

COLOSS Working Group 4: Diversity and Vitality

Genotype-environment interactions

Experimental design for a comparative test on vitality in various locations

Version: 13.05.2009

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Objective:

Observations about local strains of bees that are apparently less affected by losses and have better strategies to cope with Varroa have been reported from several different locations. To reveal interactions between genotype and environment (and/or test methods) stock queens from these different strains could be exchanged between groups and tested in different locations in a comparative survival test. The results will contribute to our understanding of the interactions within the system bee-mite-environment. Additionally, we expect to use the results for the development of sustainable management strategies adapted to different regions of Europe.

Test locations and genetic origins:

At each test location one locally adapted strain (autochthonous subspecies or traditionally kept bee race) will be compared to at least two strange origins. As Serbia doesn't allow any imports the test will be run on a national level without external exchange to the European partners. For the other partners an international exchange of test strains will be organized according to the attached genotype allocation table.

Each participating partner is responsible of certifying the declared origin. Samples of workers from each test colony will be collected during the experiment for a possible future genetic analysis.

Location requirements & colony management:

- Minimum location size: 3 groups with 10 colonies each (total 30 colonies)
- Each bee origin at least in 3 different locations
- Uniform colony start in summer 2009 with low Varroa infestation (initial treatment recommended)
- Complete brood removal combined with a trapping comb as optional measure to limit mite and brood diseases

- Individual chemical treatments against Varroa restricted to the excess of certain infestation threshold values
- Test duration until spring 2012 if at least 25 % of the initial colonies survive within that location
- Optional prevention of swarming by temporal queen nucs
- Registration (marking) of queen, but no exchange of superseded queens
- Optional honey harvest and sugar feeding ensuring a minimum honey storage of about 10 kg/hive at all times
- colonies in danger of collapsing should be withdrawn from the test to prevent domino effects on the basis of environmentally adapted threshold values (e.g.: > 10 % Varroa infestation of bee samples, < 5000 adult bees)
At least one main census in spring, summer and autumn

Test parameters:

- Queen survival
- Colony survival
- No of occupied combs
- Brood extension (no of brood combs, average brood area per comb)
- Pollen storage (classified 0,1,2,3)
- Honey/food balance: registration of all feeding and harvesting, colony balancing
- Varroa, Nosema infestation of bee samples
- Virus infections (optional)
- Recognition of all disease symptoms (AFB, EFB, Ascospaera, Tracheal mites etc.)
- Hygienic behavior (method needs to be standardized)

Standardization & training:

- Workshop standardization of methods I, Unije (Croatia) 22.- 26.05.2009
- Workshop standardization of methods II, Kirchhain (Germany) 28.07. - 02.08. 2009

Evaluation & publishing:

- Common internet data base?
- Annual internal local reports until November by the local partners
- Annual internal central report until January by the coordinator
- Presentations and papers upon consultation, usually one coauthor per test location
- Final publication in a peer reviewed journal