

Varroa Treatment, with Resistant Mites in Mind.

Word should have got round by now that virtually all the mite populations that live in the bee colonies in our area are to a lesser, or more likely larger extent resistant to the two approved Pyrethroid-based treatments, namely the *Bayvarol* and *Apistan* strips. -- We have now to practice “IPM”, Integrated Pest Management – a lovely word to say that we have to do more work for and with the bees, more or less throughout the year, whereas the strips were, on the whole, so effective and reliable that one treatment in the autumn was all we had to do.

One fairly simple thing we can do, without much extra cost and effort, is the application of **Icing Sugar**: each time you open your bees’ brood chamber, you sprinkle it down each seam of bees, for instance by “tickling” it from a tea strainer or similar sieve. You can also place a travelling screen on top of your brood chamber, throw a small hand-full of icing sugar on it and brush it down with your bee brush or bee feather (or do you use a goose feather ?). The way it acts on the mites and bees is this: (1) It spoils the adhesion of the mites’ feet, so that they fall off more than they normally would, and (2) it causes the bees to groom themselves and each other, and in the process of cleaning the sugar off, they also knock off a few mites. – For this method to work to good effect, it is important that you keep your bees on mesh floors, so that the mites that fall off the bees and combs will really fall out of the hive without much chance of cleaning themselves, laughing their heads off, and climbing back onto the combs, as they would do if they landed on a solid floor. – And: don’t think you get a better effect when you take the frames out and hold them horizontal, and then shake the sugar onto the bees; true, you would then cover the bees on that comb more efficiently; but you would also get it into the open brood, and the bees would be likely to clear out larvae that they find “contaminated” with that white dust.

Drone Brood Removal: While they evolved together with their original host, *Apis cerana*, the Varroa mites have learnt that they have some four more days to produce viable fertilised females if they enter drone cells rather than worker cells, and therefore they prefer to breed in drone brood. We can turn this behaviour into their “Achilles Heel”, by management schemes that cause the colonies to produce more drone brood than they would do naturally, and then remove and destroy that brood before the drones emerge and release the nasty parasites that have shared their cell. – This extra drone brood can be encouraged by (1) putting one or two **super frames** into the brood box, hoping that the bees will build drone comb in the empty space below these frames (they usually do, but sometimes, of course, they don’t), and that the queen will prefer to lay there (she usually does, but sometimes, of course, she doesn’t !). You have to keep an eye on the situation, so that you know when that brood has been laid and, more importantly, when it will emerge; so that you don’t miss the boat and allow all that drone brood to emerge along with its heavy mite burden. (2) You could put a frame fitted with **drone foundation** into your colony, hope that the bees will draw it out, or **drawn drone comb**, and proceed the same way as with the super frames. – Somewhat more reliable, but involving more cost and effort, is (3) the method of **Queen Trapping**: A frame of drone foundation or drone comb is encased in a box made from queen excluder material, the queen is trapped in there till she has laid most of this space up with drone eggs, this brood is allowed to be capped and then removed and destroyed, mites and all. The queen can be allowed to do this on two or three frames, and each time a fair number of mites will “not make it”. Again, timing is essential: you have to remove the drone brood before it emerges – if you miss that time, you have indeed bred mites very efficiently.

The only other chemical treatment that is approved in this country is **Apiguard**, the thymol-laced paste that is administered in a small tray placed on top of the brood frames (make sure the crownboard is raised sufficiently to allow the bees access onto the tray), at the end of the season after the honey has been taken off (*Apiguard*’s strong smell is likely to spoil your honey) and when the colony reduces its brood rearing and many of the mites will have little sealed brood to hide in and will therefore be exposed to the chemical. – Unfortunately, the stuff is fully effective only when the day-time temperatures are sufficiently high (*Vita*, who markets *Apiguard*, say that the day maximum must be above 15 °C for optimum efficiency – how can you be sure that this will be the case during the six weeks after you put the first tray in ?), and therefore there is a good chance that a significant number

of mites will survive the treatment and be a burden to the wintering colony, weakening it, as we have often seen last winter, to such an extent that it was too weak to build up the new season's population in time for it to survive. (Just the same as resistant mites that have survived a treatment with the old strips). – Also, this treatment is to be given just about the same time as we want to feed the colonies; and as there have been cases where the bees refused to touch either the food or the *Apiguard*, *Vita* has suggested the way round this problem is to give the first tray early, leave it in for two weeks, then feed, and give the second tray after that; so that feed and treatment are not on the hive together at any time.

Luckily, there is the treatment with organic acids, to catch the bulk of the mites that have survived the autumn treatment. Of these, **Oxalic Acid** is the most commonly used on the Continent (where they have had resistance some 15 years before us). However, as it does not affect the mites and their larvae in the sealed bee brood, and as it may also harm the open brood, it is best applied during winter, i.e. when there is little or no brood being raised by the bees (December, January). There are a number of ways to administer this acid to a colony: >> Spraying a solution onto the face of the brood combs (this means taking out each frame that is covered with bees, i.e. causing quite a disturbance to the cluster of the wintering colony). >> Evaporating the acid and blowing it into the hive entrance from a copper tube heated with a gas flame, or from a small electrically heated frying pan placed on the hive floor (when applied with these methods, the acid re-condenses in the hive to form a very fine mist). You can buy these evaporator pans from the equipment suppliers; and I have seen a home-made version in the Shrewsbury honey show, which used a Diesel-engine heater plug for its heater element.

The **Trickling Method** seems, on balance, the most promising. It uses a solution of the acid in sugar syrup, 5 or 6 ml of which is trickled onto each seam of bees of the winter cluster. You can buy the concoction ready-made, e.g. from Thorne's, but this has a very limited shelf-life even when kept in the fridge: it goes brown as HMF builds up and makes it toxic to bees (hydroxy-methyl-furfural, also used in the analysis of over-heated honey). It is therefore best made up in the quantity you expect to need at the time, following this recipe: 35 g of the acid crystals dissolved in 1 kg of syrup made up from 1 part water + 1 part sugar (by weight). Each full seam of bees is to receive 5 – 6 ml of this syrup from a suitable syringe. With this method, there is no need to go any further than taking the crownboard off, so the disturbance to the winter cluster is kept to a reasonable minimum.

All these organic acids are potentially harmful to the beekeeper: if handled carelessly, they will cause damage to eyes, skin, or your inside (if you swallow the stuff, or inhale it in its powdery form), so the greatest care is to be taken: don't play with the stuff when there are inquisitive children or dogs, wives/husbands or similar distractions around, and wear mask, eye protection, gloves.

As both, the Icing Sugar and the Oxalic Acid treatments, are most effective and/or least harmful to the colony, when there is no capped brood present or preferably no brood at all, they may also be administered effectively to a young swarm: in a prime swarm, there will be no sealed brood for a good week at least, and more in a cast swarm. For that period of time, all the mites in that swarm will be sitting in the open, riding on the bees or walking around on the comb or foundation, without a chance to hide in the safety of the sealed bee-brood cell, and will therefore be vulnerable to the treatment. – Same idea as treating a young swarm with the Pyrethroid strips, left in the swarm for just a couple of days – there was no need for them to be left in for the six weeks to catch two generations of emerging bees + mites.

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