



## INFESTATION OF *ACHORIA GRISELLA* F (WAX MOTH) IN HONEY COMBS OF *APIS MELLIFERA* L IN SHIWALIK HILLS, HIMACHAL PRADESH

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### ABSTRACT

During present study an attempt has been made to study the life cycle and seasonal incidence of *Achoria grisella* Fabricious. During the study period *Achoria grisella* F. was found the most prevalent pest in Shivalik Hills. Among all the developmental stages, only larval forms feed and destroy the comb above economic threshold value. Laterally the seasonal variation revealed that the maximum infestation was observed during the monsoon season i.e. August to October in comparison to the remaining seasons of the year. Pest infestation was diagnosed by thread or tunnel construction made inside the mid rib region of the combs. The incidence of smaller wax was higher in the weaker colonies as compared to stronger ones.

**KEYWORDS:** *Apis mellifera* L., *Achroia grisella* F., Shivalik Hills

### INTRODUCTION

Presently beekeeping industries are facing many challenges throughout the world and one of the major constraints in beekeeping developmental programmes in India is the damage caused to honeybee colonies by various pests, predators and pathogen. Perhaps the most common of these are the greater wax moth *Galleria mellonella* L. and smaller wax moth *Achroia grisella* F., which would attack combs left untended in warehouses or in the colonies with insufficient bees to cover the combs (Chariere and Imdorf, 1997). Among them smaller wax moth is least importance but is usually most prevalent throughout the year (Nagaraja and Rajagopal, 2003). Wax moth could be terrible menace to the colonies if allowed to get out of hand and will destroy brood comb in a very short life in warm climate. So an attempt was made to study the life cycle and seasonal infestation of smaller wax moth in Shivalik hills of Himachal Pradesh. With the understanding of biology and seasonal dynamics of this pest enable one to control the problem.

### MATERIALS AND METHODS

Present study mainly pertains to the biology and seasonal incidence of the *Achroia grisella* F from different apiaries of Shivalik hills of Himachal Pradesh situated between 30° 22' to 33° 12' North latitude 77° 47' to 79° 04' East longitudes and altitude varying from 350 to 7,000 metres above mean sea level (amsl). The elevation of areas surveyed for the infestation of these pests varied from 350 to 1500 metres with annual rainfall ranging from 1500 to 1800 mm.

During study a culture of smaller wax moth was maintained in laboratory and various stages of *Achroia grisella* was detected i.e. egg, larva, and pupa to adult stages. The studies on the biology of this pest were made for 10 generations. After culture preparation the seasonal fluctuation of the smaller wax moth was also studied in

different apiaries of *Apis mellifera* L. colonies (n=20) in Shivalik hills. Observations were made on the number of colonies with infested combs present, and damaged colonies were recorded at regular fortnight intervals.

### RESULTS AND DISCUSSIONS

During the present studies female moth laid  $11.70 \pm 13.98$  eggs in groups during its  $6.90 \pm 1.135$  days of adult life. After  $7.10 \pm 1.04$  days, freshly hatched larvae borrowed into midrib region of the comb and start feeding upon the honey and other honeybee product. Full grown larvae were measured  $18.80 \pm 0.360$  mm in length. The larvae observed more destructive when combs were kept in dark and poorly ventilated room. Larvae after attaining maximum size in  $30.10 \pm 2.46$  days it start to spin thread around it to form a cocoon. After completion of cocoon larvae were changed into the pupal stage and retained for  $37.30 \pm 1.187$  days. The pupae were  $11.30 \pm 0.40$  mm in length &  $2.80 \pm 1.89$  mm in width. Now adult stages appear with  $12.30 \pm 0.40$  mm in length with wings folded over the top of the body with life span of  $12.90 \pm 1.30$  days without any destruction to the combs.

The smaller wax moth infestation was also observed throughout the studied period in experimental apiaries of Shivalik hills. During 2007-08 the maximum number of colonies infestation was observed in August ( $10.80 \pm 0.28$ ), September ( $14.30 \pm 0.28$ ) and October ( $10.20 \pm 0.31$ ) in 2007. However the minimum incidence was observed during January ( $1.50 \pm 0.20$ ), February ( $0.50 \pm 0.16$ ) and March ( $0.90 \pm 0.7$ ). Similarly, during 2008-09 revealed that the peak infestation of colonies was observed in August ( $14.40 \pm 0.35$ ), September ( $15.80 \pm 0.31$ ) and October ( $14.40 \pm 0.38$ ) 2008. However the infestation was negligible in April 2008 and January 2009 (Table 1).

It has been analysed that different stages of *Achroia grisella* F. shows the variation while completion of their stages. These may vary from time to time and condition

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to condition due to the changes in the environmental factors and availability of the food (Cherrie and Imdorf 1997, Swammy *et. al.*, 2001). Biological studies on the seasonal incidence shows that the maximum infestation was noticed between Augusts to October in comparison to the other months of the year. These studies were

comparable with the earlier records of Ramachandaran and Mahadevan (1951), Abrol and Kakroo (1996) and Swamy *et. al.*, (2005) who reported maximum infestation during July to October, May to October and March to December respectively.

**TABLE 1.** Seasonal fluctuations in population of lesser wax-moth (*Achroia grisella* F.) infesting *Apis mellifera* L. in Shiwalik Hills, Himachal Pradesh.

<.....2007.....>						.....2008.....>						
	March	April	May	June	July	August	Sept.	Oct	Nov	Dec	Jan	Feb
$\bar{X}$	0.90	2.20	3.70	6.50	7.70	10.80	14.30	10.20	6.70	3.80	1.50	0.50
$\pm$	$\pm 0.7$	$\pm 0.19$	$\pm 0.25$	$\pm 0.33$	$\pm 0.28$	$\pm 0.28$	$\pm 0.28$	$\pm 0.31$	$\pm 0.20$	$\pm 0.24$	$\pm 0.21$	$\pm 0.16$
SE2007-08	(1.308)**	(3.198)	(5.378)	(9.448)	(11.192)	(15.698)	(20.785)	(14.825)	(9.738)	(5.523)	(2.180)	(0.727)
$\bar{X}$			2.20	6.90	8.90	14.40	15.80	14.40	10.80	6.30	3.80	
$\pm$	Nil	Nil	$\pm 0.19$	$\pm 0.22$	$\pm 0.22$	$\pm 0.35$	$\pm 0.31$	$\pm 0.38$	$\pm 0.22$	$\pm 0.25$	$\pm 0.24$	Nil
SE2008-09			(2.635)	(8.263)	(10.659)	(17.245)	(18.922)	(17.245)	(12.934)	(7.50)	(4.551)	
.....2008.....>						<.....2009.....>						

Number of infested colonies

\*\* : Figures in parenthesis indicate per cent population

X± SE: Mean ± Standard error about mean

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