

## Hive Talk

### September 2011

Happy New Year! No your calendar isn't wrong and Christmas hasn't passed you by without being noticed; it's just that September is the beginning of the new beekeeping year. When the sticky business of honey extraction is over in August, the next phase is to ensure the bees have enough stores to last them through the winter so that they are strong and in good condition to start building up their numbers for the spring and the next season. Preparation is all; or as the saying goes: "fail to prepare, prepare to fail". The beekeeper certainly has the responsibility to ensure that the bees have sufficient stores, supplementary feeding with sugar syrup may be necessary, it will all depend upon what is in the box already. Each colony is different and some sub species of the Honey bee (*Apis mellifera* ...) exhibit different characteristics. The species native to most of Northern Europe and particularly these islands is *Apis mellifera mellifera* – the Dark or Black European Honey bee. This bee is thrifty and manages its stores well, it is well adapted to our climate and generally is successful at over-wintering. Honey bees are essentially forest animals or at least they have a strong association with trees and in their natural state would use a hollow tree as a nest site, though caves and sheltered nooks and crannies in cliff faces would do just as well. The nest architecture has been determined over the millennia and the vertical orientation of a typical hollow tree means that the Honey bee tends to build upwards with surplus stores being arranged above the brood nest where the business of egg laying and the rearing of young goes on. This feature is exploited by the beekeeper who simply adds boxes of frames for honey storage one on top of the other as needed. A strong colony and good honey gatherer may require eight or more boxes in a year where weather conditions and available forage combine to produce the ideal. *Apis mellifera mellifera* usually retains an arch of honey and some pollen above the area of comb devoted to brood rearing and working from the centre of the brood nest outwards, this arch of stores tends to become deeper. A typical brood nest has a rugby ball shape but it is formed within seven to eight vertical double-sided combs. Most man-made hives are designed to carry ten to twelve frames of comb, the outermost ones are rarely used by the bees for brood rearing but are used for stores. Some colonies will retain stores in the brood nest area, others will store most of any incoming nectar in the 'supers' - the boxes the beekeeper adds – above the brood nest. And of course the beekeeper removes these at the end of the summer for his or her own use leaving the bees with little or nothing. An inspection of each colony and a 'hefting' of the box during this month will have determined how much stores are present and how much more needs to be fed so that the bees have enough for the winter and for the following spring until both weather and flowers allow the bees to bring their own supplies in. A full sized colony will normally need from 20 to 25kg of stores for successful over wintering.

The difference between colonies and how they perform, even from the same apiary, can be quite marked. But most noticeable are the differences between sub-species or types of bees. Without doubt, the best bees for our country are those adapted and habituated to both the availability of forage types and our

wet oceanic climate. This bee is the Dark European bee *Apis mellifera mellifera*. All that said, there are still bees being imported into Ireland that are from an entirely different part of Europe and that are not really suited to our conditions, though they may do well for a season or so. Currently popular among some 'importing' beekeepers are bees from Slovenia and Austria. These are known as Carniolan Honey bees – *Apis mellifera carnica*. In an apiary of about a dozen hives, consisting mostly of native type Dark European bees, there is a hive of Carniolan bees. This is a very strong colony that built up quickly following the spring, but these bees have produced nothing throughout the summer. They have nothing stored and that means they are living 'hand to mouth' at subsistence levels – consuming just as much as they are gathering and therefore unable to create and store a surplus. There is no doubt that these bees will not survive the winter without the intervention of the beekeeper. But the question has to be asked, is there any point in feeding them if they produce nothing? Not only are they useless as honey gatherers, they pose a genetic threat to their immediate neighbours and those colonies farther afield – brutal as it may sound, a cull has to be the answer!

At the other end of the spectrum, there are colonies that do well. That build up well after the winter and go on to produce respectable surpluses of honey for the beekeeper. These are the colonies that the beekeeper should select from to rear queens that will carry good performance characteristics in their genes. There are a number of criteria the beekeeper should apply when selecting breeding stock, the ability and willingness to gather honey is obviously an important one but so is docility, beekeeping is not much fun if every time an approach is made to the bees a battle ensues between bees and beekeeper. It is also important to select for other characteristics, hygienic behaviour being another one. Research is currently addressing hygienic behaviour in bees as a mechanism for dealing with parasitic pests – the principal among these being the *Varroa* mite. Because these mites can adapt and have built up resistance to the chemical treatments being used – synthetic pyrethroids – their effectiveness is coming to an end and other approaches must be adopted. Some bees do better than others at dealing with *Varroa* and the mechanisms and characteristics that are connected to this behaviour require identifying and selecting for. At one end of the scale we have university research stations with experienced and dedicated scientists, at the other, we have the common or garden beekeeper. Whilst the scientists can push the boundaries and widen our understanding, the beekeeper with just a few hives can do his or her part equally well by selecting from the best in the apiary. Although it is generally not the case, all beekeepers should rear queens and ideally should have a plan in mind that requires selecting from certain stocks to improve or secure lines that exhibit desirable traits and characteristics. In this way bee breeding and queen rearing combine to help improve the overall health, well-being, productivity and sustainability of our Honey bee population. And above all else, the ability to produce home grown stocks of bees either for expansion of existing apiaries or for sale or distribution to new beekeepers means a reduced dependence on foreign imports and all the problems they bring with them.

We all know about Irish summers, but aside from the usual complaints our climate does present real problems for the beekeeper if he or she is intent on queen rearing. In order for a queen to produce sufficient viable eggs over the course of her reproductive life (some two years or more) she must be mated with around a dozen to fifteen drones. This means there must be drones available to do this. They are usually not available in sufficient numbers until May and some colonies begin to dispose of their drones in August once the main nectar flow has come to an end. From egg to emergence it takes sixteen days to produce a queen, it then takes another four to five days before she is ready to begin her mating flights and another week at least before she may begin to lay. If the weather is too wet, too cool or too windy, the queen will not take to the air. This year, we had an unusually warm and dry April – to the point where some farmers were talking about drought conditions – (in Ireland!!??), but May was cold, wet and windy. The rest of the summer was the usual mix of both warm and dry and wet and windy. A good warm dry spell a few days after the virgin queen's emergence is what is needed to create the right conditions for a successful mating. All this makes the business of queen rearing extremely precarious and a huge amount of luck is required together with good planning and close attention to details and especially to timing if there is to be a successful outcome. The best or optimum way of improving the odds is to work collectively with other beekeepers so that a ready supply of good quality breeding stock i.e. virgin queens is produced from one or two apiaries and these are farmed out to other beekeepers who will provide the mini-nucs or nucs (these are special small breeding colonies with just a large cupful of bees in each – or in the case of a nuc, just three frames of bees set-up specifically for breeding) from which they will be able to make their mating flights and begin egg laying. Once a queen has proved herself by laying sufficient eggs that in turn become larvae and are eventually capped as worker brood, she can then be transferred if need be to the colony that will become her home for the foreseeable future. Using the 'grafting' method - that is, transferring twelve – eighteen hour larvae into special queen rearing cells to be brought-up as queens – it is possible to 'harvest' these on a daily basis. Queen cell rearing colonies usually work with around twenty cells at a time and once the potential queen larvae have been fed and the cells capped they can be removed and allowed to hatch in another colony or in an artificial incubator. Another fresh batch of young larvae can then be introduced and the cycle started over again. Producing the queens is only half the story, it is equally if not more important to ensure sure a good supply of drones with the right pedigree in order that the desired breeding lines are produced. Without the commitment and cooperation of other beekeepers it is next to impossible to control how queens are mated unless instrumental insemination methods are used. It probably sounds more complicated than it is - and this is without looking at the genetics – but it is a fascinating and rewarding part of beekeeping that everyone who keeps bees should try. There is everything to gain and very little to lose. On a small scale it is possible to use certain techniques that have little or no impact on normal colony life and so do not impact on the capacity of the colony to gather honey.

In other parts of the world as you might expect, bee keeping is carried on differently. In Catalunya, the north east portion of Spain, most beekeeping is done by people who make it their full time occupation and it is therefore their livelihood. The average number of colonies is around 400 and these beekeepers practice transhumance. This means they follow the flowering periods of a number of plant species as the year progresses moving the bees as required. They will start in the lowlands and near the coast in January or February with the bees taking nectar from Rosemary plants, they will move progressively higher and into the Pyrenees where nectar producing plants include Thyme, Acacia and Heather; they also move the bees south to Valencia for the orange blossoms where the farmers there depend on the bees for pollination. The hive these beekeepers use is different to ours and to the Langstroth hive that most of the rest of the beekeeping world uses. The Catalunyan beekeepers use a hive called the 'Layens hive', it contains twelve frames about the same size as our National 'Jumbo', and is a single box with a fixed floor and hinged lid or roof. In other words, this hive has no separate moving parts, unlike our own hives that have a separate floor, brood chamber, queen excluder, supers and roof all held together by nothing except gravity and 'bee-glue' or propolis. The Layens hive is ideal for transhumance because it is easily picked up and moved without the need to secure with straps etc. The number of moves made each year numbers from ten to twelve with each 'stop' producing an average of 10kg of honey per hive. The queen has the full run of the hive because there is no queen excluder, she concentrates her egg laying in the central frames and so surplus honey is stored in the end frames and it is from these that the beekeeper collects honey. The bee favoured by and promoted by Catalunyan beekeepers is the Iberian Black bee (*Apis mellifera iberica*), a close cousin of our own Black bee. Catalunyan beekeepers are registered by the state and all their hives have a unique identification number. Because treatment for Varroa is now ineffective using synthetic pyrethroids, Oxalic acid using the vapour method is the one approved. Unlike ourselves where our closed or relatively inactive season lasts for at least half the year, these beekeepers have very little or no down-time.

So, as one season closes and another begins, it is now the time to ensure the bees have sufficient stores and, if you are using Apistan or Bayvarol strips to control Varroa, don't forget to remove them after six weeks.