Landesbetrieb Landwirtschaft
Hessen

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Sustainable Varroa management based on biological and technical methods

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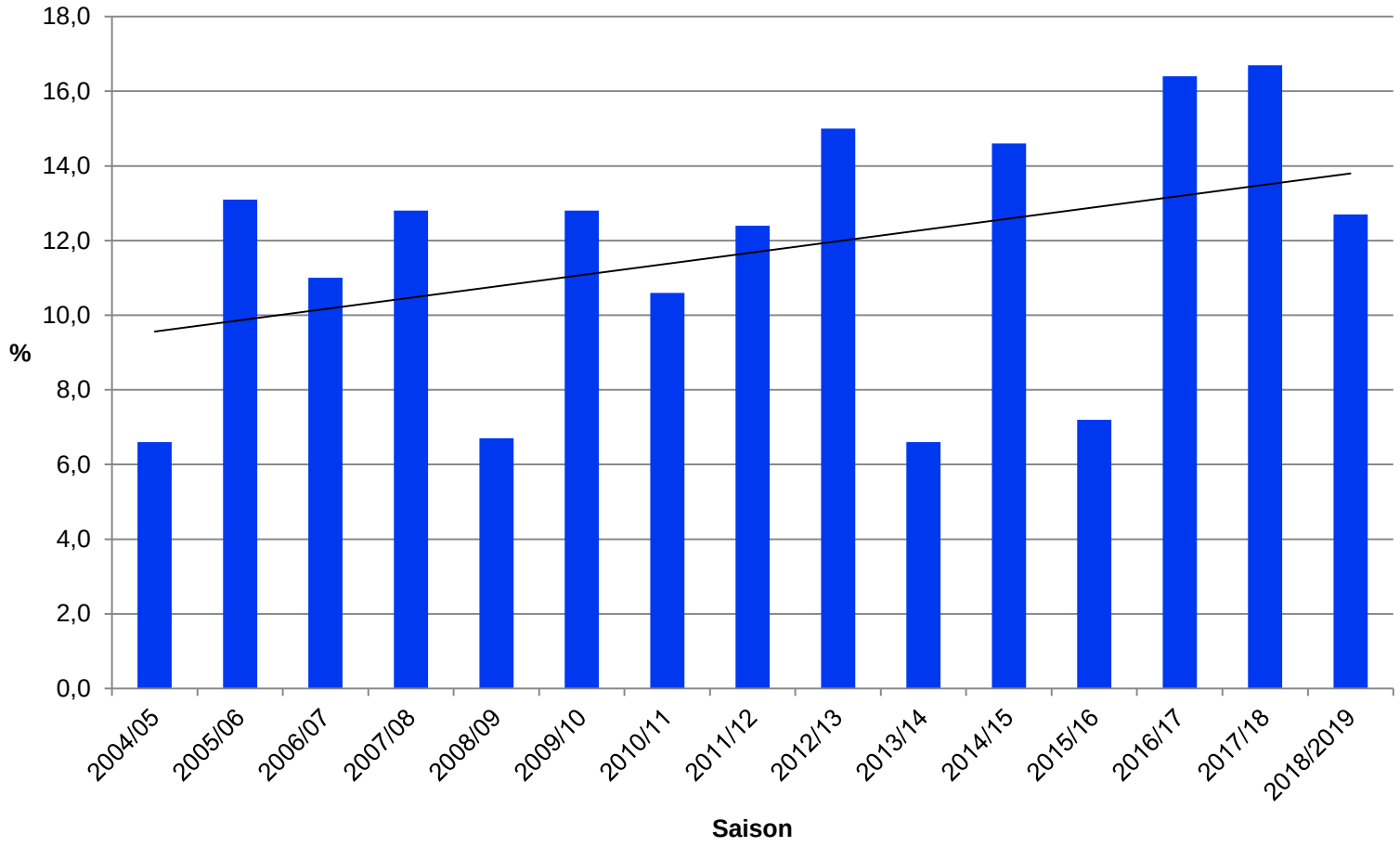
Lukovica, 18. Sept. 2021

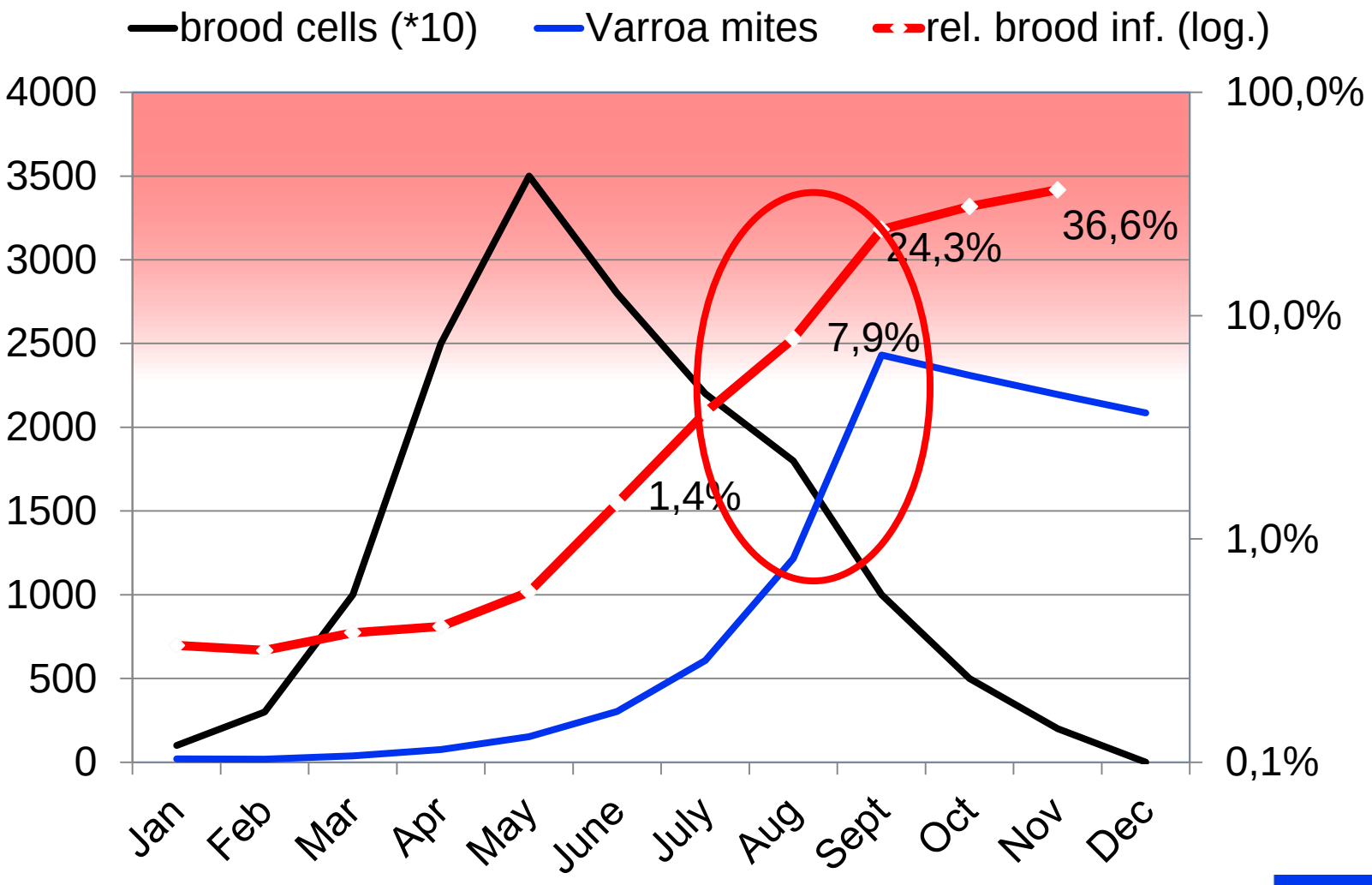
High and increasing colony losses during winter

(German bee-monitoring project (n= 5.500 bis 7.300 colonies/a)



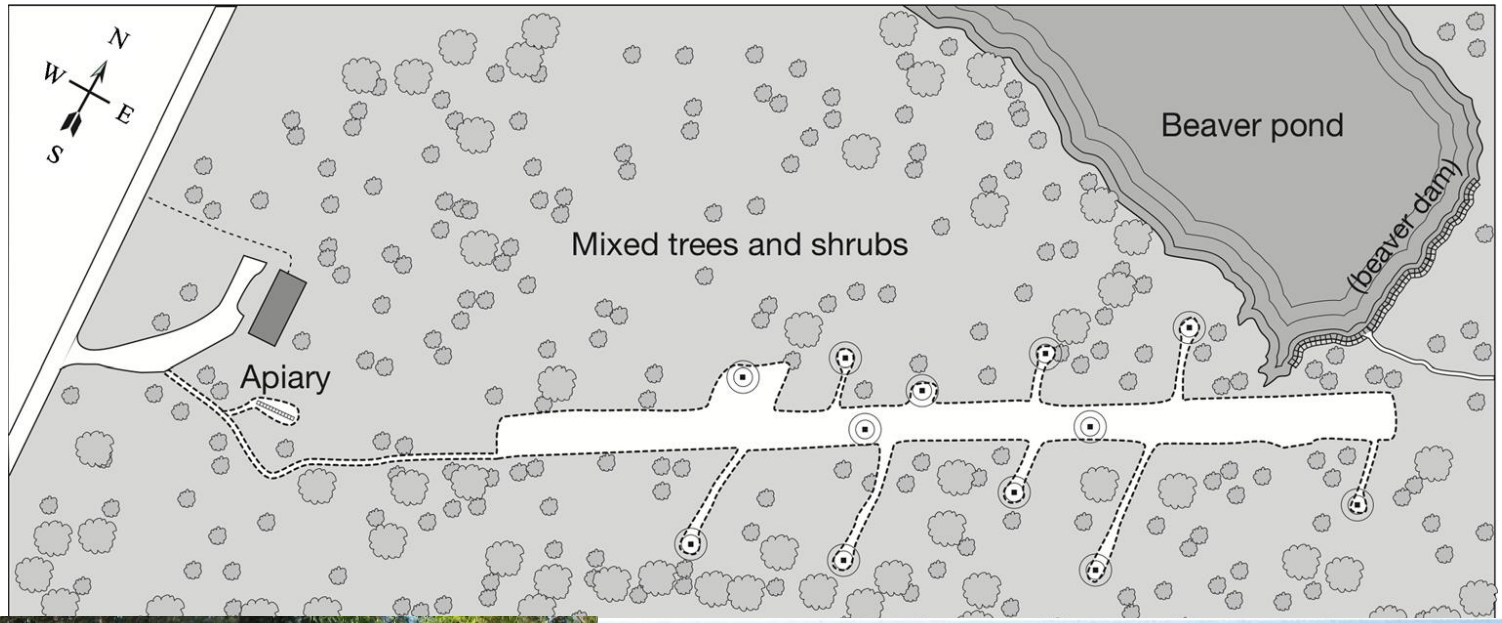
Varroosis as the main cause of winter losses

Development of brood and mite infestation



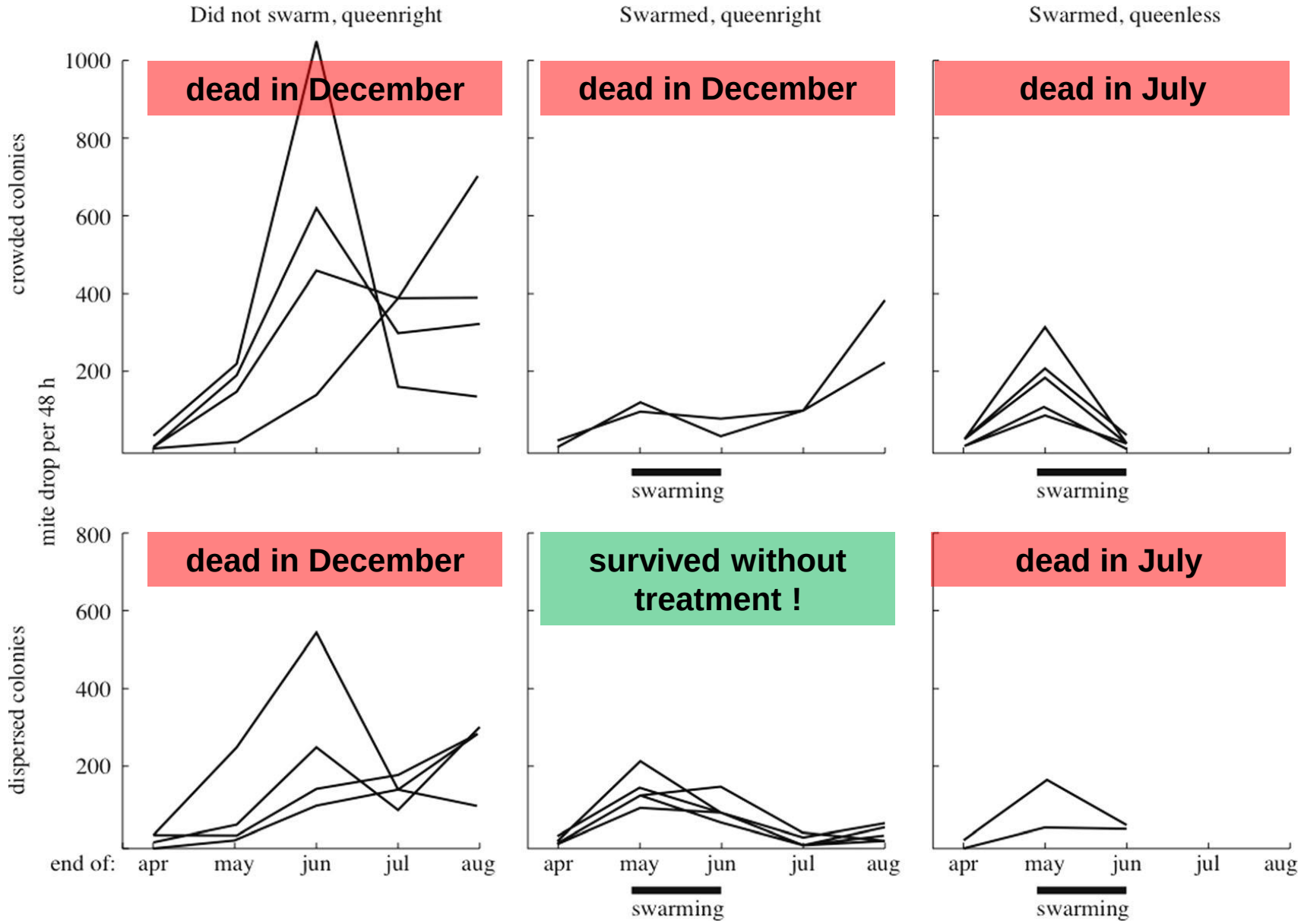
Effects from swarming and choice of nesting side on vitality

Seeley & Smith (2015): Crowding honeybee colonies…, Apidologie 46:716-727

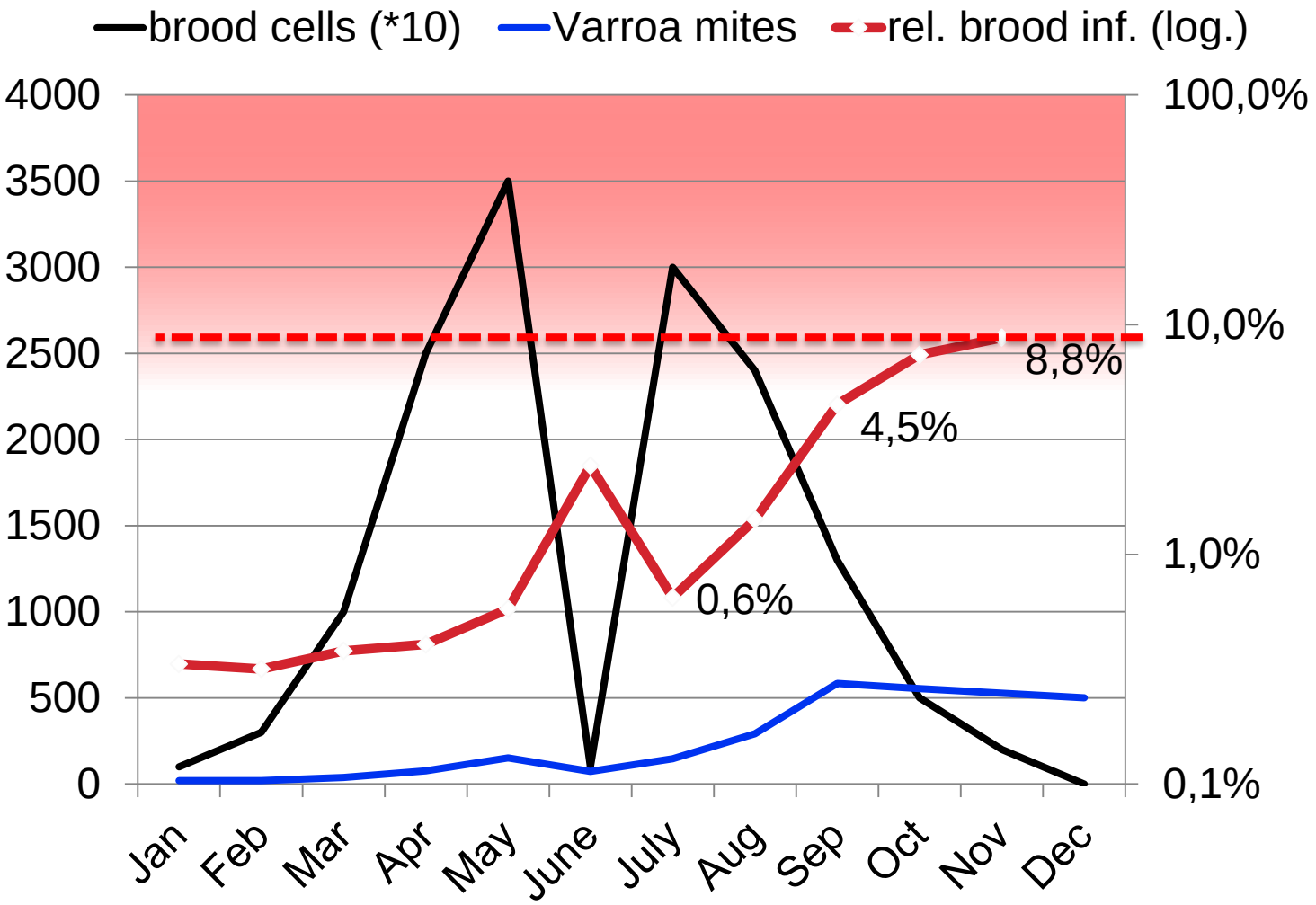


ading the hives at least 100 feet apart resulted in lower mite coun
er colony health and survival.

Varroa infestation development and colony survival



What is the effect of natural swarming ?

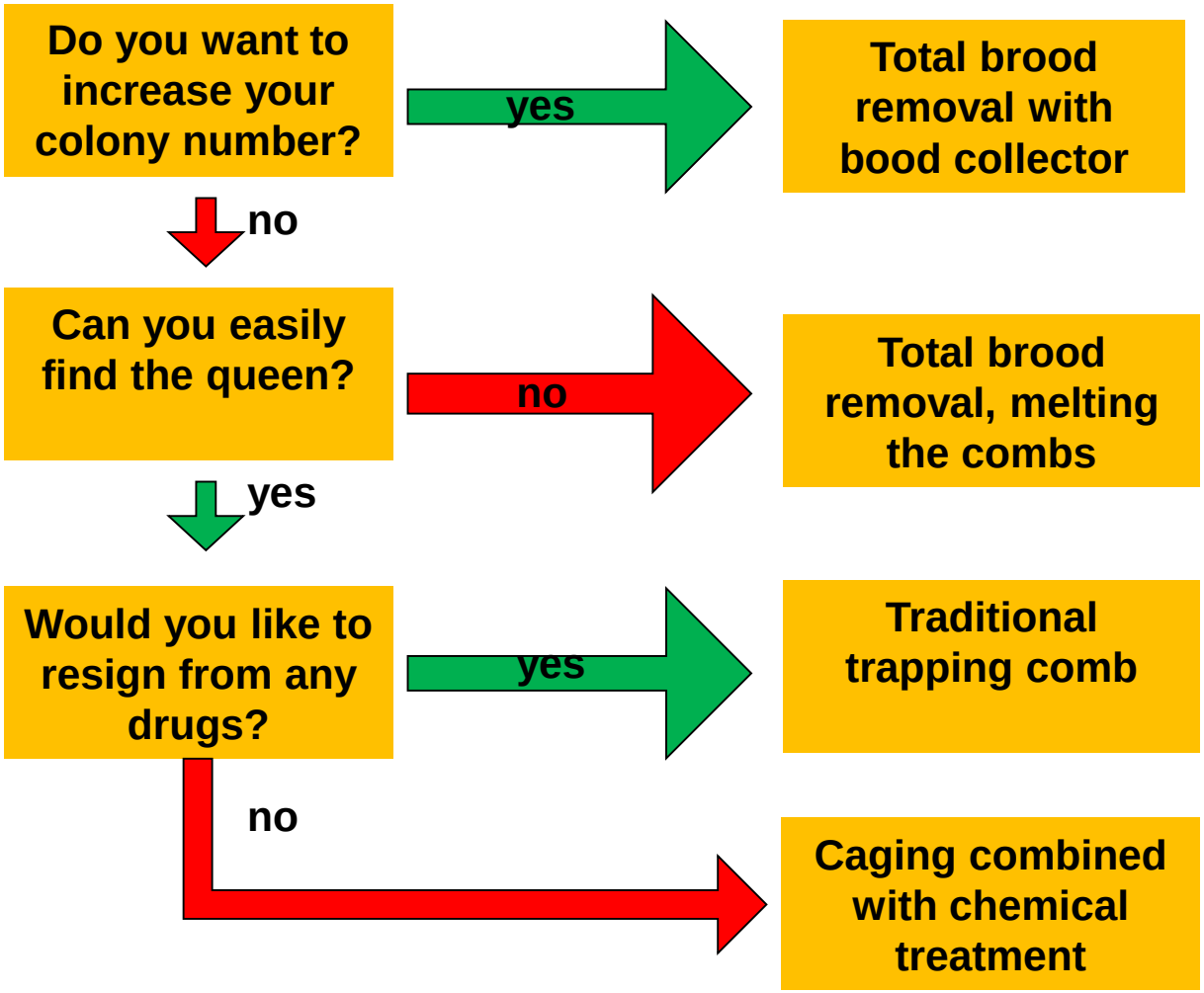


Effects of brood interruption during summer

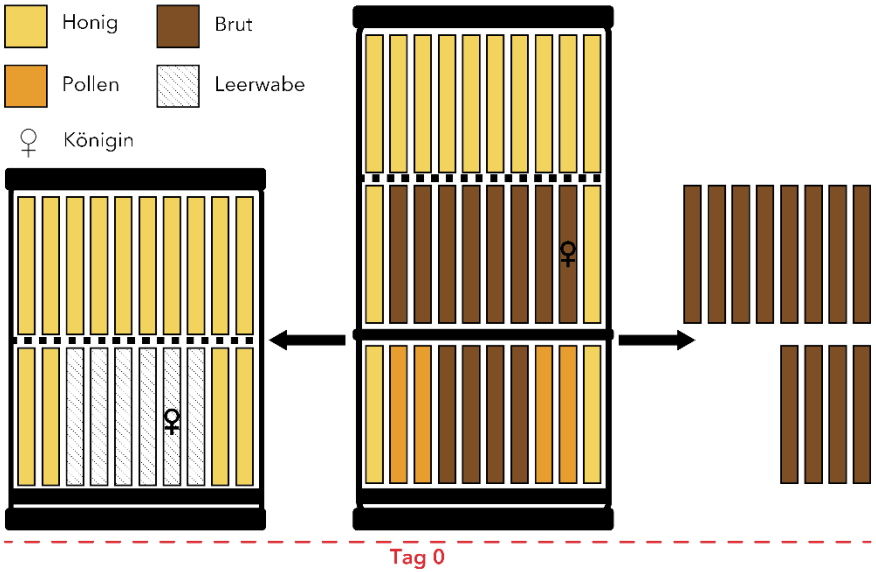
- Interruption of Varroa reproduction (acts beyond the brood stop!)
- Significant reduction of mite numbers
- Interruption of continous brood infection cycle (viruses!)
- Exchange of adult bee generation
  → interruption of continous bee infection cycle (viruses!)
- Comb renewal and start with a compact brood nest
- Option to increase honey harvest

➔ Optimal colony build-up for wintering

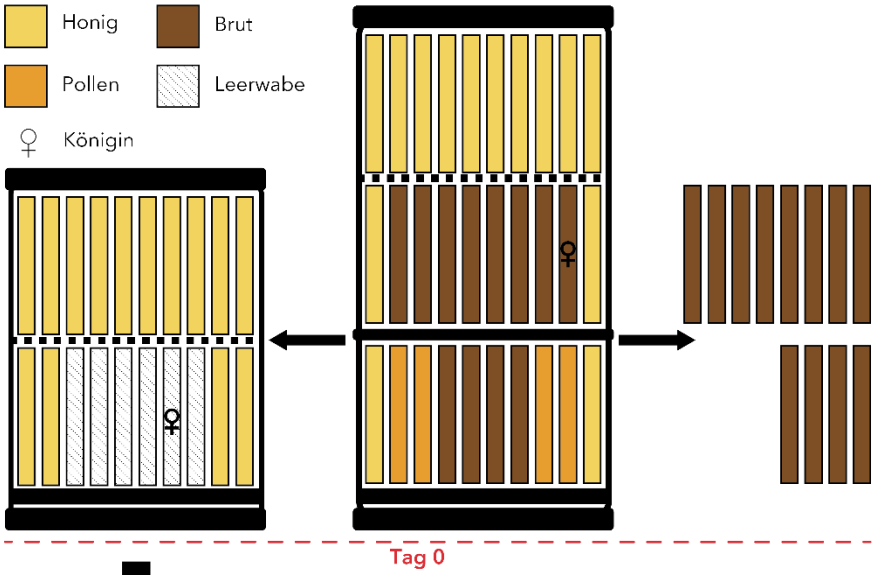
Select the most suitable method of controlled brood interruption

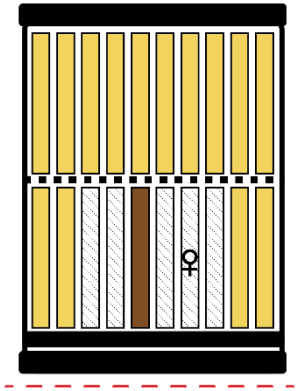


Total brood removal

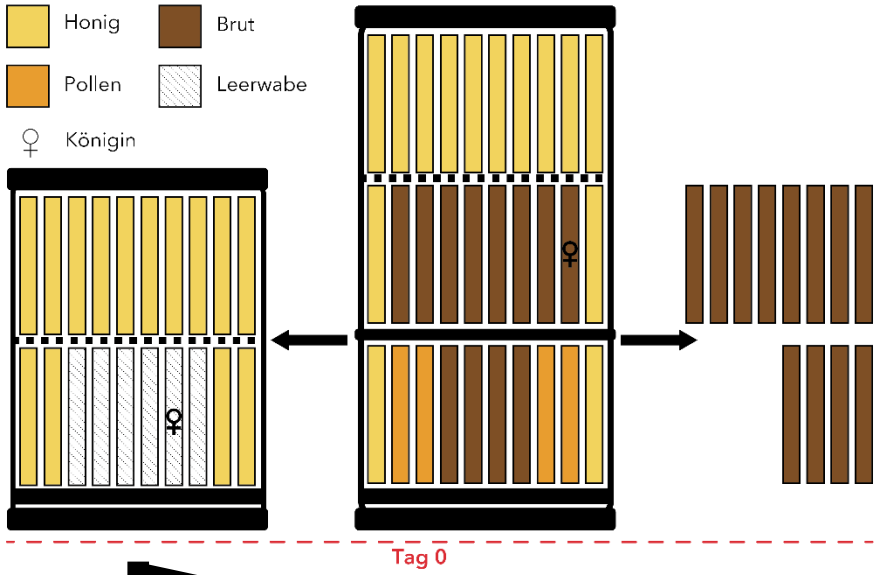


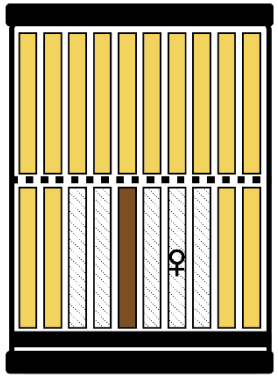
with trapping comb …

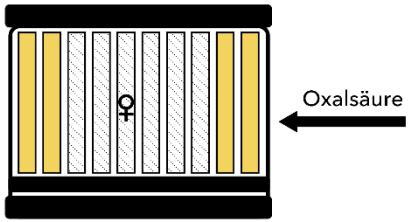




… or oxalic acid treatment







Total brood removal step by step

Selection of a trapping comb

Comb replacement by new combs or foundation

Return former honey supers above queen excluder

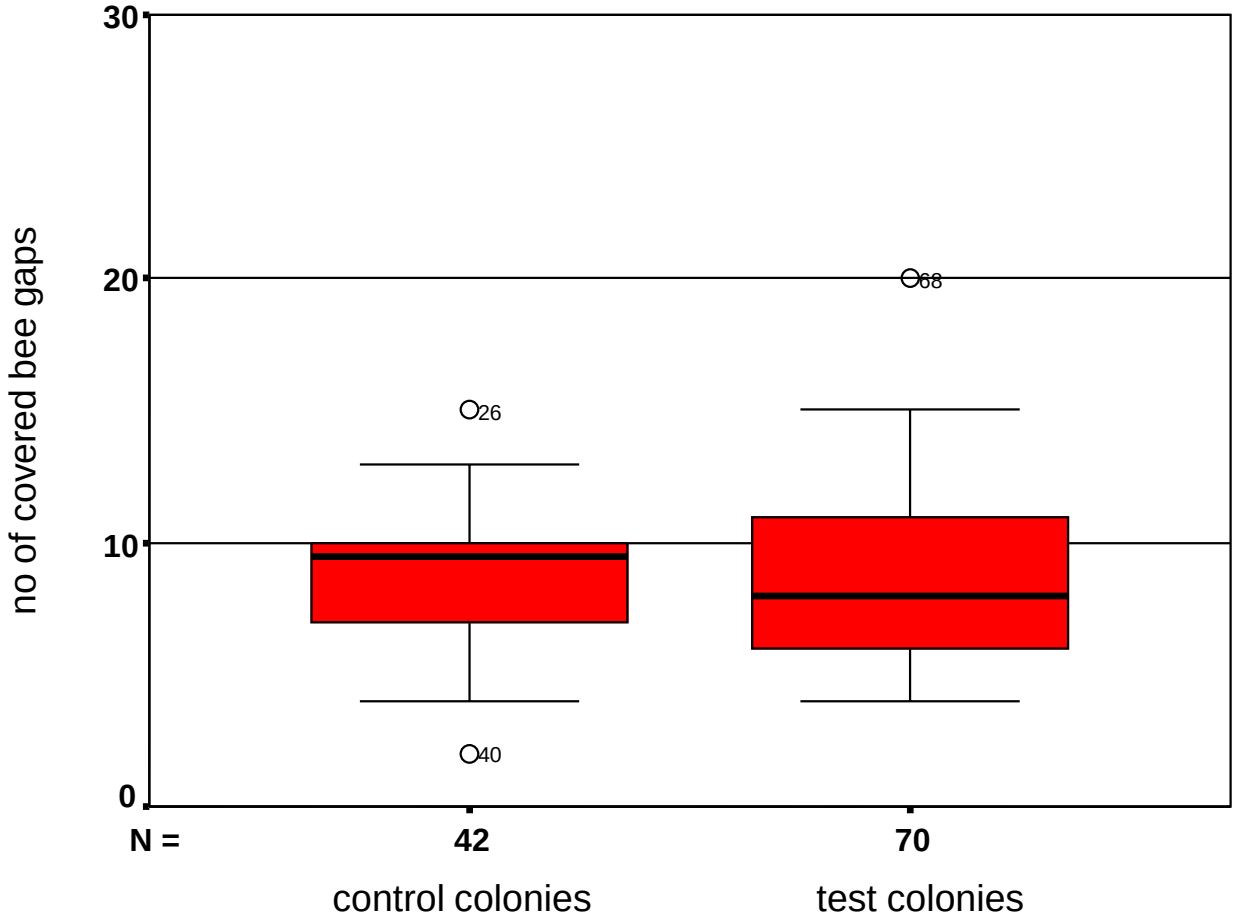
Collect brood combs in seperate hives or take them home for melting

Control treated hives after 7-9 days

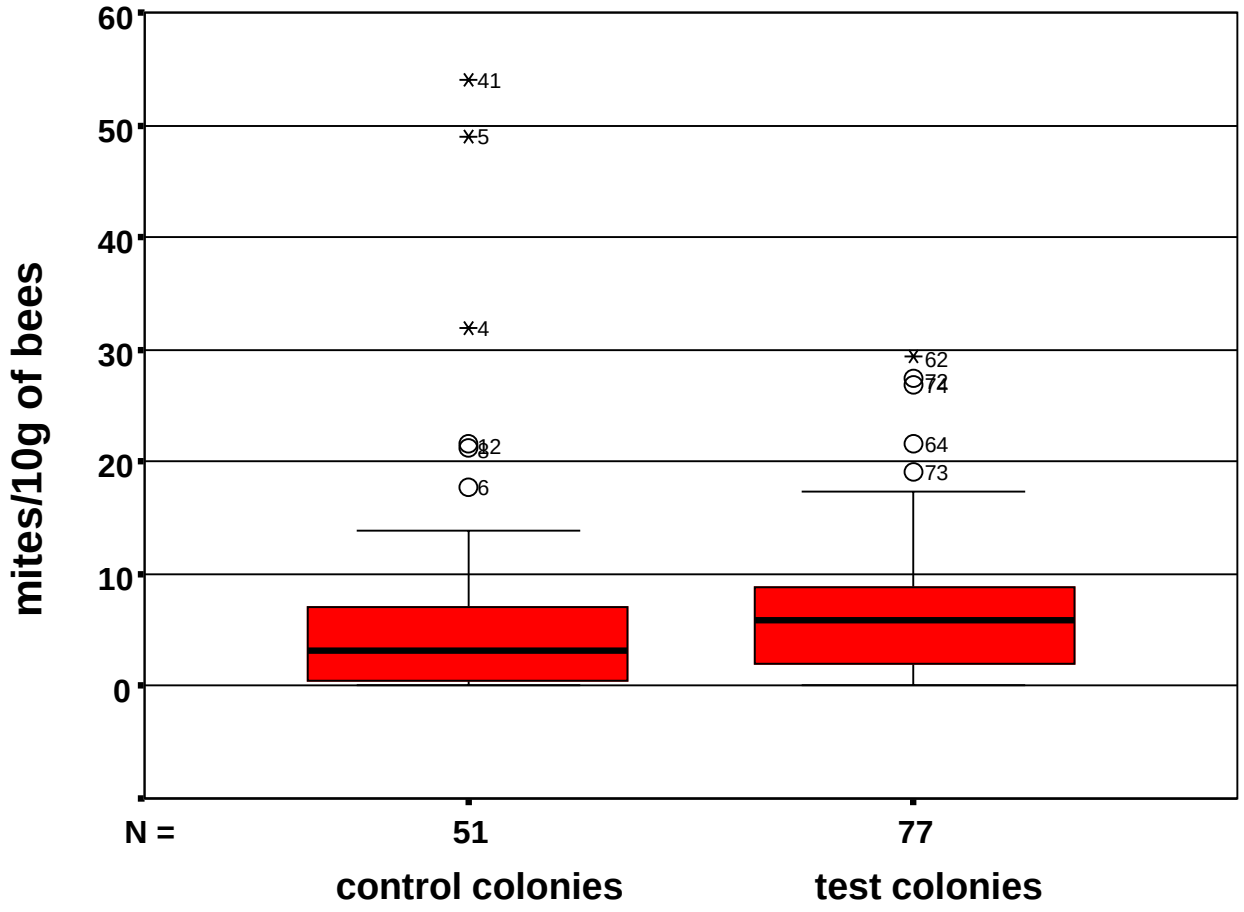
„Ripe“ trapping comb

Check and treatment of brood collectors after 21 days

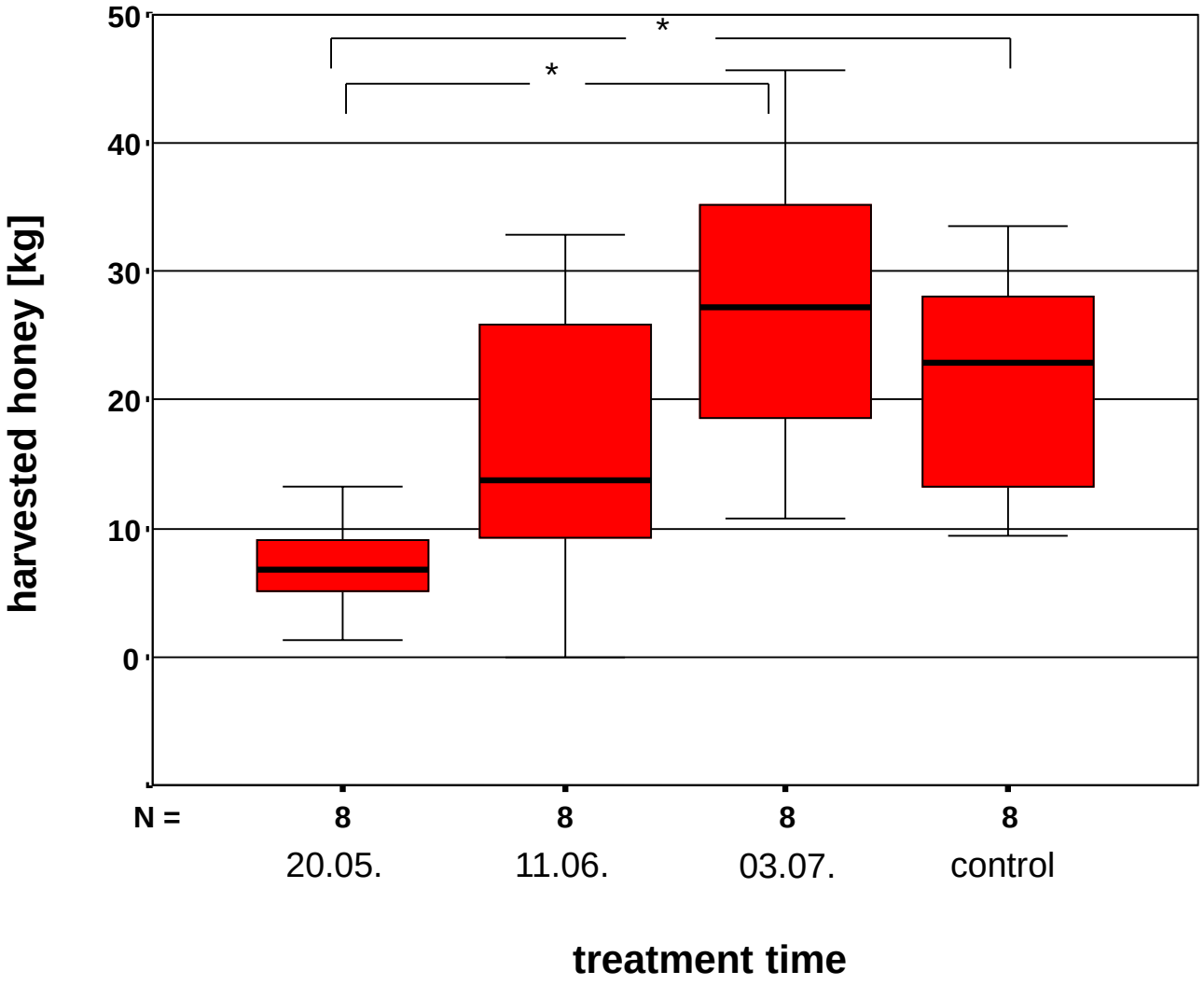
Effect of brood withdrawal on colony strength for wintering



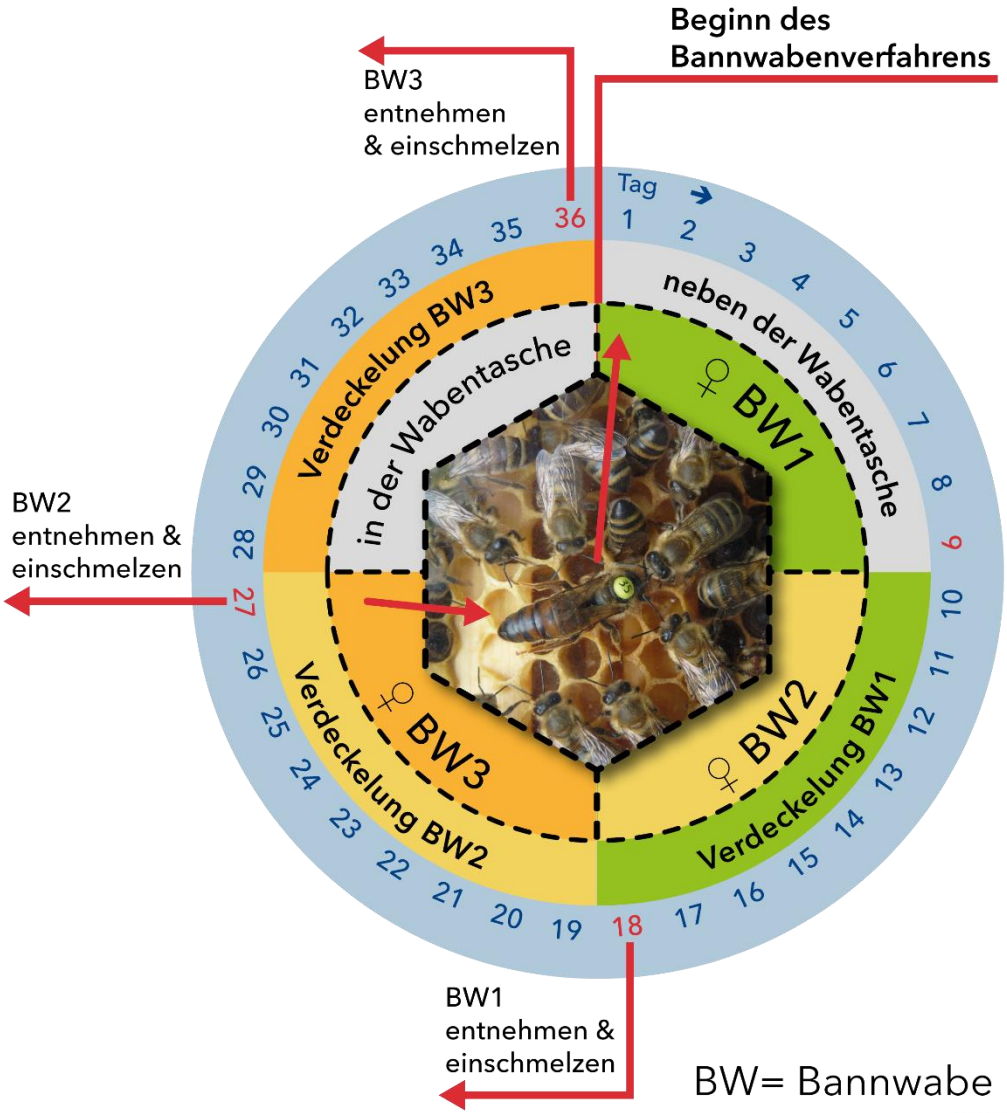
Effect of brood withdrawal on Varroa infestation in autumn



Effect on honey productivity



Traditional trapping comb technique



BW= Bannwabe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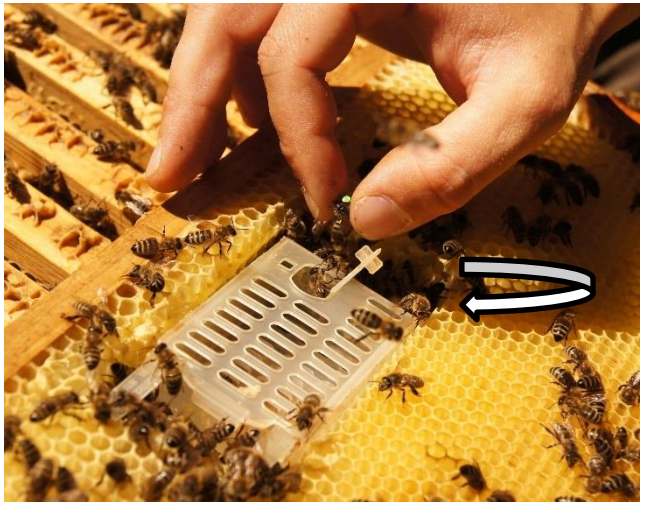
Queen caging combined with a treatment

Caging of the queen

Brood interruption



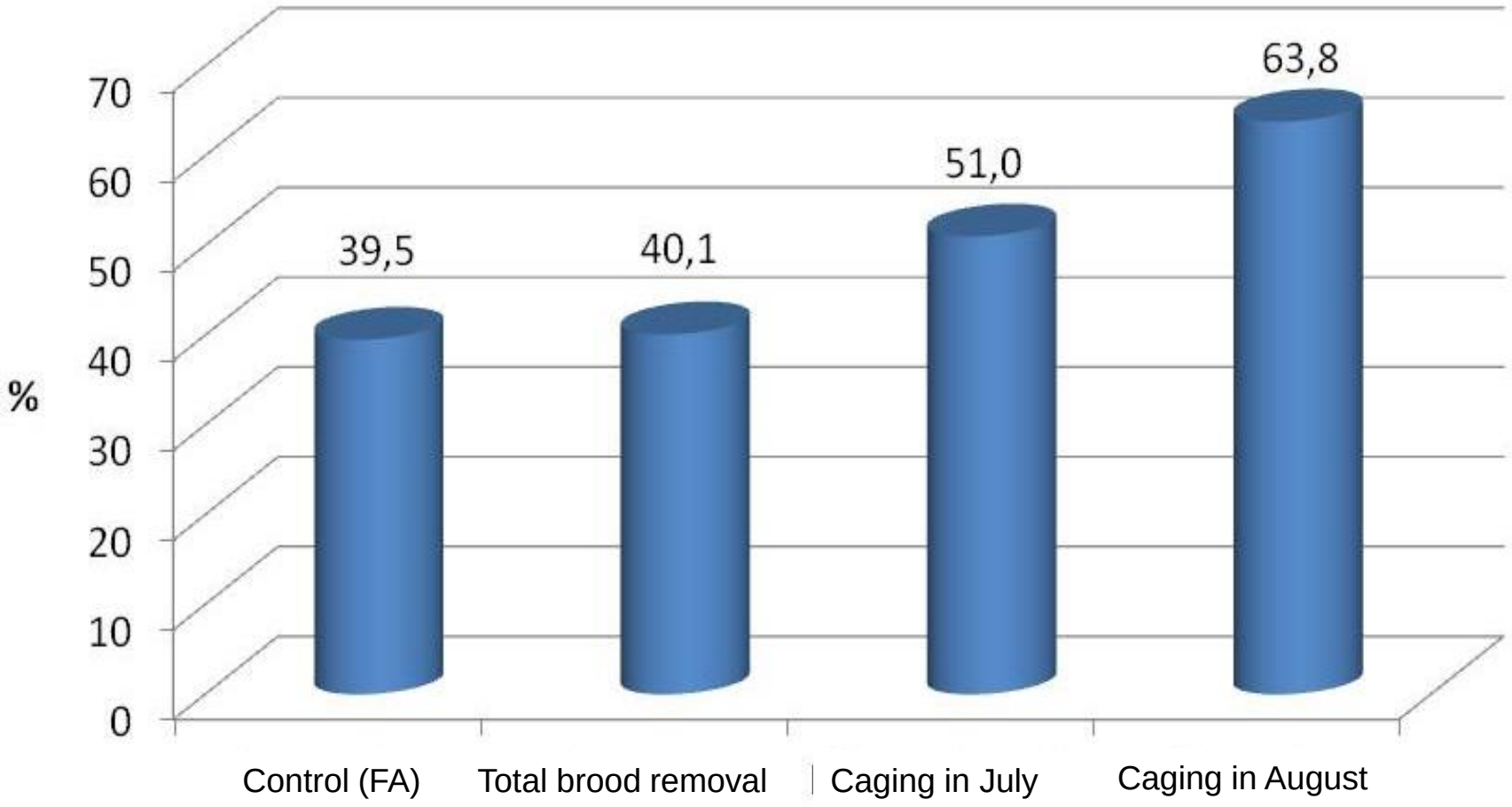
25 days caging period

Treatmant of

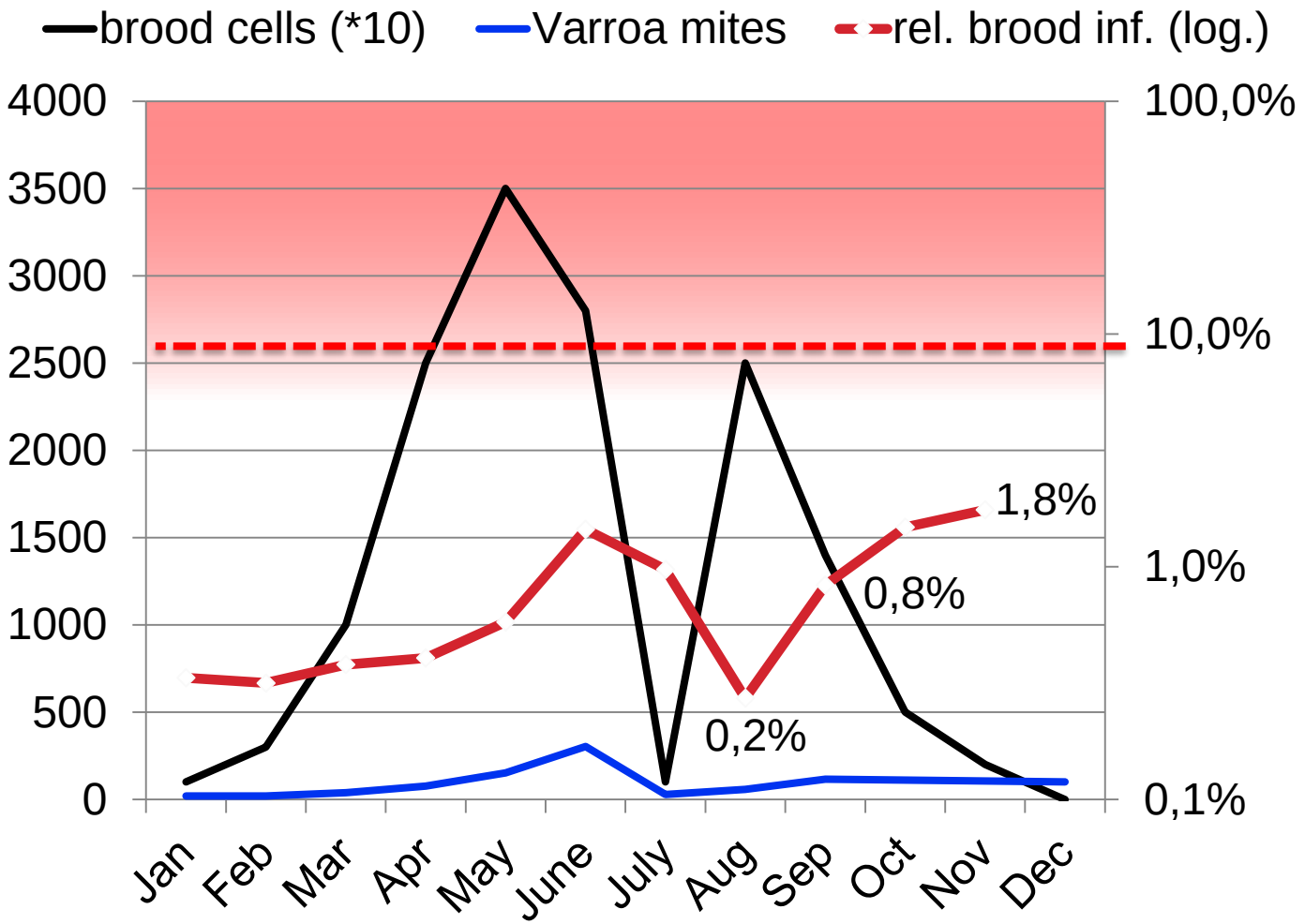
Oxalic acid

brood free colony

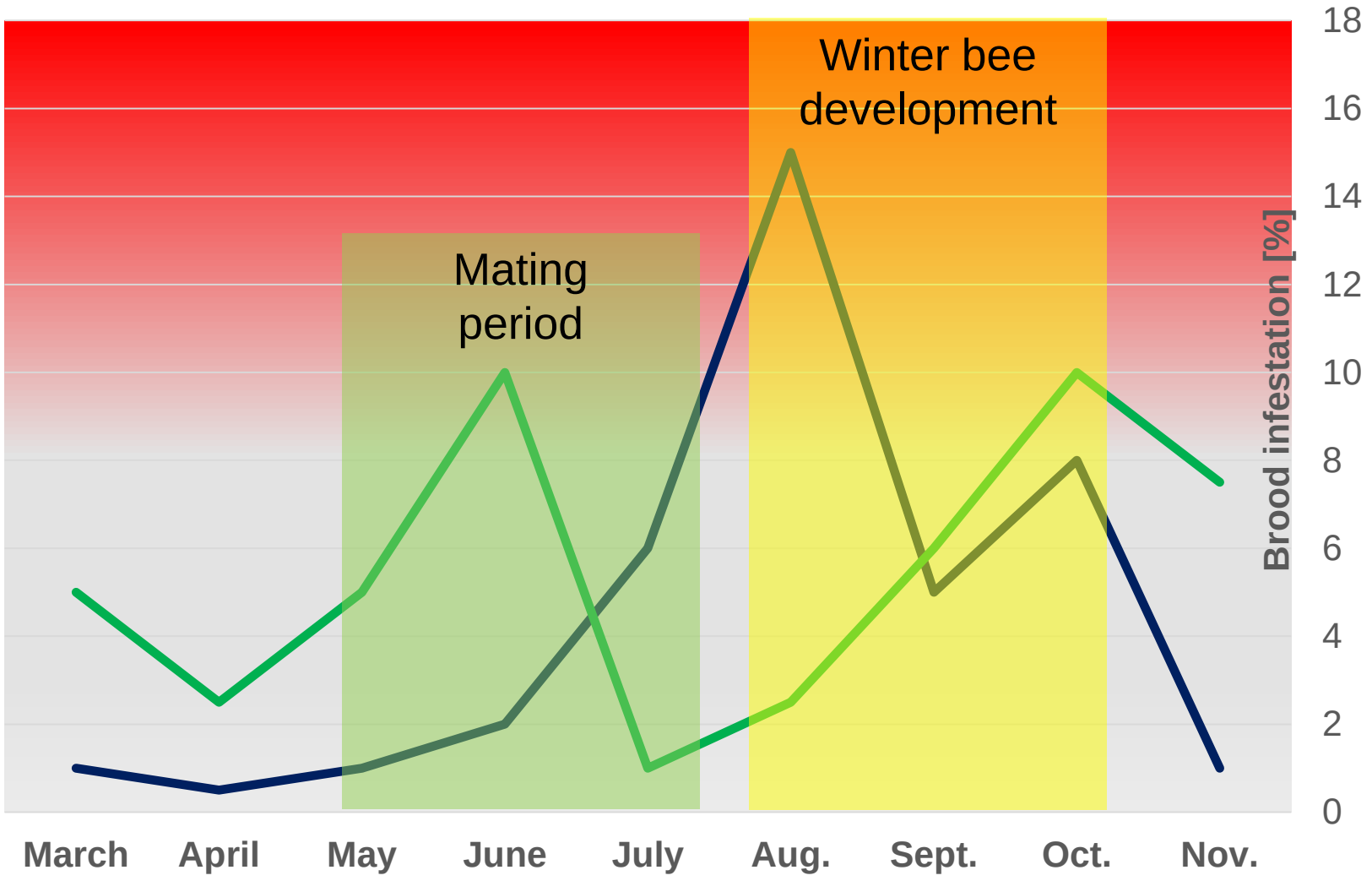
Colony strength after wintering in relation to strength at the start of treatment (investigation from 2015/2016)



Development with total brood removal and trapping comb in July



Comparison of classical and near-natural treatment



Effects of varroa infestation on the mating success of (drone-) colonies

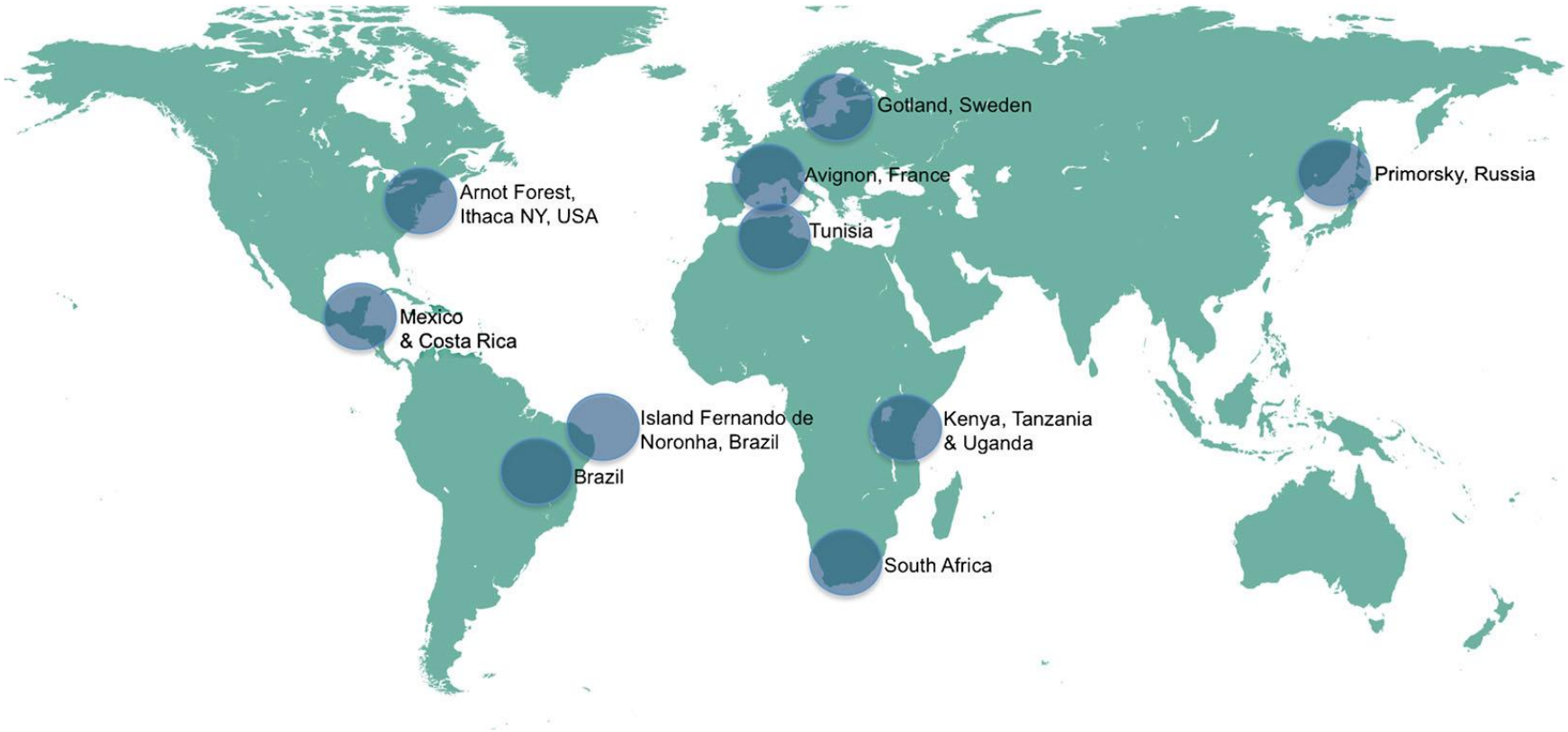
Mating experiment on the island Norderney 2005

- 26 drone colonies without winter treatment
- Measurements of:
  - Colony development and drone population
  - Varroa infestation of bee samples
  - Individual mating success (microsatellites)

Main findings

- Substantial infestation differences between drone colonies during mating period (minimum 0,2 – maximum 8,8 mites/10g of bees)
- With increasing Varroa infestation of colonies:
  - Reduced drone rearing
  - Limited mating success of drones
  - Less descendants per mating event
- Number of descendants per drone colony varied in relation 1 – 10 and correlated to Varroa infestation level (r = - 0,38)
  - **Natural selection of more resistant colonies**

Examples of resistant *Apis mellifera* populations



Locke (2015): Natural *Varroa* mite-surviving *Apis mellifera* honeybee populations, Apidologie, open access

Sustainable control of Varroosis

- **Brood interruption**
  - total brood removal (combined with trapping comb)
  - trapping comb technique
  - queen caging (combined with a treatment)
- **Selection** of resistant stock
- Limited use of drugs (respect infestation **thresholds)**