Better-B practical recommendations

Two-track management approach: a sustainable alternative for the current intensive beekeeping practices

The Better-B Consortium November 2026 Recommendation n°1

The Better-B project is a four-year Horizon Europe project funded by the European Commission that began in June 2023. The project aims to improve honey bee resilience by restoring balance within the colony and between the colony and its environment. The consortium comprises 16 partners and two associated partners coming from 14 countries. This document is part of a series translating our results into clear recommendations for a diverse target audience. Depending on whether a recommendation is practice-oriented or policy-supporting, it is classified as a "Practical Recommendation" or a "Policy Brief," respectively.

Summary

Beekeeping is facing severe colony losses during the winter. Current beekeeping practices are now unbalanced in the face of the growing number of stress factors to which bee colonies are nowadays exposed. Therefore, there is an urgent need to reconsider current beekeeping management approaches. To give the transition to a new management model a chance of success, two objectives must be pursued: the creation of more resilient honey bees and safeguarding high honey yields. The Better-B consortium has developed a concept that meets these two requirements. Its central thought is the separation of production and reproduction in its conceptual model. The requirements the reproduction unit must meet, in particular, are clearly described. For the production unit, on the other hand, the beekeeper has much more freedom of action. The concept emerged from a critical analysis of the challenges involved and the relevant scientific literature; validation is currently underway.

The problem

The introduction of modular beehives around WWII brought about a major shift in beekeeping management. The so-called "intensive beekeeping" that emerged hereof was characterized by a large-scale approach that focused on high yields, often involving migratory beekeeping practices where beekeepers travelled with their hives across the country, following the flowering periods of various agricultural crops and wild mass-flowering plants. However, in the past 50 years the great success of this intensive beekeeping was systematically disrupted by the emergence of new stressors affecting the honeybee, such as pesticides, parasites and pathogens, invasive species, landscape degradation and climate changes. The high annual colony losses—particularly during winter—that result directly from the accumulation of stressors call intensive beekeeping into question. The Better-B consortium has developed a concept that could serve as a viable alternative to intensive beekeeping, aiming for both high production and resilient bees.

The evidence

A critical analysis of the colony losses reveals an imbalance between colony density and the landscape's carrying capacity for pollinators. And because the beekeeper takes full control of reproduction and dictates selection criteria, the bees are deprived of certain natural processes that contribute to their fitness and resilience. This results in a loss of genetic diversity and poor local adaptation, as well as a vulnerable honey bee population. It has been demonstrated that restoring resilience of bee colonies is technically possible, though it may cause significant losses at the beginning of the process and often requires adjustments that come at the expense of production levels. This significantly hinders the smooth transition to sustainable beekeeping. Consequently, there is a need to find management approaches that ensure both resilience and high production levels. The Better-B consortium has addressed this challenge and proposed a new concept. The validation of this concept is currently underway, with testing taking place within the framework of the 'Darwinian Black Box' selection experiment, which is being rolled out simultaneously across several European countries. The initial results are very promising.

Practical recommendations

1. General considerations

The concept dictates that the beekeeper must separate bee colonies intended for production from those intended for reproduction. Ideally, we opt for a physical separation of these units; however, if that is not feasible (for instance, because the hobbyist beekeeper has only one apiary), we recommend at least employing different beekeeping practices. Hence the term "2-track management system." The reproduction unit generates the genetic stock, utilizing practices that mirror natural processes. The production unit utilizes the genetics from the reproduction unit while being granted sufficient operational freedom to ensure for a successful honey harvest.

2. Conditions imposed on the breeding unit

This freedom of action is not granted to the breeding unit. Indeed, here four conditions are imposed. First, the beekeeper must carry out annual splits that mimic the swarming process. Second, genetic diversity and local adaptation must be maintained. It is therefore advisable to involve more beekeepers in the selection process. Forming regional clusters can help in this regard. Moreover, it offers the advantage of providing sufficient buffer capacity should some participants face heavy losses. Further, it allows for better comparison of colonies, as all those involved keep bees in the same environment. Third, selection must be highly focused and well-balanced. We recommend prioritizing varroa resistance right from the start. Poorly performing colonies should be promptly removed (or treated and removed from the breeding population). If necessary, measures are taken to gradually build up Varroa pressure across successive rounds of selection. Finally, the beekeeper managing the breeding unit must avoid subjecting the honey bees to any form of avoidable stress. You can interpret this in a broad sense, ranging from low bee colony density and protective measures against the Asian hornet to the prevention of colony overheating. Ultimately, this approach aims to produce survivor colonies capable of making it through the winter without the beekeeper's intervention. Further breeding can then be carried out in the following spring/summer using these bees.

Path to implementation - Examples - Impact

This concept can easily be translated into an adjustment of the beekeepers' selection efforts. The best approach is to engage local beekeepers' associations and develop together a selection programme in line with the concept presented here. At present, the focus of selection efforts must be on creating varroa-resistant bee colonies.

Ghent University has launched such a selection programme in 2026. The promotion campaign resulted in a doubling of the number of selection workers in Flanders (Northern Belgium).

Further reading

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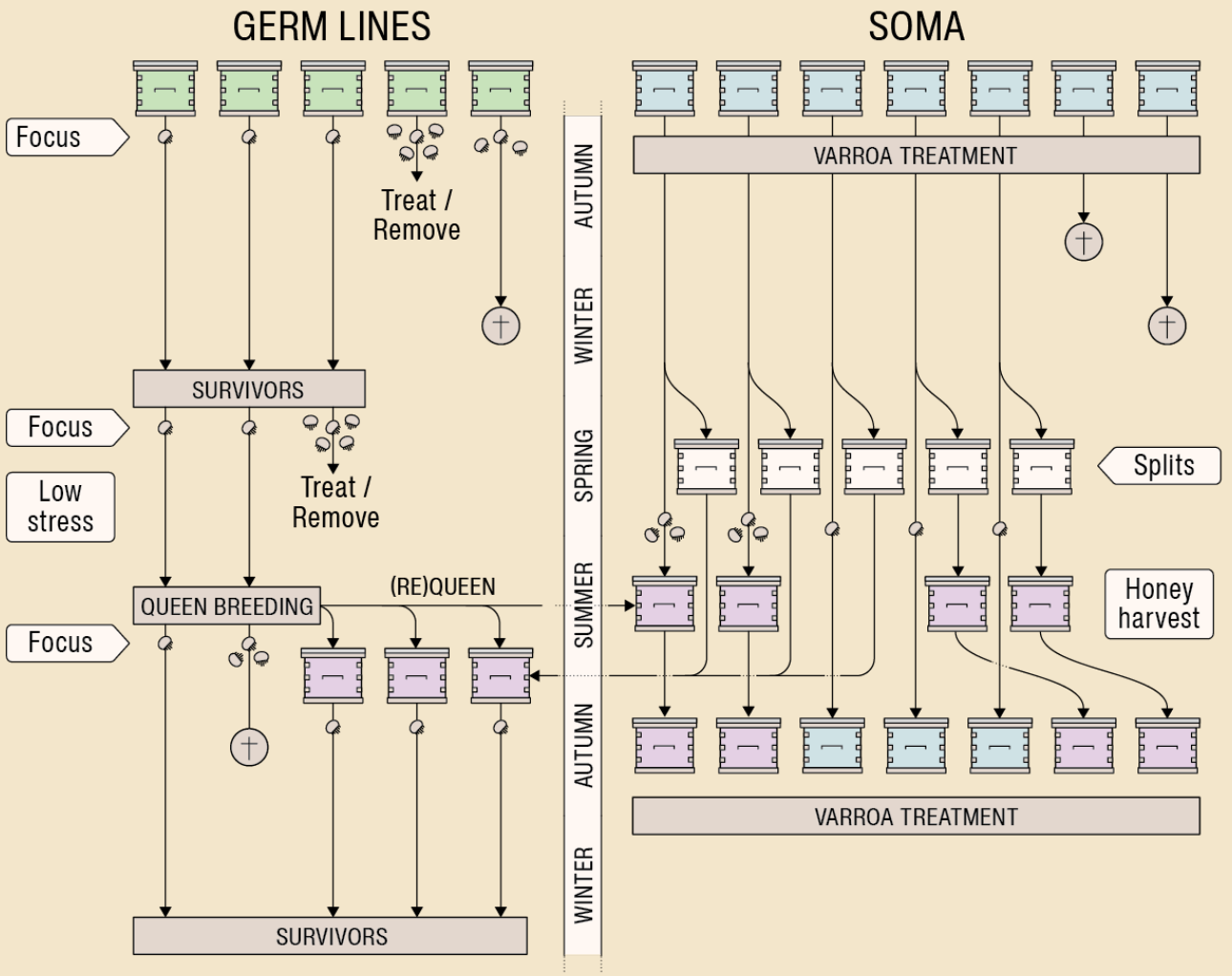


Figure 1: The concept of a two-track management approach dictates that germ lines and soma are separated. The former should mirror what happens in nature, which is why strict conditions are imposed: i) annual splits, ii) greater involvement of practising beekeepers (to ensure genetic diversity and local adaptation), iii) focused selection (here for varroa resistance) and iv) low stress beekeeping practices. The soma aims to guarantee high production levels, which is incompatible with these conditions which therefore do not apply. Eventually survivors from the germ lines deliver the genetics for the next reproduction cycle or to reinforce the soma by requeening.

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