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University of Kaposvár, Faculty of Animal Science, Kaposvár

The influence of different types of beehives (made of different material) and of the origin of Queens on the development of diseases

Z. Tucak[1], M. Periškić[2]
[1]J.J. Strossmayer University, Faculty of Agriculture, Trg sv. Trojstva 3, 31000 Osijek, Croatia
[2]Croatian Veterinary Institute Zagreb, Veterinary Department in Vinkovci

ABSTRACT

Our investigation was aimed at determining the extent to which different types of beehives: Langstroth-Root (LR), Dadant-Blatt (DB) and Albert-Žnideršić (AB), made of different material (poplar-tree, lime-tree, fir-tree), with queens of different origin (natural and selected), influence the development of diseases in the hives. All bees used in the investigation belong to the European bee species Apis mellifera carnica. Research results indicate the interplay of all the factors (different types of hives, origin of Queens, and type of wood used for the hive) in the development of diseases in the hives.
(Keywords: beehive types, origin of Queens, diseases)

INTRODUCTION

In order to investigate the factors that influence the development of diseases in beehives, we decided to study the influence of different types of beehives made of different material, and using different queens.

MATERIALS AND METHODS

The research was conducted in Vukovarsko-srijemska County in the Republic of Croatia. During the investigation we used the following types of beehives: Langstroth-Root (LR, n=265), Albert-Žnideršič (AŽ, n=285) and Dadant-Blatt (DB, n=136). The wood used for the hives were poplar-tree (n=150), lime-tree (n=154) and fir-tree (n=382). We used natural (n=426) and selected queens (n=260).

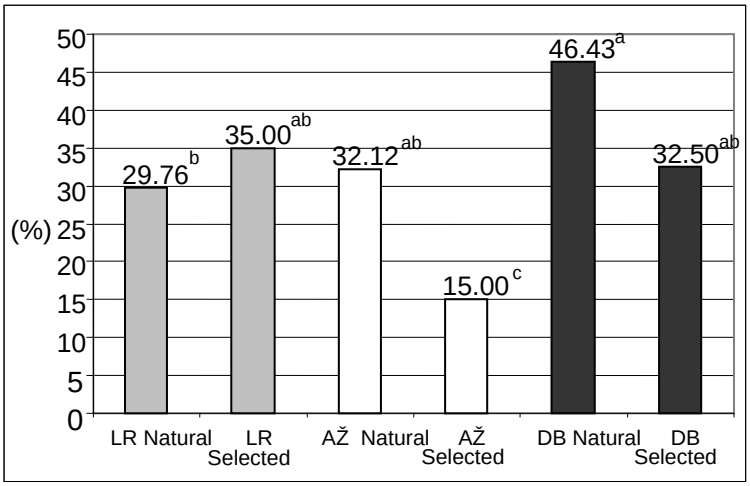
All bees used in the investigation belong to the European bee species *Apis mellifera carnica*. The honeybee brood obtained food and nutrients by visiting various species of the honey vegetables: Oil-seed Rape (*Brassica olespeciesa* subsp. *Oleifera*), False-acacia *(Robinia pseudacacia*), Lime tree (*Tilia* spp.) Horse-chestnut (*Aesculus hippocastanum*), Sunflower (*Helianthus annuus*), Goldenrod (*Solidago* spp.), Mint (*Mentha* spp.), False indigo (Amorpha fruticosa), Meadow Sage (Salvia pratensis) and other meadow plants.
The influence of different types of beehives, different material and types of Queens was determined using the attributive marker test. The differences between the groups ($P<0.05$) were marked using the letters a, b, c, and d. Research results were analysed using Statistica v7.1.30.0 (StatSoft.Inc 1984–2005).

RESULTS AND DISCUSSION

The influence of types of beehives on the development of diseases has been identified by *Tucak et al*. 2002 and 2003. *Figure 1* indicates the frequency of nosema in queens of different origin in different types of beehives. Most bees with nosema were found in DB type beehives with natural queens (46.43%). In LR type beehives with queens of both origins, in AŽ type beehives with natural and DB type beehives with selected queens, the incidence of nosema was about 30%. The incidence of nosema was the lowest in AŽ type beehives with selected queens (15%), which is statistically significantly less than in all other investigated groups. Statistically significant differences ($P<0.05$) were also found between DB beehives with natural queens, and LR beehives with natural queens, as well as AŽ beehives with selected queens. With AŽ and DB beehives we noted the tendency towards a higher incidence of nosema with natural queens compared to LR beehives. The highest incidence of nosema was found in AŽ beehives (32.89%), statistically significantly higher ($P<0.05$) than in DB beehives (24.91%). We have not found statistically significant differences ($P>0.05$) between LR and DB beehives regarding the incidence of nosema. In beehives with selected queens we have recorded a smaller share ($P<0.05$) of individuals with nosema (25%) compared to the beehives with natural queens (32.86%).

Figure 1

Incidence of nosema in queens of different origin in different types of beehives a, b, c P<0.05

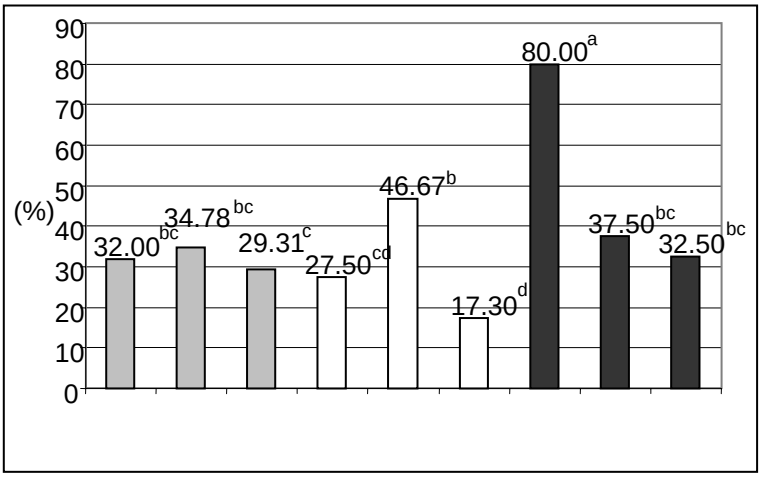


The influence of different materials on the occurrence of nosema in the investigated beehives is shown in *Figure 2*. The highest incidence of nosema was found in DB beehives made of poplar-tree (80%), statistically significantly higher than in all other investigated groups. A significantly higher incidence of nosema ($P<0.05$) was found for AŽ beehives made of fir-tree compared to LR and AŽ beehives made of fir-tree and poplar-tree. AŽ beehives made of fir-tree had the lowest incidence of nosema compared to other groups. In all three types of beehives the smallest incidence of the disease was

found for the ones made of fir-tree (29.31%, 17.30% and 32.50%). In LR and AŽ beehives the highest incidence of nosema was found in the ones made of lime-tree (34.78% and 46.67%), whereas in DB beehives it was the highest for the ones made of poplar-tree (80%). The lowest incidence on nosema was found for beehives made of fir-tree (24.15%), statistically significantly lower ($P<0.05$) than for those made of poplar-tree (34%) and lime-tree (40.26%). The differences in the incidence of nosema between beehives made of poplar-tree and lime-tree were not statistically significant ($P>0.05$).

Figure 2

Influence of different materials on the occurrence of nosema in LR, AŽ and DB beehives a, b, c, d P<0.05



CONCLUSION

- The highest incidence of nosema was found in AŽ beehives (32.89%), statistically significantly higher ($P<0.05$) than in DB beehives (24.91%). We have not found statistically significant differences ($P>0.05$) between LR and DB beehives regarding the incidence of nosema.
- In the beehives with selected queens we have recorded a lower incidence ($P<0.05$) of nosema (25%) compared to beehives with natural queens (32.86%).
- The lowest incidence of nosema was found for beehives made of fir-tree (24.15%), statistically significantly lower ($P<0.05$) than for beehives made of poplar-tree (34%) and lime-tree (40.26%).
- The highest incidence of nosema was found in DB beehives with natural queens (46.43%). The lowest incidence of the disease was found in AŽ beehives with selected queens (15%), which is statistically significantly lower than in all other investigated groups.
- In AŽ and DB beehives we have noticed a trend of the increasing incidence of nosema in beehives with natural queens compared to LR beehives.

- In DB beehives made of poplar-tree we have found the highest incidence of nosema (80%), statistically significantly higher than in all other investigated groups. AŽ beehives made of fir-tree had the lowest incidence of nosema compared to other groups.
- For all three beehive types, the incidence of nosema was the lowest for those made of fir-tree (29.31%, 17.30% and 32.50%).

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Corresponding author:

Zvonimir Tucak
Faculty of Agriculture, Josip Juraj Strossmayer University in Osijek
31000 Osijek, Trg Sv. Trojstva 3, Croatia
Tel.: +385 31 224 284; fax: +385 31 207 017
e-mail: ztucak@pfos.hr