

The 'Bee Improvement Group' Handbook

A brief guide to setting up and running a Bee Improvement Group

A BIBBA PUBLICATION

The Bee Improvement and Bee Breeders' Association (BIBBA) is a Registered Charity founded in 1964 (originally known as The Village Bee Breeders Association).

BIBBA's aims are, ... 'the conservation, restoration, study, selection and improvement of the native and near native honeybees of Britain and Ireland'...

This booklet is designed to help beekeepers to work together to further these aims.

For further information see the BIBBA website: www.bibba.com

or contact the Groups' Secretary via the BIBBA website

BIBBA believes that bee improvement starts at the local level. The quality of our bees can be improved, over time, through the assessment and selection of colonies from which to propagate new queens. It may not be an easy process, particularly as we are often starting from a low base, in terms of quality, but long-term, it represents the only sustainable way to develop a hardy, docile and productive bee. Problems and setbacks may occur but with co-operation and perseverance, progress can be made, year on year, and we can enjoy the satisfaction of contributing to a more sustainable future for our beekeeping.

Jo Widdicombe
President of BIBBA
January 2021

A note on biosecurity: An outbreak of a notifiable disease (AFB or EFB) could disrupt a bee improvement programme for months or even years. Every care must be taken to avoid introducing or distributing these diseases. A Group of beekeepers working together, sharing equipment and bees, faces an increased risk of disease, as stock and equipment may be obtained from various sources. There is also an increased potential for the spreading of disease through the distribution of stock to numerous beekeepers, over a wide area. Beekeepers involved in Bee Improvement Groups must be vigilant about the health of their colonies and work with, and seek advice from, the professional services of the bee inspectorate available in their area.

The Group Handbook

Introduction

Many of us are keen to improve the quality of our bees but, with limited resources, may feel it too big a task to tackle on our own. This booklet is aimed at guiding beekeepers into how they may work together to develop a locally adapted bee, best-suited to the beekeeper's needs.

There has been, and still is, a tendency to look to imported queens as an easy way to improve quality but imported bees have not been selected for their performance in our conditions and results can be disappointing. They may prove less hardy than local stock, perhaps resulting in higher winter losses. Despite this, imports have continued to rise, and the possible biosecurity risks associated with importation are generally ignored.

Any improvements in temper achieved by importing bees tend to be short-lived as succeeding generations cross with local bees making an incompatible mix of different sub-species. This ongoing importation adds to our mongrelised bee population making the selection and improvement of bees more difficult. The population of honey bees in much of the British Isles are of very variable quality and, genetically, are a mix of numerous sub-species. Because of this, beekeepers are often reluctant to use local stock for bee improvement; it is easier to believe that there is better stock elsewhere.

Despite all the imports since the mid-19th century, the genes of the original native sub-species still form a large portion of the make-up of many of our bees, particularly of colonies not derived from recent imports. The natural dominance of the native strain in much of our stock represents a valuable resource which can be refined and improved. It makes sense to work with this natural dominance rather than try to impose and maintain an exotic strain which would generally depend on repeated imports. There is great genetic variability within the native strain and this offers us the scope to produce a bee of the quality that we would like to see.

A bee developed from local resources of the native sub-species will have different qualities and better local adaptation than bees brought in from other regions as well as being easier to maintain in the area. By working with the best of our native bees rather than resorting to importation, we can start on the gradual path of improvement rather than one of constantly battling with declining standards.

The majority of beekeepers are operating on a small scale and by co-operating and working with other like-minded beekeepers through the sharing of resources, labour and skills, the possibility of developing a hardy, docile and productive bee can become a reality.

1. Composition of the Group

Working with other like-minded beekeepers enables the sharing of ideas and activities. Beekeepers who wish to form a Group should be prepared to learn the skills needed for the successful assessment and selection of stock, and for the rearing, mating and introduction of queens. Before forming a Group, talk to other beekeepers about bee improvement. It is not a matter of 'converting' others to share the same views; not all beekeepers will agree with the suggested aims or methods.

A Group should consist of beekeepers who are seriously interested in achieving bee improvement through the selection and improvement of stock, rather than through importation. A newly formed Group can be fragile and unstable, and therefore vulnerable to collapse if things go wrong before any real achievements have been made. Members of the Group should view bee improvement as a long-term commitment and resolve to keep going whatever the difficulties.

It is a good policy, particularly in the early stages, to admit new members by invitation only. These should be those beekeepers that show an enthusiasm for the project rather than those with skills or prestige but are uninterested or negative about the chances of success. Aim to achieve steady progress on a yearly basis, even if it is only an increase in experience, and be encouraged by any moves forward, however small.

If a branch, or a group, of an association wishes to work together, this can be advantageous due to the numbers involved and the possible backup of useful resources. A branch apiary, for example, can be ideal for producing queens and perhaps producing nucs for current or new members. Associations are well-placed for educating beekeepers in new skills and there may already be a pool of useful skills available.

2. Objectives

The Group must decide which characteristics are important in their selection programme, bearing in mind it is easier to achieve success if fewer qualities are chosen. These may include, for example, 'temper', 'low-swarming', 'health' and 'honey production'. Other qualities can be added later, as refinements, once the basic standards have been achieved.

The development of a strain that will breed true is essential if progress is to be made and the importance of this is sometimes not appreciated. The obvious way to achieve this is to work with the strain which is naturally dominant in the area, or would dominate in the absence of further imports. DNA analysis, carried out on random samples from colonies in England and Wales indicated that the largest proportion of genes were derived from the native subspecies *Apis mellifera mellifera*.

This proportion is likely to be even higher in Ireland and parts of Scotland and in areas with long established apiaries and few recent imports. There may be little evidence of the native bee in the local population in some areas but if the use of recently imported bees is avoided, and selection is made from colonies which survive and prosper under local conditions, a near-native strain may develop. The naturally dominant type of bee will come to the fore and in our relatively cool changeable summers the native/near-native drone appears to be favoured. This explains the difficulty of maintaining any other strain without the constant back-up of more imports.

To avoid being too ambitious, the Group may, at first, wish to focus on just one or two qualities. For example, the aim could be to develop a population which will breed true (near-native) and is of good temper. Once this has been achieved, further qualities could be added such as 'low-swarming' and 'honey production'. Members of a thriving group can, between them, manage a larger number of colonies, giving greater choice of breeding material within the strain.

3. Assessment of colonies and record-keeping

Initially there will be a wide genetic variation within the Group's colonies, from which breeding material can be selected, particularly if starting with unrefined local stock. The culling of poor colonies is an important part of stock improvement and these colonies can be regarded as an important resource which can be used to make up nucs to provide homes for newly reared queens.

A system of record-keeping is essential and will allow the selection of breeding stock for their behaviour and performance. The usual method is to attribute a mark on a 1-5 scale (5 being best) for each of the selected qualities. It is essential to keep a record of the behaviour and performance of all the colonies that the Group has access to. This will allow an informed choice of which queen(s) to breed from and which to cull.

4. Initial choice of breeder queen

When all available colonies have been assessed it may be that none is considered suitable as foundation stock for the breeding programme. For example, all colonies may be uniformly bad-tempered, or it may be that they are thought to be so mongrelised that they would be a poor base from which to start. When searching for suitable bees, it is worth bearing in mind that bees which have survived in an area for many years, particularly without the aid of an over-protective beekeeper, are more likely to be suited to the local conditions than bees obtained from another part of the country with different climatic and foraging conditions. It may, therefore, be sensible to re-assess the available bees; it is easy to be too critical of one's own bees.

Also, enquiries could be made of the quality of stocks of other local beekeepers. Colonies of relatively pure Dark Bees (*Apis mellifera mellifera*) have even been found in areas that have a large number of hybridised bees, so it is wise not to completely rule out local bees. The general guide should be to 'make the most of what we have got' but as a last resort, if nothing remotely suitable is available, efforts should be made to obtain breeding material in the form of eggs or queens from

another beekeeper or BIBBA Group that has suitable bees available. Ideally this breeding material should be from an area that has similar conditions of climate and forage. Bear in mind that it may be harder to establish a new strain in an area than to refine or develop a strain from bees already surviving in that area. Also, by reaching out to other areas, we may be throwing away valuable resources of local strains.

5. Establishing a strain – the importance of drones

Assessment of colonies by their appearance and characteristics can give a guide to the degree of purity of the native strain and therefore to the likelihood of a queen breeding true. A more accurate assessment of the purity of the strain of colonies may be achieved by morphometry or, if available, by DNA analysis of a sample of workers or larvae from a colony. The challenge is to establish a breeding population in an area which will breed true. A good population of desirable drones is as important as the rearing of queens.

Once a breeder queen has been identified (that is, a queen to rear further queens from), either from local stock or perhaps brought in from another improvement group, daughter queens can be reared. These daughter queens provide the key to the development of a strain as they will produce drones of the selected strain, regardless of what drones they mate with, and will increase the chances of good matings in the following season. This is an important part of establishing a strain in an area and the process can be repeated year on year with a breeder queen of the same subspecies in order to ensure a good supply of drone mothers.

Newly reared queens can be used to replace unsatisfactory queens, that is those with poor qualities such as bad temper, or those producing colonies of a different strain. In this way a steady increase in the quality of queens within the Group can be achieved.

6. Queen rearing methods

The method, or methods, of queen rearing need to be agreed by the Group. It is alright to try different techniques to see which give the best results, but it is important not to get overwhelmed and confused by the huge number of methods available. The Group may, for example, decide to transfer larvae by grafting or by the use of a Cupkit or a Jenter Kit. Members should aim to understand the theoretical aspects, and the required time schedules, before they are put into practice. Simple methods of producing queen cells are available such as merely removing the queen in a split from the main colony.

The pros and cons of using nucs, mini-nucs or 6-frame mini-plus nucs for the mating of new queens should be considered so that equipment and resource needs can be calculated. Each type of nuc has its advantages and disadvantages.

7. Queen rearing plan and timetable

The Group should decide on its aims for the season in terms of how many mated queens it plans to produce. Losses will be experienced at each stage of the queen rearing process; some larvae will not be accepted, some will not emerge, some will fail to mate, and so on. A general guide is to aim to produce at least twice as many queen cells as the final tally of queens being aimed for. Waste is an acceptable part of bee improvement as we are interested in the survival of the fittest.

Once queen rearing begins the timetable needs to be rigidly adhered to, but it is good to build some 'slack' into the system in case targets are not being reached. The schedule for the season should, therefore, allow the opportunity for the rearing of extra batches of queens in case of failures or low numbers of queens produced per batch.

Once a plan has been decided on, the amount of equipment and the number of colonies that are needed for queen rearing and for the provision of material for nucs or mini-nucs can be calculated. The plan should ensure that there are enough colonies for queen rearing and for drone production.

Equipment such as nucs and mini-nucs must be available and bees will be needed to stock these mating nucs. Also, the site for a mating apiary needs to be identified to accommodate all the nucs and mini-nucs produced. This could just be a temporary site for the summer months.

8. Distribution of laying queens

- As soon as the new queens are laying and producing sealed worker brood they are available for distribution.
- If using mini-nucs, early distribution of queens to full size nucs is recommended, to reduce risk of losses.
- Mini-nucs have advantages of requiring fewer resources but they do require a lot of attention to detail to keep losses to a minimum.
- Mini-nucs need checking frequently to ensure adequate bees and stores, or subsequently over-population and lack of space. Queen introduction into nucs is less risky than into full-size colonies, particularly if introducing to a colony of a different sub-species. Always use a tried and tested method.

9. Group status and finance

Some Groups are able to operate informally and use equipment loaned from members rather than have to make expensive purchases. A record should be kept of equipment provided and labelling will allow easy re-distribution as and when it becomes necessary.

A Group may decide to raise funds in order to purchase hives, nuc boxes, etc. and if this is the case a more formal structure will be required. The Group may need a bank account and a simple constitution outlining, amongst other things, what will happen to the assets in the event of the Group folding. A more formal structure can add complications, but the availability of funding may provide opportunities for the Group to operate in a bigger and more efficient way. The purchase of much-needed equipment allows a group to progress more rapidly. A record of assets of the Group must be kept and equipment should be clearly labelled with the name of the Group. The Group should ultimately aim to be financially self-sufficient as this provides stability and allows for continuing progress. The Group does not need to be a profit-making organization, but the costs of the Group should be covered by receipts from the sales of queens and nucs.

10. Liaison with BIBBA

BIBBA is keen to encourage the formation of Bee Improvement Groups as it is believed that this is the key to progress in improving the quality of our bees. Bee Improvement Groups run according to BIBBA principles can demonstrate that bee stocks can be improved in terms of hardiness, temper and performance. These Groups are BIBBA's representation 'on the ground' and a large network will allow co-operation between Groups to the benefit of all.

Register your Group In order to maintain an up-to-date list of Bee Improvement Groups BIBBA would like Groups to register on the BIBBA website.

The submission of reports of Group activities are always welcome for possible publication in the BIBBA Monthly.

Email your submissions for publication to: editor@bibba.com www.bibba.com

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