

# Occurrence and abundance of insect enemies of honey bees in Karnataka

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The investigation was carried out on the insect enemies of different species of honey bees viz., Indian bee, Rock bee, Little bee, Italian bee. During the study 25 species of insect enemies were recorded on four species of honey bees. Among insect enemies greater waxmoth *Galleria mellonella*, ants *Camponotus compressus* and *Oecophylla smaragdina*, yellow banded wasp *Vespa tropica* were predominant, observed in large scale and caused higher infestation to all the four species of honey bees.

Key words : Insect enemies, Honey bees

## INTRODUCTION

In addition to production of honey and wax, bees also help in increasing the yields of many agricultural and horticultural crops and the same time help in the maintenance of ecological balance. In recent times due to fast modes of transport and movement of bees and their product have aggravated the problem of bee pests and diseases. The honey bee enemies create serious problem, which must be met not only by the bee keeper but also by the bees. Honey bees are affected by several insect enemies like waxmoths, wasps, ants, robber flies, dragonflies, preying mantis, death headed moth, termites, cockroaches. Of these, waxmoths are the most devastating pests of honey bees. Several species of waxmoths are found as pests on honey bee combs of all species. Among the several species of waxmoths, the greater waxmoth *Galleria mellonella*, is considered as a notorious pest of honey bee colonies (Kapil and Sihag, 1983).

## MATERIALS AND METHODS

The survey was conducted to record the occurrence and incidence of various natural enemies of honey bees in different districts of Karnataka, coming under various climatic zones. The honey bee colonies were examined for the presence of natural enemies by carefully taking out three frames randomly from each of the colonies. The number of healthy and infested colonies were recorded in different bee keeping areas. Observations on the number of colonies infested, number of combs present, the number of combs damaged, pest population, per cent

colony infestation and number of deserted colonies were recorded. The different enemies that occurred on honey bees were collected, preserved and identified.

## RESULTS AND DISCUSSION

As many as 25 species of insect enemies of honey bees were recorded during the course of investigation (Table 1).

*Order: Hemiptera :*

*Acanthaspis siva* Distant is a black medium sized bug with three whitish round patches on the basal, middle and apical portion of the wings. Adults and nymphs were observed to suck the body fluid from the adult honey bees. Subbiah and Mahadevan (1957) also reported the incidence of this predatory bug in the bee hives.

*Order : Lepidoptera :*

*Galleria mellonella* is a serious pest on the combs of all species of honey bees and was found active throughout the year. The incidence was observed in almost all the districts of Karnataka. The larvae of waxmoth cause no direct damage to bees at any living stage, but are very destructive to the combs. They eat the wax of the comb and other associated materials viz., Pollen, Propolis, Dead bees and Pupal cases of bees. The larvae of waxmoth bore in to the combs and make tunnels in the middle of the comb. Later black excreta can also be noticed in the web. As a result of serious infestation, weak bee colonies abscond, while in strong colonies bee population quickly reduced and complete destruction of colonies have also been recorded. The combs were completely destroyed in

Table 1: List of insect enemies associated with honey bees

Order	Family/ Sub family	Species	Bee species affected	Remarks
Hemiptera	Reduviidae	Acanthaspis siva (Distant)	A.cerana A.mellifera	Minor; Occasional; Polyphagous
Lepidoptera	Pyralidae	Galleria mellonella(L.)	A.cerana A.mellifera A.dorsata A.florea	Major; Throughout the year; Polyphagous
		Achroia grisella (Fab.)	A.florea A.dorsata A.cerana A.mellifera	Minor; Throughout the year; Polyphagous
	Sphingidae	Acherontia styx (Westw.)	A.cerana A.mellifera	Minor; Occasional; Polyphagous
Coleoptera	Tenebrionidae	Lyprops sp.	A.cerana A.mellifera A.dorsata A.mellifera	Minor; Throughout the year; Polyphagous
Hymenoptera	Formicidae Formicinae	Anoplolepis longipes ( Jerd. )	A.mellifera	Minor; Occasional; Monophagous ?
		Camponotus compressus ( Fabr.)	A.cerana A.mellifera A.dorsata A.florea	Major; Throughout the year; Polyphagous
		Camponotus rufoglacus ( Jerd.)	A.cerana A.mellifera A.dorsata A.florea	Minor; Occasional; Polyphagous;
		Oecophylla smaragdina (Fabr.)	A.cerana A.mellifera A.florea	Major; Throughout the year; Polyphagous
		Paratrechina longicornis (Latr.)	A. cerana	Minor; Occasional; Monophagous?
	Myrmicinae	Crematogaster sp.	A. cerana	Minor; Occasional; Monophagous?
		Monomorium floricola (Jerd.)	A.mellifera A.cerana	Minor; Occasional; Polyphagous
		M .pharaonis (Linn.)	A.cerana A.mellifera	Minor; Occasional; Monophagous?
		Monomorium sp.	A.cerana A.mellifera	Minor; Occasional ; Polyphagous

Contd.....

Table 1 Contd.....

Order	Family/ Sub family	Species	Bee species affected	Remarks
		<i>Pheidolgeton diversus</i> (Jerd.)	<i>A.cerana</i>	Minor; Occasional ; Monophagous?
		<i>Tetramorium</i> sp.	<i>A.cerana</i> <i>A.mellifera</i>	Minor; Occasional ; Polyphagous
	Dolichoderinae	<i>Tapinoma melanocephalum</i> (Fabr.)	<i>A.cerana</i> <i>A.mellifera</i>	Minor; Occasional ; Polyphagous
		<i>Technomyrmes albipes</i> (Smith)	<i>A.cerana</i> <i>A.mellifera</i> <i>A.florea</i>	Minor; Occasional ; Polyphagous
	Ponirinae	<i>Leptogenys processionalis</i> (Roger)	<i>A.mellifera</i> <i>A.cerana</i>	Minor; Occasional ; Polyphagous
	Vespidae	<i>Vespa tropica</i> (Linn.)	<i>A.cerana</i> <i>A.mellifera</i> <i>A.florea</i>	Major; Occasional ; Polyphagous
Diptera	Asilidae	<i>Promachus rufipes</i> (OS)	<i>A.cerana</i> <i>A.florea</i>	Minor; Occasional ; Polyphagous
Odonata	Gomphidae	<i>Pantala flavescens</i> (L.)	<i>A.cerana</i> <i>A.mellifera</i>	Minor; Occasional ; Polyphagous
Mantodea	Mantidae	<i>Mantis religiosa</i> (L.)	<i>A.cerana</i> <i>A.mellifera</i>	Minor; Occasional ; Polyphagous
Blattodea	Blattidae	<i>Periplaneta americana</i> (L.)	<i>A.cerana</i> <i>A.mellifera</i>	Minor; Occasional ; Polyphagous
	Blattellidae	<i>Blatella germanica</i> (L.)	<i>A.cerana</i> <i>A.mellifera</i>	Minor; Occasional ; Polyphagous

storage conditions and also in neglected bee colonies of many private bee keepers.

*Achroia grisella* is a small moth with pale-grey coloured wings. Larva is small and whitish in colour. The larvae were observed to feed on brood combs of the honey bees, the larvae tunnel through the wax cells and feed on wax and produce a mass of silk webbing on the surface of the comb. It was also active throughout the year but the incidence was observed to be lower as compared to the greater waxmoth.

The sphingid moth *Acherontia styx* was found to feed on honey in the bee hives which is in conformity with the observations of Zappi (1953).

*Order : Coleoptera :*

*Lypros* sp. is a medium sized brownish beetle. Both grubs and adults were found to feed on wax particles and other debris on the bottom board. The adults were also found feeding on combs and bored in to the cells of the weaker colonies throughout the year. This is in full agreement with the findings of Cherian and Mahadevan (1940) although the species of beetle was slightly different from that of the present record.

*Order : Hymenoptera :*

The present investigation revealed fourteen species of ants including *Anoplolepis longipes*, *Camponotus*

*compressus*, *C. rufoglaucus*, *Oecophylla smaragdina*, *Paratrechina floricola*, *Monomorium pharaonis*, *Monomorium sp.*, *Pheidolgeton diversus*, *Tetramorium sp.*, *Tapinoma melanocephalum*, *Technomyrmex albipes* and *Leptogenys processionalis* as pests on different species of honey bees. Ants mainly feed on honey, larvae, pupae and adult bees and the incidence was observed throughout the year. Of the fourteen species of ants recorded on four species of honey bees in different districts of Karnataka, *Camponotus compressus* and *Oecophylla smaragdina* were more serious in causing damage particularly on domesticated bees viz., *Apis cerana* and *Apis mellifera*. The other twelve species of ants caused negligible damage to the honey bees. The occurrence of *Monomorium pharaonis* was also noticed in the bee hives for the first time in Eastern Germany by Gottschalk (1963).

Adults of yellow banded wasp, *Vespa tropica* were observed to fly around the bee hives and catch the incoming and out going worker bees at the hive entrance. The greater activity was observed on *Apis mellifera* colonies compared to *Apis cerana* colonies. When the wasps visited the hive entrance of *Apis cerana*, many guard bees clustered, raised their antennae and displayed, abdomen shaking and vigorous fanning of wings coupled with a shimmering sound. Such defensive behavior was not observed in *Apis mellifera*. The maximum wasp activity was observed during June to September under Karnataka conditions and these observations are in full conformity with the findings of Subbiah and Mahadevan (1958), who observed the wasp frequency on the base boards of the hives on cool cloudy mornings from June to December and attack the workers as they pass in and out. Breeding activity is low among the bees at this season and attack further weakens the colony, so that the bees either desert the hive or perish.

#### Order: Diptera :

Adults of robber fly, *Promachus rufipes* were observed to fly around the hives and catch the foraging bees. Similar observations were also made by Bromley (1930), although the species of robber fly was different from that of the present study.

#### Order : Odonata :

Adults of dragon fly, *Pantala flavescens* were found to catch the incoming and outgoing bees. The present observation is in conformity with the findings of Goodacre

(1923) Who reported that the dragonfly, *Hemianax papuensis* as a serious pest to apiaries.

#### Order :Mantodea :

Adults of preying mantis, *Mantis religiosa* were observed to catch the foraging bees near the hive entrance and also when the bees are busy in collecting the pollen with host plants.

#### Order : Blattodea :

The two species of cockroaches *Periplaneta americana* and *Blattella germanica* were observed to nibble the combs for wax in the weaker colonies.

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