The Appreciation of the Special Combinative Capacity at Three Rabbit Populations from Timiş County, for Corporal Mass of the Descendants at Birth

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Abstract
Non additive genetic component that is the base of a quantitative character has no predictability, this is the reason for which the present paper is proposing to appreciate the special combinatory capacity for corporal mass of the descendants at birth in a specific crossing scheme combining three rabbit breeds common in Timis county breeders New Zealand White, Large Chinchilla and Californian. The data obtained, statistic presented prove a good special combinative capacity for this character, reason for which the crossing scheme is recommended for producing meat individuals destined for slaughterhouses. This scheme provides an exploitation of the high fervency of the heterozygote at maternal forms and at the final hybrids.

Key words: crossing, hybrids, special combinative capacity

1. Introduction

Breeding the domestic rabbits is an old occupation. In antiquity, the rabbits were breed for sport, later they were breed for research animals or for meat, fur or hear [1].

In the last decades there were registered in most of the countries in the world special efforts for development of this economical branch because of the good reproductive capacities it can provide rapidly a large part of the meat necessary for human population.

Some breeders with experience have the entire necessary premise to be extremely profitable soon, because the rabbit meat is not affected by the diseases that affect all the other (cows, pigs, poultry), more common, domestic species. Plus the rabbit meat is easy, tasty and different from the other meat types more commonly consumed.

The structure of the production shows that on an world scale, 40% of the rabbit meat is produced in traditional farms, 33% with intermediary rise and 27% is produced in commercial farms [1].

The highest production of meat in Europe, is produced by Italy. France the county with the oldest traditions in the production and the consumption of meat, and Spain is the second in production, according to FAO STAT.

In Romania in 1990 the rabbit meat production was 10625 tones, and this dropped rapidly, so in 2000 it was 71.77% lower, in 2007 it was 97.5% lower comparative to the production registered in 1999 [FAO, 2009].

In breeding domestic rabbits, the amelioration genetic presents a great importance because they target the continuous increase of the production, and reducing the specific consumption and the costs with the production. This works include
complex preoccupations for maximum usage of the genetic potential of the populations and for continuous improvement of this potential in the succession of the generations. The crossing constitute the main way to determine the manifestation of the heterosis effect, tidily depended of the existence of the interactions between the nonadditive genetic and the genetic diversity pronounced by the populations that are crossed [2].

The aim of the present paper was to appreciate the special combinative capacity for corporal mass of descendants at birth, of a crossing scheme, from the three rabbit breeds common used by the breeders in Timis county: New Zealand White (NZW), Large Chinchilla (CHL), Californian (CAL) and their hybrids.

2. Materials and methods

The biologic material used in the experiment was represented by domestic breeds from the New Zealand White (NZW), Large Chinchilla (CHL) and Californian (CAL) breeds, randomly purchased from different breeders. The animals were representative for the genetic structure of the three pure breeds from Timis county.

The crossing scheme used in the experiment had the following formula: the first generation of hybrids F1 (NZWxCHL) resulted from the crossing of the New Zealand White (NZW) as mother breed and Large Chinchilla as paternal breed, the second generation F2 (F1xCAL) had resulted from F1 hybrid as maternal component and Californian breed (CAL) as paternal breed. There were special attention given to assure a fairly comfort state for all individuals taken into study thought the entire study period, in order to fully express the genetic potential. There were also taken measurements to reduce at minimum the special environment influence, so that the differences noticed will be due to the different genetic structure of the individuals in the 5 lots. All the rabbit acquired ere vaccine and treated for parasitizes, and all were selected from micro farms with no contagious dieses.

The data recovered was statistically analyzed.

3. Results and discussion

It is known that the general combinative capacity due to the additive genetic can be predicted with a degree of probability in function of the information sources used. The combinative special capacity has no such quality reason for which it appreciation can be performed only by trial crossing between the populations taken into study [3].

In table 1 there are presented the absolute values, average values and the dispersion indicators for the number of offspring/ studied lot.

<table>
<thead>
<tr>
<th>Mean values and dispersion</th>
<th>NZW</th>
<th>CHL</th>
<th>CAL</th>
<th>F1</th>
<th>F2</th>
</tr>
</thead>
<tbody>
<tr>
<td>n [nests]</td>
<td>11</td>
<td>9</td>
<td>9</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>X [g.]</td>
<td>58.21a</td>
<td>51.46a</td>
<td>55.78A</td>
<td>61.30aA</td>
<td>61.40a</td>
</tr>
<tr>
<td>Sx</td>
<td>1.02</td>
<td>1.06</td>
<td>1.17</td>
<td>0.45</td>
<td>0.80</td>
</tr>
<tr>
<td>S</td>
<td>3.40</td>
<td>3.18</td>
<td>3.52</td>
<td>1.00</td>
<td>1.78</td>
</tr>
<tr>
<td>S²</td>
<td>11.54</td>
<td>10.09</td>
<td>12.37</td>
<td>1.01</td>
<td>3.18</td>
</tr>
<tr>
<td>C.V.%</td>
<td>5.83</td>
<td>6.17</td>
<td>6.31</td>
<td>1.64</td>
<td>2.90</td>
</tr>
<tr>
<td>Sx%</td>
<td>1.76</td>
<td>2.06</td>
<td>2.10</td>
<td>0.73</td>
<td>1.30</td>
</tr>
<tr>
<td>Min.</td>
<td>50.92</td>
<td>48.00</td>
<td>51.00</td>
<td>60.40</td>
<td>59.50</td>
</tr>
<tr>
<td>Max.</td>
<td>61.36</td>
<td>58.57</td>
<td>60.28</td>
<td>63.00</td>
<td>64.00</td>
</tr>
</tbody>
</table>

Test „t” A-a p≤0,001; A-b p≤0,01; A-c p≤0,05 a-a p>0,05

The highest value of the mean corporal weight, calculated, at the rabbits at birth, was registered at F2(F1xCAL) hybrids, the value was 61,40±0,80 g/individual. Mean corporal weight of the hybrids at birth F1(NZWxCHL) was 61,30±1,03 g/individual, with 0,16% lower than at the F2 hybrids, but with 5,04% higher than the one registered at pure breed
New Zealand White and with 16,05% higher than Large Chinchilla, the two breeds mentioned are the parental breeds of the hybrids. The lower high mean weight at birth was observed at Large Chinchilla breed, with the mean value of 51.46±1.06 g.

After applying t test, for the mean body weight at birth, for the five lots, the following were observed: the differences between the simple hybrids F1(NZWxCHL) and those from New Zealand White is not significant statistically (p>0.05); the differences registered between the simple hybrids F1(NZWxCHL) and Large Chinchilla is very significant (p≤0.001); the difference between the simple hybrids F1(NZWxCHL) and Californian breed is very significant (p≤0.001); the difference between the double hybrids three breeds F2(F1xCAL) is very significant statistically (p≤0.001); between the simple hybrids and F1(NZWxCHL) and double hybrids three breeds F2(F1xCAL) the difference is not different statistically (p≥0.05).

In the graphic representation it can be noticed that for the lots made up by hybrids (fig.1) there can be noticed that in the case of the lots constituted from hybrids, for F1(NZWxCHL) as well for F2(F1xCAL), there were registered an increase of the mean body weight at birth.

The heterosis of the body weight at birth, based on the total weight of the nest at birth, for the lot F1(NZWxCHL) constituted from simple hybrids was 11.8%, and for the double hybrids three breeds F2(F1xCAL) was 4.88%.

4. Conclusions

The three rabbit breed used in our study, New Zealand White, Large Chinchilla and Californian crossed according the hibridation scheme used in experiment, has a good special combinative capacity for corporal mass of the descendants at birth and can be efficiently used in production, for producing individuals for slaughterhouses.

References

3. Tobă (Goina) Daniela, Studiul efectului heterozis în exprimarea fenotipică a potențialității producției de carne la hibrizi de iepuri de casă - Teză de doctorat, Timișoara, 2009.