

## **Construction of Smoke Unit for Eco-friendly Management of Greater wax moth, (*Galleria mellonella*) - A world wide novel approach in Beekeeping**

Honey bees are infested by the major insect pest, Greater wax moth (*Galleria mellonella* L.) (Lepidoptera: Pyralidae). It is found across the globe and the problem become more serious in weaker bee colonies in the dearth period and under storage conditions. The adult female is nocturnal in habit and lays eggs in the empty frames, in the frames of bee colony and in the cracks between hive bodies which are stressed or weakened. It breeds effectively in empty beeswax frames under storage conditions and its young larvae feed on the beeswax by tunnelling them and make silken webs in the frames and rendering the frames useless for the another season which may also lead to serious consequences like desertation of hive by honey bees, resulting in economic loss to farmers.

The commonest methods that are being in practice to mitigate the problem of wax moth are some manipulations in the hive and other treatments to stored combs *i.e.* technical, physical, biological and use of harmful chemicals such as sulphur fumigation, acetic and formic acid evaporation applying paradichlorobenzene, naphthelene balls and celphos tablets( aluminium phosphide). Although the use of these synthetic chemicals are somewhat easy to apply and effective but their residues and contamination of honey and other bee hive products are the serious problems which also leads to colony collapse disorder. In view of the increasing sensitivity of consumers with regard to chemical traces in food, the use of chemical control is becoming more questionable.

Though, very few studies have been reported involving use of non-chemical wax moth prevention methods involving use of plant products such as neem leaves, tulsi , smoke generated by burning tobacco leaves in beehives, **but no any work has been conducted on the use of smoke for the management of empty bee frames under storage conditions.** Therefore, to overcome the problem of wax moth infestation in empty bee frames under storage conditions and keeping in mind the harmful effects of chemicals and the potential of non chemical means, an airtight wooden smoke unit is constructed.

### **Airtight Smoke Unit: For Management of Wax moth, *Galleria mellonella***



**Double walled smoke unit    Filling smoke**

### **Sealing of the unit**

**ADVANTAGES** This is the worldwide novel approach to construct an airtight wooden smoke unit as a simple model to demonstrate the effect of smoke to overcome the burgeoning problem of greater wax moth infesting empty bee frames under storage conditions during dearth period.

- 1) In the airtight wooden unit the regular smoke treatment effectively controls the wax moth infestation in empty beeswax frames.
- 2) During honey flow season, these smoke treated bee frames after removing from the smoke units and after keeping them in fresh air and dim sunlight for few minutes and replacing them back to beehives are successfully adopted by the honey bees for rearing brood and storing honey without causing any damage to brood and the bees.
- 3) Use of **DOUBLE WALLED AIRTIGHT SMOKE UNIT** seems to be a potential and cheap alternative to hazardous synthetic chemicals mainly CELPHOS to manage this notorious pest by preventing the entry of gravid adult females in the unit due to double walled surface ( no cracks and crevices) and by reducing the larval infestation in the empty beeswax frames if any, due to smoke treatment under the storage condition,
- 4) It also does not involve the risk of harmful or residue problems on wax combs as in case of harmful chemicals. Thus, the smoke can play a prominent role as one of the eco-friendly, cheap, safe measure for management of insect pests of honeybees in organic beekeeping.

- 5) The commercial beekeepers who have large number of beehives can construct large units, small rooms or aluminium boxes with provision of passing smoke under airtight conditions to keep several empty bee frames during off season to protect them from attack of wax moth.
- 6) This easy, eco-friendly and cost effective smoke based technology is adopted by several beekeepers in Uttarakhand and Uttar Pradesh for safe management of wax moth under storage conditions.