

the overwintering strength and the colony development in the spring after the survival test as selection traits. Auspicious early results indicate that this is a beacon for breeding strains of bees that do not require treatment for Varroa, which promises to revolutionise apiculture.

Fig. 1. Despite the large progress in auxiliary traits the original problem of colony losses caused by Varroa parasitism and related diseases has not yet been solved and it is time to bring the strands together and refocus on the real desired outcome.

Progress in auxiliary traits

Pin test

Infestation growth

12pp (percent points), resp. 2.4xSD 0,3 mites per 10g sample, 2.1xSD. In (standard deviation). In practice, waiting practice, hard to observe because large time is reduced from 24h to 3h, still variation in mite population [3, updated]. yielding 70% cleared cells [3, updated].



Since 2000, breeding progress for pin-test Since 2006, breeding progress for VID is

Varroa infestation development

Hygienic workers

Since 1997, breeding progress for the Since 2012 Breeding progress for SMR share of beginners (workers that start to (suppressed mite reproduction) is 10.2pp, open a cell) is 1.8pp increase, while 4pp 1.3xSD, for recapping of infested cells increase for share of helpers (workers 14.5pp, 1.0xSD [4]. In practice, large that contribute in opening the cell), both increase in the observation of non-

SMR & Recapping

Fig. 10 Setup for brood investigation (©

With (red) and without (blue) evaluation of overwintering and spring development.

Survival test

- Preselect
 - good in auxiliary traits
 - little infestation
- No varroa treatment in autumn
- How well does it overwinter? •
- How strong it develops spring?

3,2 3.4 3.6 3.8 1,2 1,4 1,6 1,8 2 2,2 2,4 2,6 2,8 Evaluation Fig. 15 Evaluations in 2023/24 test season of overwintering (cyan) and spring development (green).

281 colonies have been evaluated and the vast majority (262 for overwintering, 249 for spring development) have good (\geq 3) evaluations. This is a breakthrough result as treatment-free honeybees had been reported for naturally adapted, not high-performance breeding stock.

Fig. 9 Average breeding values effect by year, for beginners (red) and helpers (blue).

Fig. 13 Average breeding values effect by year, for beginners (red) and helpers (blue).

Literature

- Büchler et al. Evaluation of traits for the selection of Apis mellifera for resistance against Varroa destructor. Insects (2020) 11(9):618.
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