

A National Bee Improvement Programme

Jo Widdicombe outlines a proposal from the Bee Improvement and Bee Breeders' Association (BIBBA)

The Bee Improvement and Bee Breeders' Association (BIBBA) has recently put forward proposals for a national bee improvement programme. The aims of the programme are twofold: to improve the quality of our honey bee population and to reduce the levels of imports, as they pose a possible biosecurity risk. Also, imports of foreign subspecies of honey bee are detrimental to the development of local adaptation in our honey bees and to the long-term sustainable improvement in their quality.

An outline of the proposal was sent to the Department for Environment, Food and Rural Affairs (Defra), the National Bee Unit (NBU) and to the main beekeeping organisations in Great Britain. The authorities, the Bee Farmers' Association (BFA) and the British Beekeepers' Association (BBKA) have each declined to support the proposal. Nevertheless, BIBBA is going ahead with the detailed planning of the programme which, it believes, will offer a positive alternative to the importation of stock and lead to a reduction in the random hybridisation of our bees.

Imports

Importation over 150 years has, through hybridisation of the subspecies, resulted in the poor quality of our bee population. It is seen by many as the only way of getting better quality bees, but the long-term view is never considered. A temporary improvement in quality may be experienced, but this will be followed by a deterioration in quality and a further need for imports.

Of course, many imports occur for reasons other than improving quality; they offer a cheap source of bees for pollination contracts, or to make up nuclei (nucs) for ongoing sales. They are a good source of revenue, but the effect on our bee population is not considered to be an important issue.

Rising Levels of Imports

Should the BFA and its members be concerned by the rising levels of imports? Imports of bees into the United Kingdom (UK) have been rising, year on year, for at least a decade. While some of this apparent rise may be accounted for by under-recording in previous years, the underlying trend is quite steeply upwards. About 22,000 queens were recorded as imports, in one form or another, in the 2019 season.

Many bee farmers benefit financially from these imports, both from the sale of bees and from the honey production produced by this stock. While other organisations professes to discourage the import of queen bees and colonies from outside of the UK, the BFA has no such qualms, presumably because so many of its members rely on them for their businesses.

Bee Health

In the Healthy Bees Plan of 2009, the importation of honey bees was identified as a possible biosecurity risk. As a result, Defra feels a responsibility to at least appear to be addressing the issue and, from 2017 onwards, held a series of meetings with representatives from various beekeeping organisations and groups, including the BFA.

Scarcely a year goes by without some biosecurity threat to our livestock or plant health being reported. In the UK, we tend to have a relaxed attitude to these threats compared to, for example, Australia and New Zealand, where rigorously applied rules are in place to protect agricultural industries, including beekeeping.

Beekeeping in the UK is certainly not immune to health problems associated with imports. During the twentieth century, honey bees were hit by two major health issues, both probably stemming from the importation of stock: Isle of Wight Disease, in the early part of the century, and the varroa mite, discovered in this country in 1992 and still having repercussions today. We face the continuing threat of introduction of small hive beetle (SHB).

It is not unreasonable to expect organisations like the BFA and others, which have their members' interests and the welfare of honey bees at heart, to investigate ways in which the level of imports and their associated risks, could be reduced. We know that many bee farmers rely on imports in their business models, but that does not mean that the risks can be ignored.

Alternative Approach

Supporting an alternative approach which would reduce imports and, also, improve the quality of our bee population, would not be counter to the interests of bee farmers. Those that favour imports could still pursue that path, but others would be encouraged to develop a system that would benefit bee farmers in the long term, with better bees and lower risks. It

would not be inappropriate to recognise the merits of both systems and not, as at present, merely to support the current situation.

Selection and Breeding

Selection is only possible within the framework of a well-defined population. In the breeding of any animal, there is a need to get consistency into the programme; one needs offspring to resemble parents. Bee breeders generally recommend working within a single strain or subspecies. Giles Fert (*Raising Honeybee Queens*, 2020) explains: 'Selection is only possible within the framework of a well-defined population, for example, within a given race or, even better, a fairly large local population that has been disrupted as little as possible by the introduction of foreign bees'. This is the reason we have the development of pedigree strains in livestock.

In plant and animal breeding, these pure strains are often used in crosses, to reap the benefits of hybrid vigour. Brother Adam liked the 'hybrid vigour' produced by crossing different subspecies of honey bee in a technique still used today. He freely pointed out that the way to maintain the Buckfast quality is to regularly bring in new Buckfast queens.

In the case of most plants and animals, these crosses, or hybrids, can be repeated at will and the same hybrid produced. Unfortunately, in the case of

the honey bee, due to the queen mating with multiple drones, hybridisation quickly results in a population of random hybrids that are extremely variable and difficult to select and improve.

Beowulf Cooper, the founder of BIBBA, recognised that this was happening to our bee population and noted the decline in quality that was occurring because of the use of imported bees. Ironically, Brother Adam also lamented the loss of the availability of the pure strains that he needed to produce his bee.

How the Programme Would Work

The National Bee Improvement Programme would be organised (or coordinated) nationally but would operate locally, generally with local stock. Participants would range from individuals with one or more colonies, to groups of beekeepers working together to achieve more influence, to bee farmers managing numerous colonies. Each member of the scheme would agree not to use imported bees or offspring of recently imported bees. The aim would be to develop a bee which was locally adapted and therefore would perform well under the prevailing conditions. Members would keep records of performance of each of their colonies, using a standardised record card, recording such characteristics, for example, as docility, health, swarming propensity and honey production.

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A combination of the previous season's records and observations at the start of the new season, such as how the colony has overwintered, health issues and so on, will allow the selection of 'breeder queens' in the area, which will produce the next generation of queens. Queens reared from the breeders will produce 'good' drones directly related to the chosen breeder queens and these will lay the foundation for development of the local strain.

By the selection of a mating area which can be flooded with 'good' drones, the next generation of queens can be mated with these 'good' drones and the process can be repeated year-on-year. We know, from beekeepers' experience in Britain and Ireland, and across Europe, that it is a system that works. A strain can be developed that breeds true and progress can be made in improving the quality of our bees.

Conclusion

A national bee improvement programme would have many benefits for beekeeping in this country. We could move from the current situation of having to look abroad for imports to achieve any sort of quality, albeit only temporary relief, and reduce the risks we are taking with the health of our bees. Beekeeping is crucial to world food production; we should be aiming for a modern sustainable industry that will allow us to develop a bee suited to local conditions and adaptable to future changes.

A national bee improvement programme would enable us to improve our bee population in line with natural selection and with the qualities that beekeepers need. The principles of bee improvement allow for a continually evolving bee as we can constantly select the ones that do best in our circumstances. Bees showing resistance to a particular pest or disease, for example, would perform better, and could be selected to breed from. Under the current system, we are unable to select or maintain any favourable traits.

In business, short-term profitability is essential for survival, but for the good of one's business, we should also have an eye long-term sustainability. If our system is relying on luck to save us from impending disaster, then there is something wrong with the system and it is time to re-think things.

I think the BFA owes it to its members to not just think of the short term but to look a little further ahead and plan for a long-term sustainable future. □