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Winter Preps Part 2: Comb Preservation

Bristol Beekeepers

Importance of Comb. The quoted amount of nectar (and hence honey) required to produce wax varies between sources, with figures as much as 10lbs of nectar for 1lb of wax being stated[1]. Whatever the actual quantity is, it is fair to say that a significant amount of resources are required for the bees to draw comb. Consequently, it is a precious resource and must be treated so.

Earlier in the year we dealt with renewal of brood comb using both the shook swarms and Bailey Comb Changes. Whilst the colonies that we performed these on have come on very well, with associated low levels of disease, our focus now is on ensuring that the combs in the supers are protected prior to them being stored overwinter.

Foes. It will be little surprise that there are many other insects and animals all too keen to capitalise on unprotected comb. These vary from mice and rats to wax moths. Sound storage, by placing queen excluders over stacks of supers and ensuring that the boxes have no gaps should prove sufficient for the former. It is the latter, the wax moths, that are of concern here[2].

Types. There are 2 types of wax moth that we need to concern ourselves with[3], Figs 1 and 2. Care needs to be exercised to ensure their larvae are not confused with Small Hive Beetle *Aethina tumida*, which has distinctive "mohawk" on its back, Figs 3 and 4:

(i) The Lesser Wax Moth (LWM) *Achroia grisella* around 11mm in length and

(ii) The Greater Wax Moth (GWM) *Galleria mellonella* around 24mm in length.

Fig 1: Lesser Wax Moth

Fig 2: Greater Wax Moth

[1] https://www.bbka.org.uk/beeswax

[2] Whilst a pest to stored, sound comb, wax moths are a great friend to diseased comb (including that with foulbrood: EFB and AFB) as they remove this infectious comb from the disease cycle. In addition, recent research has focused on their ability to consume waste plastic - see https://www.sciencedaily.com/releases/2017/09/170915144156.htm.

[3] Wax Moth, National Bee Unit, Mar 17.

Fig 3: Wax Moth Larvae

Fig 4: Small Hive Beetle Larvae

The Damage. Though they favour brood comb, both varieties of moth will damage super combs if given the chance. It is worth noting that LWM is very unlikely to be found on frames with bees, unlike GWM. However, in both cases the female moth, favouring darkness, enters the hive/stack of boxes at night and lays several hundred eggs in crevices around the frames. When these hatch, the larvae tunnel through the comb, devouring wax, its contents and general detritus, leaving behind a mess termed "frass".

Prevention is Better than Cure….. As the adage goes. So to deter these moths 2 techniques[4] will be used at Honey Comb Farm this weekend.

(i) Fumigation using Acetic Acid[5,6]. This has the added benefit of also reducing the loadings of both *Nosema spp* as well as Chalkbrood *Ascosphaera apis*. The process is thoroughly explained in the NBU's handout[5] but in short: all frames are removed and their wooden parts scraped clean. Next the runners are coated with vaseline (since acetic acid attacks metal!). Resting on a pair of wooden battens over grass (see[6]), is a wooden floor with 5 supers stacked on top. Above this an empty super is placed that has inside it a saucer containing 600ml of acetic acid. On top goes a lid followed by a hive roof. The sides of the boxes are sealed with tape and left for a week. Following this period, the boxes are then aired prior to storage (QX top and bottom).

(ii) Treatment using Certan B401 *Baccilus thuringiensis.* This is a bacterial micro-oganism that is toxic to the wax moths, but completely harmless to both humans and bees[7]. Importantly it kills the wax moth larvae (which is the damaging part) and, once applied, lasts for up to 1 year. It is mixed together with water at a ratio of 19:1 (water:B401) and sprayed onto the frames using a plant mister. After application the frames are allowed to air (again with QXs top and bottom). The 120ml bottle at the apiary will be sufficient to treat around 15 supers - hence we shall make up approximately 800ml of solution (760:40).

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[4] Other techniques are available, such as freezing frames, or using Sulphur dioxide strips. These will not be used here.

[5] Fumigating Comb, National Bee Unit, Jun 18.

[6] Acetic acid is a very nasty product which even corrodes concrete! The health and safety guidance in the NBU's handout must be followed carefully.

[7] *B. thurigiensis* is effective in an alkaline gut, which is what the wax moth has, but completely harmless in an acid gut, which both bees and humans have.