VARROA : TO TREAT OR NOT TO TREAT?

The summer edition of The Welsh Beekeeper published the results of the Meirionydd and Lleyn and Eifionydd Beekeepers 2014 – 2015 winter losses survey. Compiled by Clive and Shan Hudson, they offered a valuable record of the colonies lost from the beginning of November until the end of March around the Lleyn Peninsular. A distinction was made between those beekeepers who used chemical treatments for Varroa and those who did not. The results showed little difference in the percentage of colonies lost by those who used chemical controls and those who did not. Both come in at just over 8 per cent. The data and their conclusions were both interesting and thought-provoking.

The Lleyn losses compare favourably with other winter loss surveys. National Bee Unit inspection data records Welsh colony losses of 19 per cent between the start of October and the end of March 2015, whilst the BBKA reported 14.5 per cent losses in England. The reasons cited for the colonies lost are various: queen failure, weak colonies and starvation are amongst the most common. The Lleyn bees are clearly a robust bunch, living in a special part of the world! Without additional monitoring information on the presence of Varroa in the lost and surviving colonies, it is difficult to extrapolate the role played by Varroa in these figures – or, by extension, the part played by chemical or biotechnical Varroa control in winter losses. Levels of mites, DWV, swarming, broodless periods and passive varroa control all come into play.

NBU research

Varroa destructor causes varroosis, a very serious and complex infestation of honey bees. Since being reported in Western Europe in the late 1970s, it has caused massive economic losses and expense for beekeepers. An evidence profile on Varroa[i] which was developed during the 2011/12 policy review of bee health identified Varroa as the number one problem for honey bees. The profile reflected the costs of treating for varroa in 2011 as being almost £7 per hive which is, of course, a fraction of the price of a replacement colony. It concluded that:

- insufficient action was being taken by beekeepers to monitor and act in relation to Varroa, and an (unfortunate) level of acceptability of colony losses;
- varroa was more of a worry than other pests and diseases, in that it stressed the bees and made them more susceptible to other pests and diseases;
- managing and controlling Varroa was the highest priority for bee farmers and took precedence over EFB and AFB risks.

The NBU's Random Apiary Survey from 2009 – 2011 was based on samples from over 4500 apiaries across England and Wales. It found Deformed Wing Virus (DWV) in 66 per cent of apiaries in Year 1 of the survey and 75 per cent in Year 2. DWV is transmitted by the Varroa mite and is aptly named. The virus affects the development of bees' wings which appear small and shrivelled, shortening the bee's life and limiting its ability to fly and forage. Other deformities may also be present. The survey also found that those colonies with DWV were, on average, half the size of those in which the virus was not present.

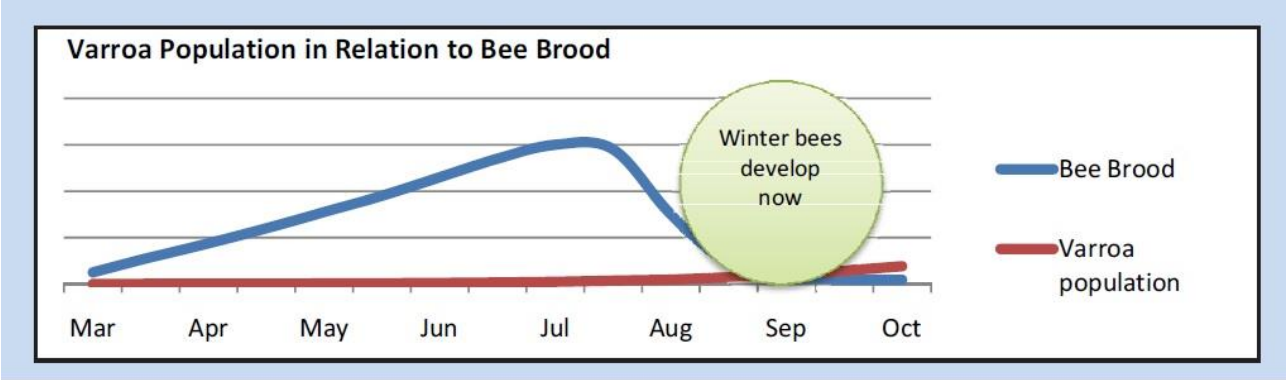
Last month, the NBU published its latest research findings, *Pathogens as Predictors of Honey Bee Colony Strength in England and Wales*[ii]. It uses NBU sampling to assess the role played by pathogens in colony health. It highlights the particular presence of DWV in those colonies with fewer combs of bees or brood. As well as the widely documented physical deformities, the researchers consider DWV to have an immune-suppressive impact on honeybees, reducing their capacity to resist other pathogens. They identify the means of the virus' transmission as being one of the key points of control:

> "*Beekeepers in England and Wales should concentrate on Varroa control, queen maintenance, and timely feeding to reduce colony losses. A clear link was demonstrated between poor colony strength and presence of Deformed Wing Virus (DWV). Owing to the tight link between Varroa and DWV, and until effective anti-viral products are available to combat this virus, the only recourse available to beekeepers is to control Varroa as a proxy for controlling DWV*".

Varroa populations

It is generally considered that Varroa as a sole bee pest will probably not kill the colony for a number of years. However, it impacts on honeybee social cohesion, the colony's ability to function and can gradually debilitate bees by depriving them of nutrition. When Varroa starts acting in concert with other viruses, including those transmitted by the mite itself, it can become fatal quite rapidly. One colony can therefore live for some time with thousands of mites whilst another may collapse with only a thousand. It is widely accepted that an increased presence of DWV in drones will adversely affect the queen's mating success, suggesting a direct link between varroosis and queen failure.

During spring and early summer, bee brood and mite populations increase. The bee brood population peaks in July whilst mite populations continue to grow. More Varroa mites start to enter a reducing number of bee brood cells. The change in ratio increases the negative impact on the bees, as a greater proportion of bee brood is affected and resistance to other viral and bee disease levels falls. If the situation is allowed to continue into September and October, the lifespan of individual overwintering honey bees will be significantly shortened. This can cause dwindling and the possible collapse of the colony in late autumn or winter, even if varroa was controlled earlier in the year.



Best practice fact sheet : Varroa (National Bee Unit 2012)

A knowledge-based approach

Mite infestation levels should be monitored. A decision on whether or not a colony requires treatment should be based on knowledge of its disease status. Natural mite mortality can be measured using open mesh floors and a monitoring tray, or by uncapping drone brood. Mite levels vary throughout the year and the Beebase varroa calculator[iii] takes account of these variables and the sampling method used to give an infestation measure on which beekeepers can base a decision as to whether the colony can withstand the threat or more action is required on the part of the beekeeper.

There is no need to monitor all the time but rather at key points during the year. In February or March, the mite population should be assessed as the colony goes into the spring. Very low infestations will require no action, light infestations can be controlled by using open mesh floors and drone brood removal to slow the mite population growth. Heavier infestations can be controlled by using queen trapping, artificial swarm methods, shook swarm or chemical treatments.

In late spring and summer, infestation levels of drone brood can be checked to monitor progress or detect mite invasion and, in July, a decision can be made as to whether late summer treatment is required. This treatment should be carried out in early August after removal of the honey crop followed by monitoring in October to assess the effectiveness of the treatment and whether winter treatment is needed.

Treatments for varroa

There are a range of methods available for controlling Varroa. The Food and Environment Research Agency publication, *Managing Varroa*, remains the most comprehensive. It describes the practical details and the respective pros/cons in both biotechnical controls (physical methods of control) and varroacides (chemical controls). The Integrated Pest Management Approach, summarised in a paper prepared by the Wales Inspectorate[iv], vests its success on the deployment of a range of control methods at different times of the year to maintain Varroa levels below the treatment threshold.

The use of chemical treatments for Varroa has proven both uncomfortable and disappointing for some beekeepers. This is largely due to the fact that the earliest medicines were based on synthetic pyrethroids and their early efficacy was followed by the mites' development of a significant resistance. 'Softer' treatments based on naturally derived chemicals, primarily thymol, have since been licensed in the UK. Their development and licensing is ongoing, reflecting the ongoing threat posed by Varroa. A new treatment, Hopguard, is anticipated to be licensed next year. Current licensed products, per active ingredient, are:

- Synthetic pyrethroids – Bayvarol and Apistan;
- Thymol-based treatments - Apiguard, Apilife Var, Thymovar;
- Formic acid-based – Mite Away Quick Strips (MAQS)
- Oxalic acid - Api Bioxal.

These Varroa treatments are subject to regulation - products should be both used and disposed of according to instructions on the label and a record kept of their purchase and administration for a minimum of 5 years. Provided they are used correctly, they are also effective and safe. They enable colony vitality, strength and productivity to be maintained, without risk of residues. There can be an impact on queen laying and brood production but this is outweighed by the damage caused by Varroa infestation that inspectors continue to see on a day-to-day basis.

As in all livestock management, good husbandry and care reap rewards. This should include Varroa monitoring, biotechnical controls and judicious use of appropriate medicines. With proper planning and monitoring, bio-technical and management methods will be the first controls used in relation to Varroa. If successful, chemical treatments should become an important but last resort. The use of a range of different methods enables more effective control. It also reduces chemical use and resultant residues in hives and bees, without neglecting the importance of Varroa as the number one threat to our honey bees' health.

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[i] Review of policies on managing and controlling pests and diseases of honey bees -

[ii] Pathogens as Predictors of Honey Bee Colony Strength in England and Wales - Budge GE, Pietravalle S, Brown M, Laurenson L, Jones B, Tomkies V, Delaplane KS.

[iii] http://www.nationalbeeunit.com/public/BeeDiseases/varroaCalculator.cfm

[iv] http://www.conwybeekeepers.org.uk/wp-content/uploads/2011/07/Varroa-IPM-Wales-July-2011.pdf