

A Report on Beekeeping in the UK for the Erasmus Let Bee Project

1. Climate

1.1 In general the climate in the UK is cool and often cloudy. Extremes of temperature, whether hot or cold are rare. Summers are generally cool. Winters are not particularly cold but can be very damp. Snow is infrequent. The wettest parts of the UK may receive 1500mm or more rain in a year, whereas the driest receive half of this. Apart from damp, the other climatic problem faced by bees is the highly variable nature of the weather. Unseasonal weather can occur at any time of year. Mild winters can encourage unseasonal activity by the bees and poor summers can severely limit colony development and honey storage.

2. Honey Flows

2.1 Weather permitting (see 1.1 above), over most of the country, the main honey flow occurs in June and early July, from flowers such as clover (*Trifolium spp*) and blackberry (*Rubus fruticosus*). In the north of England and Scotland, heather (*Caluna vulgaris*) provides a honey flow in August. Heather honey is regarded as a specialist product and is highly valued by consumers. Agricultural crops, such as oilseed rape (*Brassica napus*) can be important sources of honey in some areas in the spring, although the quality of the honey is poor. The only significant summer tree honey comes from Lime trees (*Tilia spp*), but the nectar flow from these is notoriously variable and, in many years, absent. In the autumn, ivy (*Hedera helix*) can produce significant nectar flows that can be a great help in providing winter stores for the bees.

3. Beekeeping Organisations

3.1 There are two main beekeeping organisations in the UK: the British Beekeepers Association ('BBKA') and the Bee Farmers Association ('BFA'). Neither can be considered organic or ecological in their approach. As a result, beekeepers who favour more ecological approaches often form their own local self-help groups. The Natural Beekeeping Trust does not have a membership as such, but widely promotes ecological beekeeping practices ('natural beekeeping') both in the UK and abroad.

4. Numbers of Beekeepers and Certification

4.1 Estimated beekeeper and hive numbers in the UK are summarised in table 1:

Table 1: Beekeeping Organisations and Membership

Organisation	No of Members	Typical Number of Hives per Member	Ecological	Commercial or hobby	Number Certified Organic or BD
BBKA	25,000	2 - 20	No	Hobby	None
BFA	450	40 - 300	No	Commercial. Mainly part time, a few full time.	None
Other	1,000 - 2,000?	2 - 20	Yes	Hobby	None

4.2 UK certification bodies currently require that no significant amount non-organic land should be within 6 km of the hives (see Soil Association Standards, para 15.4.2), although it is proposed that the limit should become 3km. Intensive non-organic agriculture is so widespread that few sites in the UK satisfy this revised requirement and those that do are often not suitable for keeping bees year-round. As a result, we are not aware of any UK beekeepers who are certified organic or biodynamic. A small amount of honey is sold as 'near-organic', that is, the bees are on an organic farm but cannot be certified due to the 4 mile rule. Any certified organic honey that is sold in the UK is thus imported.

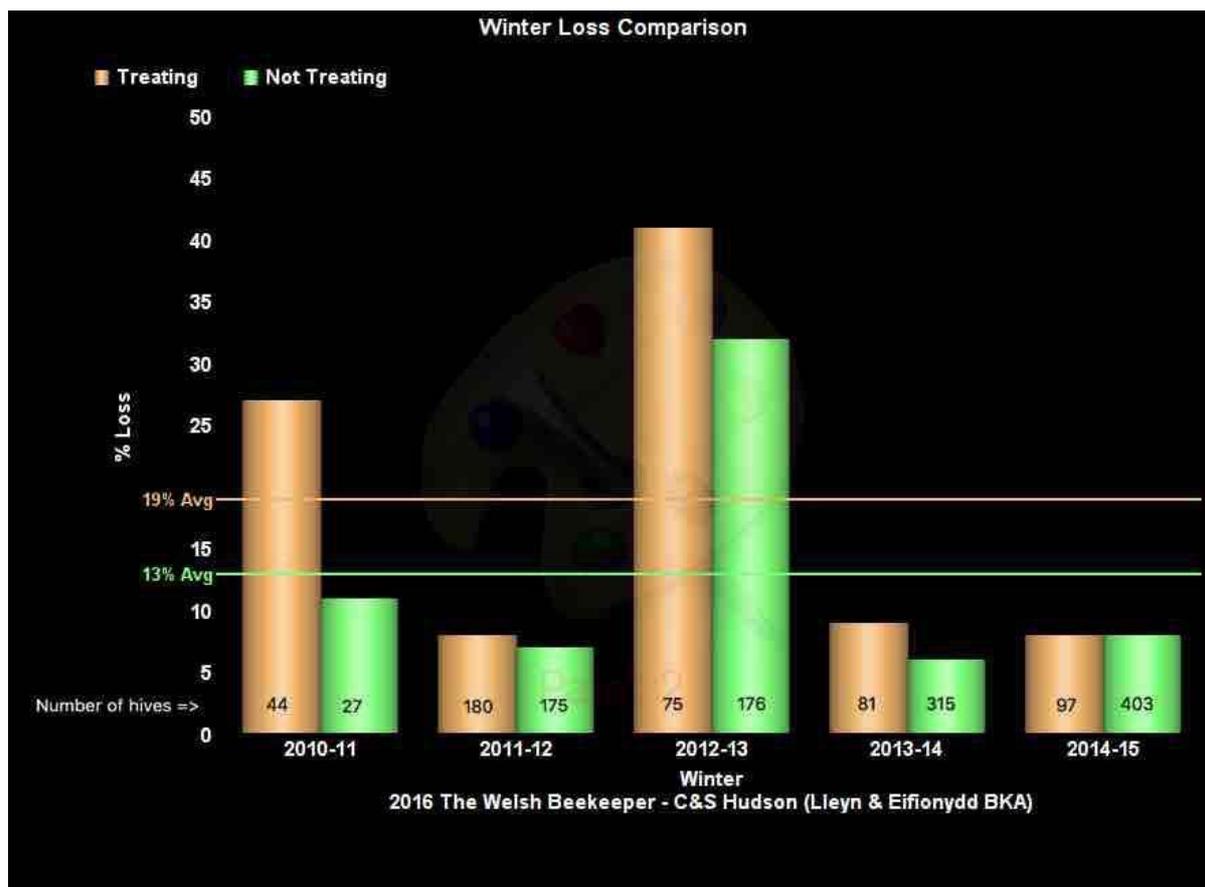
4.3 The BFA estimates that around 85 percent of all honey consumed in the UK is imported.

5. Bee Health

Varroa

5.1 The varroa mite is seen as the main threat to honeybees in the UK. Yet it is estimated that perhaps 10 percent of all beekeepers (ie 2,000 - 3,000) do not treat their hives for varroa. These include both ecological ('natural') beekeepers and conventional beekeepers. Many of these beekeepers report that their hives remain healthy and data indicates that many non-treatment beekeepers lose no more hives during the winter than beekeepers who treat. Figure 1 shows the winter losses in one area over 1,500 hive winters:

Figure 1: Winter Losses in North Wales over 5 years



Graphic courtesy of Jonathan Powell

Environmental Issues

5.2 UK farming is highly intensive. In recent decades large reductions in the amount of wild flowers have occurred due to the widespread and constant use of herbicides. In addition, persistent systemic insecticides such as neonicotinoids ('neonics') are widely used. A full review of neonics is outside the scope of this report but the following points can be made¹. Despite an EU ban on the use of neonics on flowering crops which attract bees, recent research shows that wild flowers growing around field edges still contain high levels of these chemicals. Laboratory trials indicate that neonics affect bees even at sub-lethal doses. Neonics may be a contributing factor in the reduced queen fertility that has become a problem for many beekeepers in the last 20 years, but this needs further research. It is widely agreed that the combined effects of adverse environmental factors, combined with the UK's vary uncertain weather, make commercial beekeeping here even more difficult than previously.

6. Strains of Bee

¹ For more information, see for example: <http://onlinelibrary.wiley.com/doi/10.1111/1365-2664.12111/full>

6.1 The native British bee is *Apis mellifera mellifera*. It is frequently stated that this bee is no longer present to any great extent in the UK, having been replaced by imported bees such as *A. m. carnica* and *A. m. ligustica* or by the hybrid Buckfast bee. However, beekeepers who rely on locally available bees rather than imported or hybrid bees, often find the bees in their hives have many of the characteristics of *A.m. mellifera*. This is particularly true when they collect feral swarms. From this one can conclude that, although colonies of pure Amm bees may be rare, Amm genes are still present in wild bees and will come into evidence if bees are left undisturbed by foreign imports or hybrids.

6.2 The changeable British weather can place considerable stress on bees not adapted to it. For example, warm, damp winters with cold, wet springs can be very hard on imported bees adapted to cold, dry winters with sunny dry springs. Likewise, imported bees can struggle in cool, wet summers. Local Amm is well adapted to both these situations. Although it may give less honey in a good year than imported bees, in poor years it may still give a surplus even when imported bees need feeding.

6.3 The stress placed on imported bees also tends to show in poor queen mating in cool summers and in higher levels of varroa infection. It is noticeable that beekeepers who have healthy bees but do not treat for varroa often have a high proportion of native Amm in the blood of their bees. (Note in this context that such bees may not have the dark colouring of Amm but will show other Amm characteristics.)

6.2 Ecological beekeepers generally prefer bees with a high proportion of local Amm genes and, where possible, will seek to increase the Amm blood in their bees.

7. Commercial Beekeeping Systems

7.1 Commercial beekeeping in the UK is based on hives that are essentially variants of the Langstroth hive. Hives are fitted with queen excluders, with supers placed above. Artificial queen rearing, by various methods, is widespread and queens are replaced regularly by the beekeeper. Various swarm control methods are practiced. In strong contrast to the skep beekeeper visited in The Netherlands, we are not aware of any commercial beekeepers in the UK today who allow unrestricted swarming.

7.2 Treatment for varroa is widespread, to the point of probably being universal. Treatments used include oxalic acid and formic acid. Varroa mites have become resistant to many of the earlier chemical treatments. Biotechnical methods are also employed. These make use of the fact that varroa is attracted to drone brood. Various methods exist for 'trapping' varroa in drone brood, which is then destroyed.

Various methods of artificial swarming ('shook swarms') are also used to control varroa. Those who wish to minimise dependence on any one method, use a combination of techniques, which is referred to as Integrated Pest Management, or IPM.

7.3 Feeding of sugar syrup is widespread, although perhaps not universal. In this regard, some commercial beekeepers remove nearly all the honey from hives at the end of the season as part of their varroa control strategy. David Rudland, who was visited on the field trip, is one of these. His bees overwinter mainly on sugar in the form of fondant placed above the brood nest. The absence of honey in the hive enables a shook swarm to be performed early in the spring as part of his varroa control regime.

7.4 Honey for sale is mainly produced by extracting combs in a centrifugal extractor before it is bottled. It is generally heat processed and may be 'creamed', ie partially crystallised before being whipped to give an even, white, consistency. Care must be taken in warming to avoid over-heating, which leads to the formation of undesirable breakdown products (HMF). The main exception to the foregoing is the production of heather honey. Heather honey is very viscous and is difficult to extract from combs. It is thus often sold in the comb, as cut comb honey.

7.5 Many commercial beekeepers engage in contract pollination work, supplying hives to fruit growers to pollinate crops. This involves close liaison with the grower to ensure that the bees are provided and removed at the correct time. Failure to do so can result in poor pollination and harm, even death, to the bees if the crop is to be sprayed with insecticide.

7.6 The supply of queens and bees to hobby beekeepers is also an important source of income for some commercial beekeepers. A few beekeepers focus on this as their main, or even sole, commercial activity, importing bees from outside the UK to do so. (Note: the importation of bees is contrary to BBKA policy, but this is not enforced.) A few commercial beekeeping businesses manufacture and sell beekeeping equipment, again mainly to hobbyists. Others, such as David Rudland, engage in widespread teaching activities.

8. Hobby Beekeeping

8.1 Hobby beekeeping as taught by the BBKA is essentially a small scale version of commercial beekeeping and follows much the same practices as outlined in 7.1 to 7.4 above. Where honey is sold, it is generally sold locally, as a sideline activity.

Few, if any, hobby beekeepers engage in the activities in 7.5 and 7.6, except to buy bees, queens and equipment from commercial beekeepers.

9. Ecological Beekeeping

9.1 As indicated in 4.2 above, certification restrictions mean there are no certified ecological honey producers in the UK.

9.2 One of the most popular hive used by ecological ('natural') beekeepers in the UK is the Warré, which does not have a queen excluder and is expanded in a downwards manner rather than the upwards manner used in conventional hives. Downward expansion reflects the behaviour of the bee in hollow trees, where the comb is built down from the top of the cavity.

9.3 Some natural beekeepers use the horizontal top bar hive. This is despite the fact that the shallow depth of this hive means it does not satisfy ecological (eg BD) criteria for brood nest shape. Its popularity is likely due to a well-known beekeeping personality, who promotes the hive as convenient for the beekeeper. In contrast, the lesser used Einraumbeste, which is equally convenient, is a horizontal hive which respects the need for the bee to have a deep brood nest. Some ecological beekeepers keep bees in log hives and similar, and many have a few straw skeps. A small number use conventional hives.

9.4 Amongst the beekeepers visited in the UK were Heidi Herrmann and Gareth John. Both have around 20 hives and have applied Biodynamic techniques for a number of years. A summary of some of the BD criteria is given in table 2. Organic criteria are less strict.

Table 2: Some Biodynamic Beekeeping Criteria

	BD Criteria	HH	GJ	Comments re HH & GJ
1	No artificial queen breeding	Complies	Complies	
2	Only increase colony numbers via swarming and natural queen cells	Complies	Complies	

3	Artificial swarming allowed with old queen (prime swarm)	Exceeds	Exceeds	All prime swarms in HH & GJ's apiaries are natural.
4	Hive may be divided after main swarm has left	Exceeds	Complies	HH does not divide. GJ has done so, but is decreasing the practice because cast swarms show more vitality than divisions.
5	Only locally adapted bees to be used	Complies	Complies	
6	Bees purchased from other sources to be BD or organic	Exceeds	Complies	HH uses no outside bees. GJ uses occasional swarms from wild colonies.
7	Queen wings not to be clipped (cut)	Complies	Complies	
8	No systematic queen replacement	Complies	Complies	
9	No routine uniting of colonies	Complies	Complies	
10	All comb in brood area to be built by bees, no foundation except starter strips	Exceeds	Exceeds	No starter strips used by either HH or GJ
11	No queen excluder	Complies	Complies	
12	Foundation permitted in supers	Exceeds	Exceeds	No foundation used by either HH or GJ
13	Winter on honey if possible	Complies	Complies	
14	Sugar only fed to mature colonies to prevent starvation	Complies	Complies	
15	Swarming bees may be fed for support	Complies	Complies	

16	No stimulative feeding	Complies	Complies	
17	Varroa treatment allowed through drone culling, organic acids etc	Exceeds	Exceeds	HH & GJ's bees have remained healthy over many years without any beekeeper treatments
18	Hives to be made mainly from natural materials	Complies	Complies	

9.5 Point 17 in table 2 is of particular note. As indicated under 5.1 above, we are aware of many, possibly 2,000 - 3,000, beekeepers in the UK who do not treat for varroa. Some lose colonies to varroa but they do not lose any more colonies than their neighbours who do treat - see figure 1.

9.6 Two common threads seems to run through such colonies: they overwinter on honey and they are in areas which are known to harbour wild bee colonies. Wild colonies, by their nature, are never treated. Only those that can remain healthy in the presence of varroa survive. These hives then produce swarms. If suitable cavities are available for these swarms to occupy, gradually a population of varroa resistant bees develops. However, in the UK there is a shortage of hollow trees. Bees often take up residence under roofs and in chimneys, but this is not always popular with the human occupiers of the building. The placing of log, or similar, hives in suitable locations can help.

10 Log Hives and Freedom Hives

10.1 The visit to the UK included a visit to Matt Somerville who creates log hives and so-called Freedom Hives. These hives are mounted high in trees and are designed to mimic wild bee cavities. Matt's experience is that swarms readily move into them and grow rapidly into mature colonies. Growth is helped by the high degree of insulation such hives provide. Thus the bees are able easily to maintain the high temperatures needed inside the hive for comb building and brood rearing while using relatively small amounts of honey. The bees are untreated for varroa.

11 Wild Bees, Managed Bees and Varroa Resistance

11.1 Bee colonies living in the hives described in 10.1 can provide a much-needed source of varroa resistance and, through their drones or the production of swarms, can enable this resistance to pass to managed colonies in their neighbourhood.