ANALYSIS OF SPRING DEVELOPMENT OF SOME SELECTION LINES OF HONEYBEE IN EASTERN SERBIA

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ABSTRACT
The aim of this paper is to determine the cause of variation in quantity of bees and broods. This work covers quantitative characteristics of honeybees from 4 selection lines belonging to selection center “TIMOMED” from Knjaževac (eastern Serbia.)
The research includes the data collected in two years of selection study, which demonstrates the intensity of spring development of a colony before the main honeyflow in eastern Serbia. Using statistical methodology we showed the difference between the examined lines of honeybee.
The degree of successful wintering and the influence of cluster size to spring development were analyzed.

Keywords: selection, number of bees, productivity, bee brood, spring development

Introduction
Honey bees, like other organisms, vary in many traits. Individually, the bees may differ in color, size, quietness, and productivity in other ways. Bee colony, composed of individuals of bees, reflect the characteristics of their bees, the line or ecotype (7). The population of bees that bee society is still characterized belong to the societies of which consists.

Differences between bee colonies or lines are often used in practice minor, or such a nature that are immeasurable (1, 5, 13). In other cases the differences are significant and easily noticeable.

These are the differences based on which beekeepers accurately and objectively review the quality of their bees and maintain lines that meet them (6).

Preservation of genetic material is above features the largest number of beekeepers. The simplest way to continuously provide bees of similar quality, the supply and add a queen from the Centers for selection who have the proper equipment, have adequate staff for managing this demanding and long work (4).

There are different opinions about which race is ideal for beekeeping and whether it is better pčelariti with one or more races of bees. According to the legislation applicable in the territory of the Republic of Serbia is possible to grow only Carniola breed bees Apis mellifera carnica. Imports of other races of bees is prohibited by law. Our climate is ideal for beekeeping with Kranjska bee because this breed bees maximum adapted on our honeyflow and climatic conditions (8, 10, 12).

Selection program is conducted on the territory of the Republic of Serbia is a complex character, but includes the reproduction of material selection, improve the productive and important morphological features whereby special attention is paid to the properties of productivity, wintering, spring development and resistance to important diseases of bees and brood.

It is known that the number of bees and the amount of brood in the high correlation with the production and reproductive ability of colonies (2). For this reason this work is included in the analysis of bees and the amount of brood as well as two basic indicators of the quality of queens.
Materials and Methods
As a sample for analysis served Selection center of honeybees "Timomed" from Knjazevac (Eastern Serbia) who are already 10 years and deals with improving the selection of genetic material and specifically ecotype domestic honey bee in Eastern Serbia. The features of bees were analyzed during two productive years (2008 and 2009). The information about the number of bees and brood surface in one autumn and two spring selection inspections were taken into consideration. Nectar crop on acacia flow measured using Szabo method was also considered. Acacia flow testing is the basic indicator of bee colonies yearly productivity. Analyzed data related to the 4 lines that were tracked from the moment of introduction of the selection until their replacement.

The bees belonged to respective ecotypes of Apis mellifera carnica of East Serbia. The information about the number of bees and brood surface was tested with analysis of variance, and differences between lines with LSD test. The data was processed with STATISTICA 8 software.

Results and Discussion
Four selection lines of queens with five colonies per a line were analyzed. 40 colonies were included during two productive years, and the results were obtained through 3 inspections – one in autumn and two in spring. The data was obtained in autumn inspection in 2008, and two spring inspections in both 2008 and 2009.

The analyzed values were the estimates of brood development, the number of bees and nectar crop. Bee number and brood surface data was obtained using well trusted method of Kulincevic and associates, values were expressed as 1/10 frames of bees and brood (3). The values of brood and bees were obtained through the estimate of how much a frame is covered, and calculating the average value for a colony and the examined characteristic. Nectar crop was measured using Szabo method and each colony was measured on the first and the third day since the beginning of acacia flow. The basic statistic data about the lines of queens are given in Table 1 (brood surface, number of bees and nectar crop).

**Table 1**

Summary of data about the average number of bees, the average size of brood and the average nectar crop in colonies where the lines of antecedent queens were followed.
The following parameters were examined in all bee colonies:

a. The number of bees
b. Brood surface
c. Nectar crop in acacia flow

Using the analysis of variance, the examined lines in each year were compared by the observed parameters.

The first spring inspection
No significantly important differences between years were determined in relation to the number of bees. Also, no significant statistical differences between different lines were determined. A statistically important difference (p<0.01) was determined between the examined years in brood development. Line III had statistically very significant larger brood surface than lines II and IV (p<0.01), and statistically significant larger brood surface than line I (p<0.05).

The second spring inspection
All selection colonies showed great dependence on the year of inspection in relation to the number of bees and brood surface. A very significant statistical difference (p<0.01) was determined between the number of bees and brood surface in two examined years (all the examined lines in 2009 had significantly larger number of bees and brood surface). The lines were homogenous in the number of bees within the same examined year.

A statistically significant difference (p<0.05) was determined between the line I and II in 2008 in relation to brood surface.

Nectar crop in acacia honeyflow
The crop of 2009 was larger than in 2008, which was statistically very significant. Within each year there were no significant differences between lines.

Autumn inspection
Line II was statistically significantly different than line IV in relation to the number of bees and brood surface (p<0.05).

Conclusions

a) Statistical processing of gathered data during a two years period showed great dependence of the number of bees on the productive years that the colonies were tended. Also, the analyzed data clearly showed a very strong influence of a particular year on spring development and the achieved crop of the examined colonies.

b) Some small differences which occurred between particular lines in one year demonstrate a great potential of the examined lines for perfection and the improvement of features. On the other hand, this occurrence confirms the homogeneity of the examined four lines and proves that the line selection is done within the pure race of *Apis mellifera carnica*.

REFERENCES


