Varroaresistenz 2033 I Varroa 2033

Varroa resistance 2033

The project:

Varroa-resistant bees in Europe by 2033.

www.varroaresistenzprojekt.eu

A brief project history

19.05.2022 – First meeting: „Neuensteiner Erklärung“



Project Goal:

- A joint path for the next 10 years
- Establishment of a widespread varroa-resistant honey bee population
- Discontinuation of medication use until the goal is achieved
- The participating beekeepers’ associations call on bee research institutes, authorities, ministries, and all beekeepers to pursue this goal together in the coming years

In 2022, those involved were:

- DIB e.V.
- GdeB e.V.
- AGT e.V.
- DBIB e.V
- Luxemburger Landesverband für Bienenzucht (FUAL)
- Bundesverband Dunkle Biene Deutschland e.V.

… and today:





Varroaresistenz 2033 I Varroa 2033 sees itself as a movement.

Anyone can join.

… Cross border!



Varroaresistenz 2033 I Varroa 2033

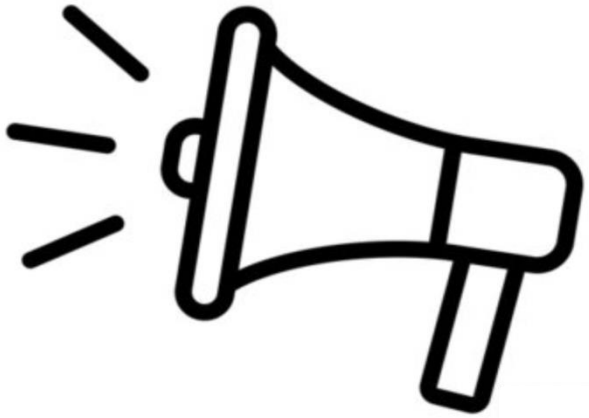
has shown since 2022 what is

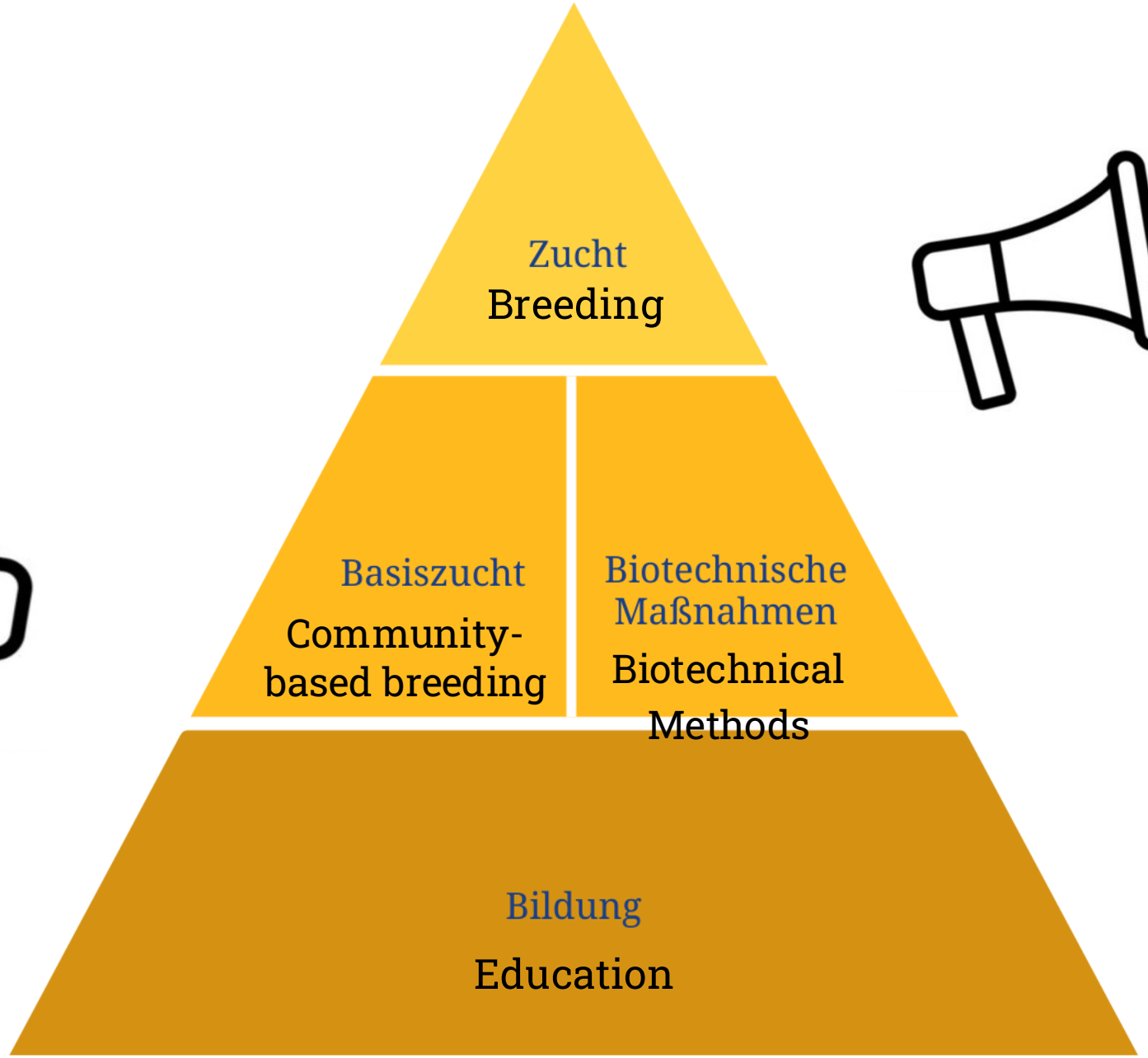
possible when pursuing a goal

TOGETHER.

Insights

Main topics




Zucht
Breeding
Basiszucht
Community-based breeding
Biotechnische Maßnahmen
Biotechnical Methods
Bildung
Education

Our task forces



Task force resistance breeding: Pia Holstein, Sascha Müller, Andreas Obst

Task force community-based breeding: Jörg Hinnerks

Task force biotechnical methods: Dr. Ralph Büchler, Thomas van Pelt

Task force education: Thomas Heynemann Küenzi

Puplic relations: Marie Förster

Contacts at www.varroaresistenzprojekt.eu/ueber-uns.html

Let’s get specific:

What can we actually do?

Biotechnical Methods

That’s a vast subject.

But the fact remains: we need to rethink our approach if we want to move away from medical treatment.

Biotechnical approaches & Varroa resistance?!

- We need to recognize differences in infestation levels, and many biotechnical measures support this.
- The colonies must be able to develop and express genetically based resistance traits.
- By eliminating winter treatment, differences in infestation levels become more evident.
- By eliminating winter treatment: drone infertility.

Biotechnical measures – the path to medication-free beekeeping

- **Total Brood Removal**
  Removal of all brood combs, including the mites present in them, from the colony.

- **“Summer House” (Brood Trap Method)**
  The queen moves with one or several combs without brood into the “summer house”; brood outside the cage emerges. The mites can only enter the brood combs inside the cage. Once these brood combs are capped, they can be removed.

- **Brood Interruption by Queen Caging**
  By caging the queen, an artificial brood interruption is created.

- **Combinations & Additional Solutions**

Selection through the elimination of winter treatment!

FAQ: „How do we spread the resistant bee more widely?”

We’ve known the answer for 40 years:

Through community-based breeding („Basiszucht“)

Community-based breeding

Every beekeeper can participate

- The number of colonies doesn’t matter
- Propagation only from the best → spreading the (naturally occurring and selectively bred) good traits
- Exclusion of the worst → eliminating the poor traits
- No blanket treatments!
- Biotechnical methods as support

The more beekeepers join in, the faster the progress!

Resistance breeding

- Breeding groups (join existing ones, or start new ones …)
- Distribute material (mating stations, mating zones, sharing breeding stock …)
- Provide support (you don’t have to be a breeder to contribute!)

There are many paths to the goal!

Varroa resistance – Where do we stand today?



What we need

A Varroa-resistant bee that…

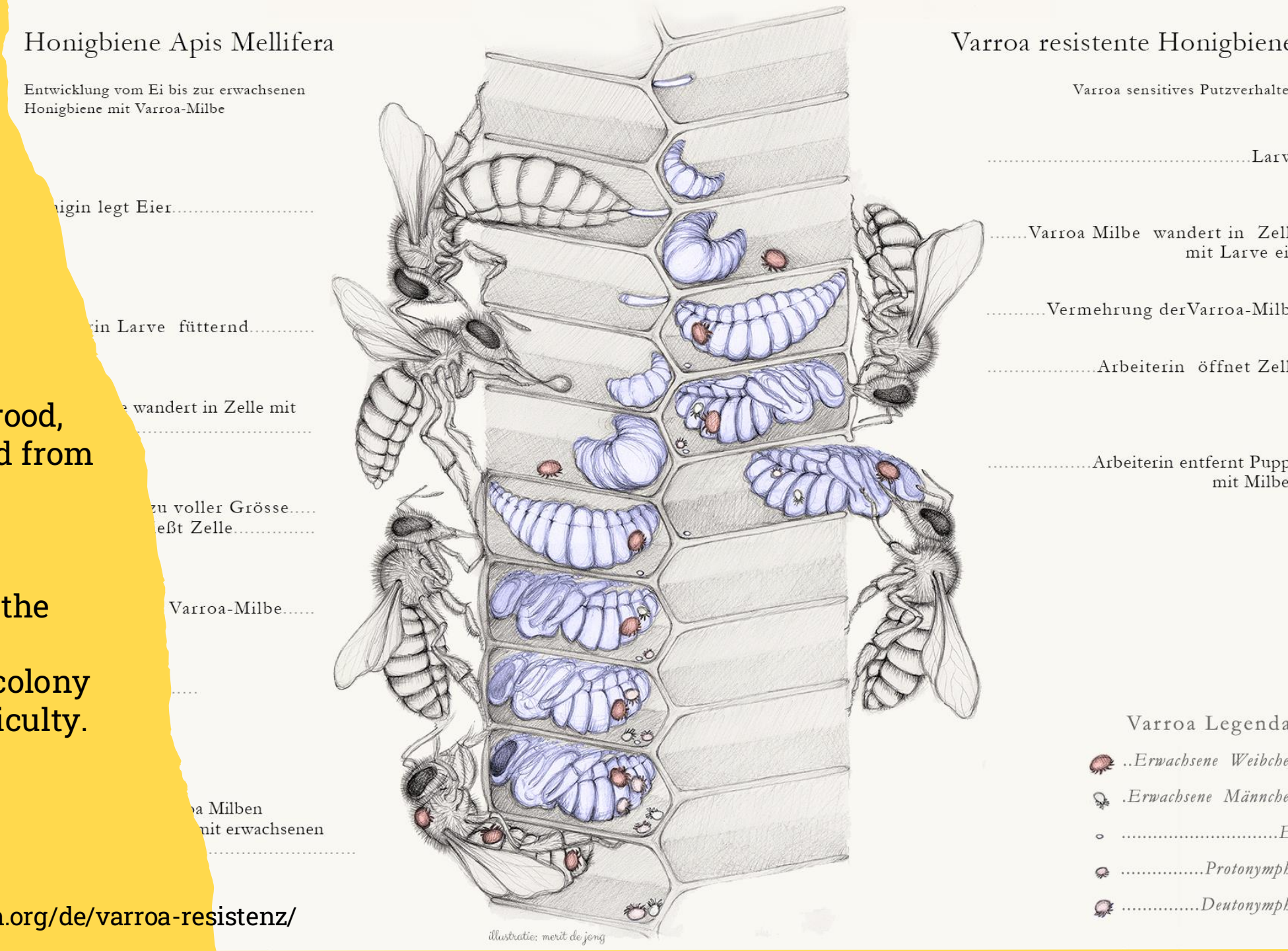
- is economically viable
- is healthy
- is „gentle“
- is not dependent on isolation
- is genetically diverse – no reduction of genetics by relying solely on one line

Our solution…?

VSH

Varroa sensitive hygiene

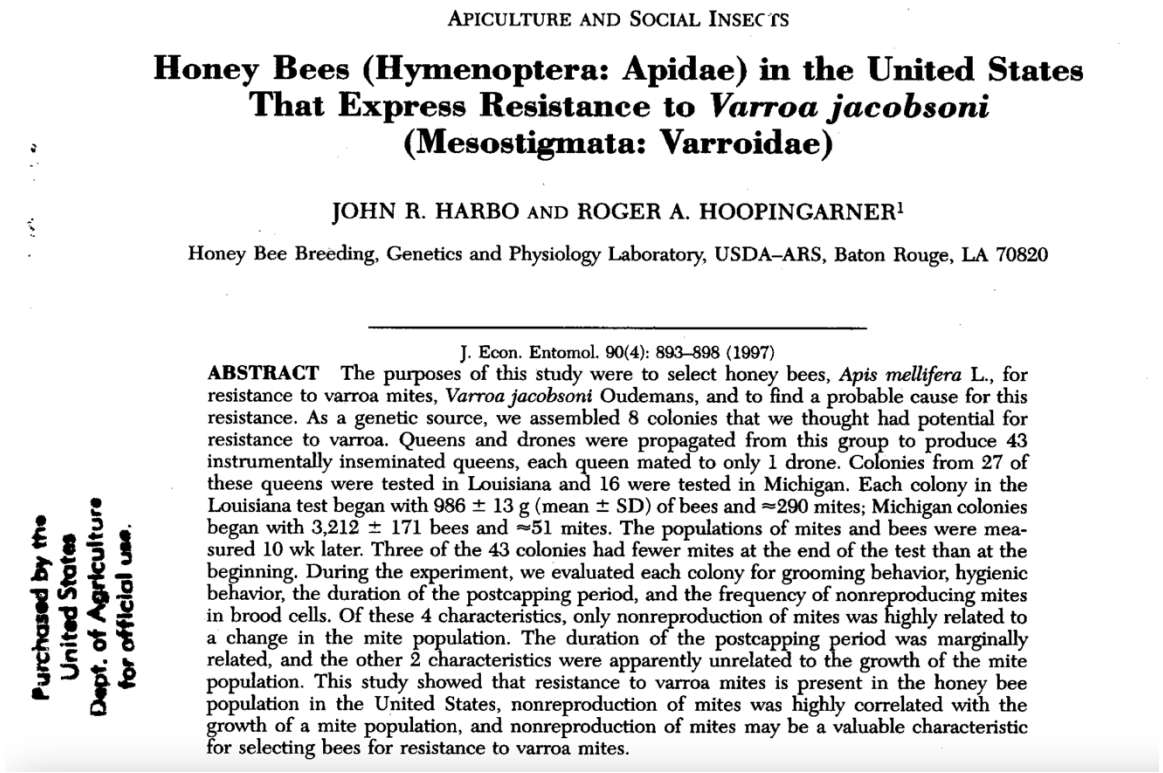
- Bees detect infested brood, which is then removed from the cells.
- The hygienic removal behavior ensures that the mites either cannot reproduce within the colony or only with great difficulty.



Quelle: https://aristabeeresearch.org/de/varroa-resistenz/

VSH - History

- Already in 1995 (!) the VSH trait was discovered by John Harbo
- Followed by 10 years of research to understand how VSH works
- Current research supports the theory that VSH alleles may be present in all bee populations worldwide
- VSH alleles can be bred into any honey bee population to create VSH-based resistance



APICULTURE AND SOCIAL INSECTS

Honey Bees (Hymenoptera: Apidae) in the United States That Express Resistance to *Varroa jacobsoni* (Mesostigmata: Varroidae)

JOHN R. HARBO AND ROGER A. HOOPINGARNER[1]

Honey Bee Breeding, Genetics and Physiology Laboratory, USDA–ARS, Baton Rouge, LA 70820

J. Econ. Entomol. 90(4): 893–898 (1997)

ABSTRACT The purposes of this study were to select honey bees, *Apis mellifera* L., for resistance to varroa mites, *Varroa jacobsoni* Oudemans, and to find a probable cause for this resistance. As a genetic source, we assembled 8 colonies that we thought had potential for resistance to varroa. Queens and drones were propagated from this group to produce 43 instrumentally inseminated queens, each queen mated to only 1 drone. Colonies from 27 of these queens were tested in Louisiana and 16 were tested in Michigan. Each colony in the Louisiana test began with 986 ± 13 g (mean ± SD) of bees and ≈290 mites; Michigan colonies began with 3,212 ± 171 bees and ≈51 mites. The populations of mites and bees were measured 10 wk later. Three of the 43 colonies had fewer mites at the end of the test than at the beginning. During the experiment, we evaluated each colony for grooming behavior, hygienic behavior, the duration of the postcapping period, and the frequency of nonreproducing mites in brood cells. Of these 4 characteristics, only nonreproduction of mites was highly related to a change in the mite population. The duration of the postcapping period was marginally related, and the other 2 characteristics were apparently unrelated to the growth of the mite population. This study showed that resistance to varroa mites is present in the honey bee population in the United States, nonreproduction of mites was highly correlated with the growth of a mite population, and nonreproduction of mites may be a valuable characteristic for selecting bees for resistance to varroa mites.

Purchased by the United States Dept. of Agriculture for official use.

Quellen:

- https://www.ars.usda.gov/ARSUserFiles/64133000/PDFFiles/301-400/341-Harbo--Honey%20Bees%20(Hymenoptera;%20Apidae).pdf
- https://www.harbobeeco.com/vsh/

Fact: To reliably determine Varroa resistance is time-consuming

And: First the testing, then the practice! Numbers don’t mind waiting.



Arista Bee Research

Stiftung für die Zucht von Varroa resistenten Honigbienen

Facts: Do we have the Varroa-resistant bee?

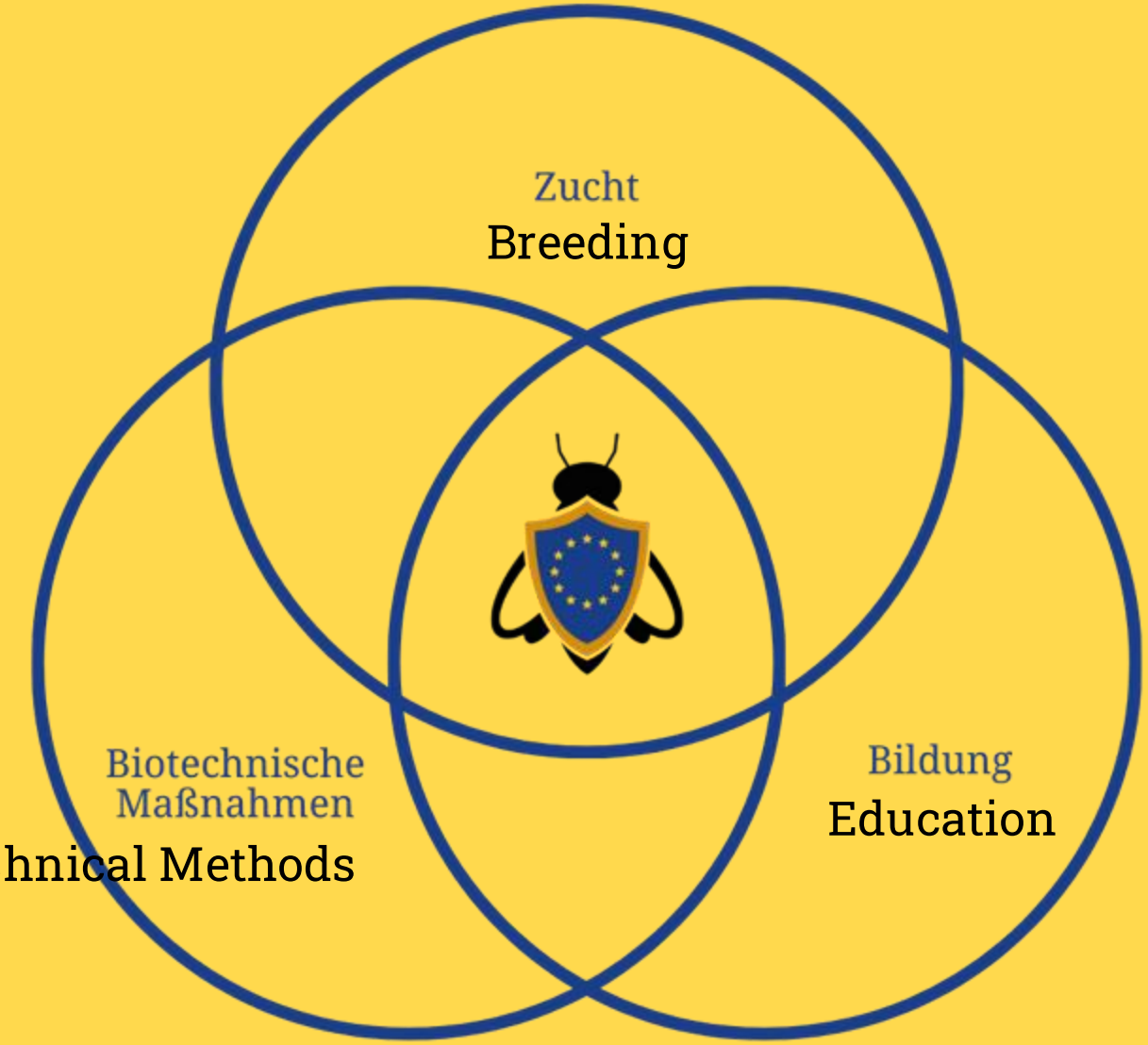
Yes! Scientific confirmation, among others, through results from:

- SETBie (University of Hohenheim / GdeB / AGT)
- Arista Bee Research, Netherlands
- John Harbo, USDA Honey Bee Laboratory, Baton Rouge, USA

Yes! Confirmed in practice by various breeders and breeding groups (USA, Luxembourg, Netherlands, Germany - AGT, Carnica & Buckfast), who have not had to treat resistant colonies for years.

The challenge now is to spread this genetics more widely.

Together!



Every little contribution matters!

Questions? Suggestions?

Contact

Your name



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