between the bottoms of the brood cells. The bees continue to build cells that lead to the classic honeycomb structure comb surface that has been scraped. (Lalita et.al,2019).

#### **Ants:**

In tropical and subtropical locations, ants of all kinds are among the most prevalent honey bee predators. They are highly sociable insects that will assault hives in large groups, stealing almost everything in them, whether it is dead or alive. Adult bees, brood, and honey are all alive and well. Aside from this devastation, they can also be a nuisance to beekeepers, causing pain in some cases. a result of their bites When *Apis mellifera* apiaries are attacked by ants, they become weak colonies can be aggressive and difficult to maintain escape, which is also *A. cerana*'s defence against recurrent ant attacks. invasions. Several ant genera and species have been recognised to be problematic in comparison to traditional beekeeping. (Michael Hood et. al)

#### **Wasps and Hornets:**

In all Asian countries, including India, these insects pose a threat to honey bees. Social wasps of the genus *Vespa*, which are found all over the world, are among the most commonly documented. Both *A.*



cerana and *A. mellifera* colonies are frequently attacked. Hornet attacks on *A. cerana* colonies usually result in the bees dying. Weak colonies of *A. abscond*, and similar behaviour has been documented. *Mellifera* Other wasp species, in addition to hornets of the genus *Vespa*, have been known to cause apiary harm on rare occasions. *Vespa* spp. predation on commercial apiaries is typically a rainy season issue. Hornet attacks on apiaries are at their highest during this time. In tropical countries, the most serious wasp infestation occurs in September-October, but in the United States, the most significant wasp infestation occurs in September-October. During the monsoon season, particularly from late June to early July, invasions occur. From June to August, the weather is hot. Apiaries located near tropical woods and foothills Those who live on the plains suffer more than those who live in the mountains. (J.D. Ellis et. al, 2010).

#### Honey bee Mites:

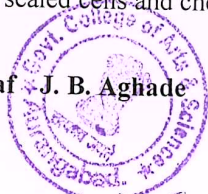
Parasitic mites are one of the most dangerous enemies of honey bees that beekeepers must contend with. The success or failure of *Apis mellifera* beekeeping operations is primarily determined by mite management. Beemite problems on the continent are exacerbated by a number of important factors. To begin with, all main parasitic honey bee mite species are currently found in Asia, with the majority being native to the continent. Second, complete mite elimination from an apiary is impossible due to feral mites. Mite reservoirs are found in the nests of parasitized native bees. Honey bee colonies that have been domesticated are re-infested. Furthermore, certain mites Species can survive, and even thrive, on the presence of many species of the host bee Several mite species have been linked to the spread of the disease. Both *A. mellifera* and *A. cerana* beekeeping enterprises have been devastated. Though not all mite species present within the hives or across the country True parasites are seen in connection with bees. (M. D. Meixner et.al, 2011).

#### Varroa Mite (VARROASIS) –

Throughout Asia, this mite is a natural parasite of *A. cerana*. It has been recorded as causing damage in both temperate and tropical climates since the start of beekeeping development programmes with *A. mellifera* on the continent. Asia's tropical climate. *Varroa* infestation has the overall effect of weakening the immune system. Honey bee colonies suffer as a result, and honey output suffers as a result. Heavy blooms occur occasionally in *A. mellifera* and more frequently in *A. cerana*. Absconding is a possibility if there is an infestation. This mite can now be found all over the world. Except for Australia and New Zealand's South Island, the rest of the planet. ( . Ben Hamida B et.al, 1999).

#### Tropilaelaps Mite –

Infestation with *Tropilaelaps* spp. is a common concern in modern *Apis mellifera* beekeeping in the tropical and sub-tropical parts of the country. This *A. dorsata* native parasite of the gigantic honey bee *A. dorsata*, the mite is a parasitic mite. As a result, beekeepers see *Tropilaelaps* as a more significant pest than *varroa* mites, despite its ease of management. *A. mellifera* has a dual parasitism. It is possible for both parasites to form colonies at the same time. *Tropilaelaps* populations are frequently higher than those of other species. The *Tropilaelaps* mite can almost entirely eliminate *varroa*. Stop the *varroa* mite from multiplying. *Tropilaelaps* Mites are substantially smaller than *varroa* mites, despite the fact that the two are related. They can still be seen by a skilled unaided eye. The mite has a light reddish-brown colour and an oval form body length is 0.96 mm and width is 0.55 mm. With a bright magnifying glass, a red streak running lengthwise on the ventral surface of the adult female can be seen. When mites are found in a honey bee colony, it means the colony is infected. They can be seen walking quickly on the street in big numbers. the comb's outer surface Adults are rarely found with them bees the mite lives within the host in all of its juvenile phases. bees' brood cells, which feed on the brood haemolymph. Adult females who have been fertilised enter the cells before being capped and ready to lay their eggs. The mite goes through the following phases of development: egg, six-legged larva, protonymph, deutonymph, and adult. Adult males of the species *Tropilaelaps* don't eat, but their chelicerae (organs) do initially used to pierce the integument of bees. As with the *varroa* mite, it has been adapted to transport sperm. The mite's life cycle is nearly identical to that of the spider the hive-bee. The harm done to colonies as a result of *Tropilaelaps* infestation is comparable to that caused by the damage done on bee brood by *varroa* are the same. Bees that survive mite assaults have a smaller abdomen and live for a shorter time than healthy bees. Bees with malformed wings might be found in badly infested colonies be seen crawling around the hive's perimeter comb surfaces, and on the entrance, while a piece of dead the house bees can remove bee brood from the hive. be seen just in front of the door Beehive inspection *Tropilaelaps*-infested vegetation exhibits an uneven pattern. As with all brood, there is a pattern of sealed and unsealed brood. Diseases of the brood. Because this symptom can be seen as a warning, the position of a poor-laying queen must be checked. The ideal method is to gently open sealed cells and check them to see if there is a mite present. Adult females will be



seen walking quickly out of the cells if mites are present. Obtaining a sufficiently accurate estimation of the quantity of pollution 100-200 cells should be opened and the brood removed if there is an infestation. For a closer look, forceps were used to extract the item.

#### **Tracheal Mite (ACARINE DISEASE) –**

This mite, *Acarapis woodi*, attacks the tracheal system of adult bees, queens, workers, and drones, all of whom are equally vulnerable. It has been reported since the beginning. Opinions on *Apis mellifera* colonies in Europe in 1921. in terms of the extent of the harm, it can do to honey Bee colonies have changed over time. India and Pakistani reports show that the tracheal mite was responsible for *Apis*'s death. *woodi* is a very little mite (0.1 mm) that lives and reproduces in adult bees' thoracic tracheae. The mite enters the first tracheal pair of bronchi through the spiracles. a 10-day-old honey bee's thorax It lays eggs there. a couple of days' intervals Males enter the deutonymph stage after the deutonymph stage. Females emerge after around 12 days, and offspring after about 13 days up to 16 days Symptoms The most common visible symptoms of the appearance of crawler bees around the hive indicates an infestation. Wing condition of the 'K' type. It has been proven to be true. that bees with severe mite infestations can feed normally. Nonetheless, there are some distinctions in terms of regards the capacity of afflicted and healthy insects to overwinter colonies. Individual bees' lifespans are shortened by infection; therefore, a severe infestation of a colony leads it to lose vigour, increasing the colony's susceptibility to disease. Losses in the winter the most reliable way of diagnosis is dissection in the lab A total of 20 or more bees were identified in the samples. Those who are unable to fly and crawl close the hive are killed. The heads and legs of the animals were removed, and their thoraxes were dissected. examination under a microscope If mites are present, they are usually harmless. In the thorax, it is found at the end of the first pair of trachea. Chemotherapeutic techniques are commonly used for control. control of mites the best results could be obtained by evaporating the water. Formic acid and ethereal oils are examples of such compounds. Formic acid is a kind of formic acid. When applied by the drops, formic acid yields positive results as described in the varroa control section.

#### **Bee Scorpion –**

This insect attaches itself to the bees' legs and follows them to the nest. It's most commonly found in the comb of the Indian honey bee *A. cerana*.

#### **Reptiles :**

Tropical forests, woods, meadows, and urban areas are the most prevalent habitats for reptiles. Among the reptile species that have been reported as being present in the area on a regular basis, *Calotes* spp., *Acanthosaura* spp., *Calotes* spp., *Calotes* spp., *Calotes* spp., *Calotes* s Arboreal reptiles such as *Sphenomorphus* spp. Bees can be attacked by geckos and skinks either near or far from the hive entrance or on the branches of flowering trees that are frequented by scavenger bees Geckos, for example, are smaller lizards. *Hemidactylus frenatus* likes to lurk in the void. between the hive's outer and inner coverings Management: The beekeeper has limited control over the situation. Foragers are being displaced by extremely mobile arboreal reptiles. The majority of the time, they are well disguised in the trees. Hives set on 40-60 cm high stands are somewhat safe from reptiles attacking from the ground, covering the legs of the bees. Reptiles may be deterred by stands containing used engine oil or grease from ascending to the hive's entrance A well-kept hive of bees a lawn that is regularly groomed and free of dense vegetation shrubbery and long grass, which serve as safe hiding spots for the animals. predators, it is less likely to be preyed upon by reptiles than one that hasn't been tended to.

#### **Honey Bee Eater Birds:**

Various species of birds may be valuable in the agriculture industry because they reduce insect pest populations in cropping fields. Many different insect species are preyed upon by many different birds. Honey bees are no different. The bees take to the air once they've taken to the air. are virtually vulnerable in the face of birds, including various kinds of which are capable of withstanding their deadly stinging defense The Bees buzzing in and out of hives in large numbers Commercial apiaries offer a once-in-a-lifetime chance. for insectivorous birds, of which there may be a great number This situation has piqued my interest. The extent of the harm caused by Honey bee-eating birds comes in a variety of shapes and sizes. A single bird or a small group of birds attacking together rarely causes a severe problem, but when a huge flock falls upon a few colonies or an area, it can cause havoc apiary, a significant drop in the number of workers in It is possible to see some or all of the hives. In contrast, the extent to which commercial apiaries have been harmed by the number of predatory birds is mostly determined by the number of preys. predators and the severity of the attack, just being there a few predators in apiaries where queens are being reared inflict significant losses.



**Mammals:** The honey bee's enemies could include a variety of mammalian species. They feed on colonies for honey and/or brood in general; some attacks are entirely predatory accidental. This generally happens when apiaries are being built. They're planted in or near woodlands and aren't well-protected.

**Pine Martins:** The pine marten is a type of weasel that lives in trees. In primarily hilly areas, pine martens destroy the combs of cultivated and wild bees for honey areas. Pine beetle attacks can be mitigated by enclosing the apiary with a fence marten.

**Raccoons:** Raccoons cause damage to the apiary by removing the beekeepers from the hive and constructing a nest to rear their young. They'll even take off the top or inner covers. Stacks of supers the honey jars are removed from the scene. They drink the honey from the hives. Raccoons can be dangerous. Red reflective ribbons were used around the apiary to capture the bees.

**Bears:** It's nearly impossible to keep a bear away from apiaries once it's had a taste of honey and brood. It's normally tough to keep colonies safe against bear attacks, especially in the winter. When the creatures are huge and powerful the damage caused by bears is significant. It's fairly obvious. The bears smashed the hives to bits. To obtain the honey and brood comb they disperse the around the yard, there are several pieces of machinery. Choosing a location for the apiary. Getting out of the bear's way decreases the bear's attack. The barbed wire that has been electrified. When bears are around, wire fences are frequently used. This is a common issue. Bringing beehives closer to people. It is also effective to live in a house.

**Skunks:** Scratch the bottom board or the front of the hive body to draw bees out of the hive and consume them. In the evenings, skunks visit the apiary. Hours of darkness. Raising the hive to a height of 15 to 18 inches above the ground. The use of wire netting around the hive and on the ground is effective to keep the skunks away.

**Rodents:** Rodents like mice and rats are a typical beekeeping pest. They create nests in hive boxes, damage comb in frames, and rip equipment apart. In They also leave their droppings all over the area. Rats have the ability to There may be major issues in storage spaces where bees are present. The equipment is retained. A mouse trap is used to keep mice out of hives. A trap can be placed at the hive's entrance. Reducing Bees will be able to enter the hive through a 14-inch opening. Mice will not be allowed to enter, but they will be free to come and go. Bait Rats and mice can both be caught in traps.

#### Conclusion:

Honeybee pollinators are many more benefits for the farmers, beekeepers, and society, it's helpful to the pollination services provided free of the coast and unfortunately effect the agricultural sector. Pollinators are also helpful of maintain biodiversity. But there are many affecting factors of pollinators (viz. Beetles, Moths, Ant, Wasps, Birds, Mammals, etc.) that cause the number of pollinating insects to be declining. In general, we can conclude that pests and predators are a very potentially threatening challenge to beekeepers all over the world. Beekeepers need to take measures to eliminate pests or change their bad habits. Beekeepers have a need the best biodiversity practices in each state, beekeeping practice training, as well as educate, and training in the inspection.

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