



- **Better-B: Improving Bees' rEsilience  
To sTressors by rEstoring haRmony  
and Balance**

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**Better-B**  
FOR RESILIENT BEEKEEPING



# Lessons learned from honey bees in Africa

- Honey bees live in harmony with nature
  - Environment: more bee-friendly (much less stressors: pesticides, food shortage)
  - Natural selection: adapted bees to their stressors and environment
  - Broodless periods: created by swarming and absconding
  - Colony density: in balance with carrying capacity of the environment
- Beekeeping has not disturbed this harmony
  - Mainly based on swarm catching
  - Selective breeding hardly introduced (natural selection and free mating are the rule)
  - Traditional hives: promote free building (wax renewal, smaller cell sizes: all in favour of colony health)
  - Colony density: determined by swarm catching (no artificial queen rearing)
  - Beekeepers' interventions: rather limited



# Intensive beekeeping has disturbed this harmony

- Honey bees do not live in harmony with nature
  - Environment: is not bee-friendly (much more stressors: pesticides, food shortage)
- Beekeeping has disturbed this harmony
  - Selective breeding has taken over:
    - focus on productivity and easy handling
    - but: resulting in vulnerable bees and poor genetic diversity
  - No absconding and swarming is prevented
  - Colony density determined by the beekeeper (mostly too high)
  - Location (apiary) and housing provided by the beekeeper (in-hive micro-climate?)
  - Wax foundations are the rule (no free building > larger cell sizes + historical contamination)
  - Beekeepers' interventions: frequent > disturbance of the colony



# Should beekeeping be reinvented? Yes, we believe!

- ‘Natural’ beekeeping is not an alternative
  - Restoring harmony but no productivity
- ‘Harmonious’ beekeeping = apiculture 2.0
  - Full use of modern technology (modelling, genetic markers, hive monitoring systems,...)
  - Making the switch from vulnerable bees back to resilient bees
  - Limiting the beekeepers’ intervention: only when necessary
  - Stress-poor beekeeping practices in all its facets



# Our contribution to 'harmonious' beekeeping

- WP1: tool for landscape-level management of colony density  
Bee Plant Catalogue (Jozef van der Steen, Alveus, NL)
- WP2: can mutations in pesticide-receptors result in innate resilience?  
can ecosystem complexity enhance resilience to chemicals?
- WP3: genomic signatures/markers for resilience to climate change & heat stress  
hive construction based on in-hive thermoregulation characteristics  
(Anna Dupleix-Marchal, Anne Lavalette, Emmanuel Ruffio, CoActions, FR)
- WP4: understanding Darwinian selection (genetics + hive monitoring systems)  
(Severine Kotrschal, WUR, NL)
- WP5: immunity: hemocyte typology based on hemocyte surfactome
- WP6: future of beekeeping under global change pressure (invasive species risk  
assessment, contingency plans, integrated pest management-tool, on-field trials, guide/illustrated  
booklet)
- WP7: multi-actor co-development







[www.better-b.eu](http://www.better-b.eu)



*Better-B-project*

This work was supported by the Better-B project, which has received funding from the European Union, the Swiss State Secretariat for Education, Research and Innovation (SERI) and UK Research and Innovation (UKRI) under the UK government's Horizon Europe funding guarantee.

Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union, European Research Executive Agency (REA), SERI or UKRI. Neither the European Union nor the granting authorities can be held responsible for them.



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