

CORRELATION OF HYGIENIC TEST WITH INTENSITY OF CHALK BROOD DISEASE

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INTRODUCTION

The hygienic test is used as a parameter of behavioral resistance of bees to infective brood diseases (Newton & Ostasiewski, 1986; Čermák, 1995). To find in what extent correlate the hygienic test and real intensity of chalk brood disease we made some observations in 1994.

MATERIAL AND METHODS

In an apiary in Moravia (Czech republic) we sorted out 32 bee colonies in different clinical stage of chalk brood disease:

1. group of six colonies of week infection, there were only to 5 cells with mummies in the brood chamber at our inspection, mummies were found only in drone brood combs, there were no mummies neither on the bottom board of the hive or in front of hive entrance,
2. group of seven colonies of middle infection, there were mummies in both worker and drone brood combs in greater extent as in the first group, there were some mummies both on the bottom board and in front of hive entrance, the infection did not clearly affect neither the condition or honey production of colonies,
3. group of seven colonies highly infested, there were many cells of dead brood and mummies and scattered brood was apparent, there were many mummies on the bottom board of hive and in front of the hive entrance, the disease clearly affected both the condition (strength) and honey production of colonies,

Control group of twelve colonies without any clinical appearance of the chalk brood disease.

We made the clinical inspection of observed colonies in June and July, 1994. In June 1994 we made the hygienic test using method by Čermák (1995) in all 32 colonies and than we compared found results.

Another observations of relations of the hygienic test and the clinical appearance of chalk brood disease are in progress in two apiaries in Bee Research Institute, Liptovsk Hrádok, Slovakia since 1990, where intensive selection for the resistance of bees against infective brood diseases runs.

RESULTS AND DISCUSSION

Comparison of the intensity of chalk brood and the hygienic test is clear in fig. 1. The intensity of chalk brood correlates well with the hygienic test. A slight clinical appearance of chalk brood disease was also in colonies with the value of test about 30 hours. The best results, i.e. no appearance of chalk brood, were in colonies with the value of hygienic test about 20 hours or less.

In our observations in colonies of Bee Research Institute we found that the correlation of hygienic test with the clinical appearance of chalk brood is not close for all colonies. Colonies of some lines with their values of hygienic test from 50 to 60 hours are clinically healthy while colonies of other lines sometimes may be found with chalk brood even at their values of hygienic test about 25 hours. We also found cases when colonies with their queens aged one or two years did not have any chalk brood and in the third year of queens' age the disease broke. We also noticed some seasonal variability of the chalk brood disease when in some colonies was not the disease clinically observed in spring and some part of summer and than it appeared in the second half of summer (July, August).

These observations agree with results of Spivak & Gilliam (1993). They found that except of hygienic behavior of bees the intensity of chalk brood disease is influenced also with some physiological resistance. In their experiments there was only a weak correlation between both mechanisms of resistance. Reviewing the literature, they mention as physiological mechanisms the ability of bees to filter out the spores of *Bacillus* larvae in the honey sac which may be the same for *Ascosphaera* spores. Another mechanisms may connect with the presence of bacterial inhibitors in the larval food which may be result of occurrence of antimycotic substances in stored pollen.

CONCLUSIONS

Close correlation between the hygienic test and clinical appearance of chalk brood was found. To increase the selection effectiveness on resistance of bees to chalk brood diseases it is recommended to evaluate except behavioral mechanisms also physiological resistance mechanisms of bees to chalk brood disease.

The ability of bees to quickly remove dead brood and mummies of chalk brood from the brood combs and other hive parts is the principal of behavioral resistance of honey bees to chalk brood disease. Because the same principal is effective to other infective brood diseases the selection based on the hygienic test is also selection against other brood diseases (American foulbrood, European foulbrood, sackbrood).

REFERENCES

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