V5.8   Suppressed Mite Reproduction SMR: Ein effizientes Instrument zur Selektion *Varroa-destructor*-resistenter Honigbienen?

Suppressed Mite Reproduction SMR: An efficient tool to select *Varroa destructor* resistant honey bee?

Adrien von Virag, Matthieu Guichard, Markus Neuditschko, Vincent Dietemann, <u>Benjamin Dainat</u>

Zentrum für Bienenforschung, Agroscope, Schwarzenburgstr. 161, 3003 Bern, Schweiz

V. destructor remains the major threat to the European honey bees, *Apis mellifera*. The selection of lineages resistant to this parasite is considered the most sustainable and durable solution to improve the survival of infested colonies without resorting to varroacidal treatments. Suppressed Mite Reproduction (SMR) is currently one of the most frequently used resistance trait in selection programs. Our study aimed at evaluating the utility of this trait for selection and to test methodological improvements.

We evaluated whether the mite fertility- and mite fecundity-based methods to measure SMR in worker brood provide comparable results and assessed their repeatability by acquiring a second measure in the same colony within a week. We also evaluated the reproducibility of SMR by measuring the trait in the highly attractive drone brood. Finally, we verified the correlation between SMR values and *V. destructor* infestation rates of colonies.

Our results shows that the fertility and fecundity methods are equivalent, but have a low repeatability as well as a low reproducibility. Phenotyping reliability could not be improved by screening drone brood. Thus, it does not appear possible to improve SMR selection using drone brood, which, being available early in the season, could allow a reduction of generation time and an acceleration of genetic progress towards resistance. SMR values were weakly correlated with *V. destructor* infestation rates. A better ability to phenotype SMR ahead of initiating long-lasting selection programs as well as a better knowledge of resistance mechanisms leading to colony survival to *V. destructor* infestation are mandatory to improve selection strategies in breeding programs for resistance against this deleterious parasite.

Keywords: Drone brood, selection, resistance, SMR, Worker brood

E-Mail: **benjamin.dainat@agroscope.admin.ch, matthieu.guichard@agroscope.admin.ch**