A Study of the Effect of the Country Producer of Sires on the Genetic Features of the Brown Breed in Bulgaria

J. Krastanov[1], L. Yordanova[2], V. Videv[1], and Y. Fenerova[1]

[1] Institute of Cattle and Sheep Breeding - Stara Zagora
[2]Thracian University - Stara Zagora

There are important reason to direct our efforts to studying the integrational features of the dairy cattle breeds, bred in Bulgaria in the contemporary European and World selection: a negative tendency in the development of the numbers and the productivity of the controlled and elite part of the population; and production and testing of sires in difficult conditions.

In this study the aim is at establishing some genetic differences, caused by the origin of the sire /country of import or bred in Bulgaria/.

Materials and Methods

The study was built upon the hypothesis that the net genetic effect of the imported from the certain country sires can be calculated as part of the variation, caused by this factor in our population, as well as the variation coused by the factors herd-year-season, age at the beginning of the corresponding lactation and additive genetic effect of the individuals.

To test the hypothesis, data from the first three lactations milk, milkfat and the percentage of fatty substances of 8769 cows and 450 sires from the Brown breed were analized.

PEST program by Groeneveld (1990) was used. The following model was applied:

$$Y_{ijklm} = Country_i + HYS_j + a_k + age_l + e_{ijklm}$$

where

Y_{ijklm} is the observation on milk, milkfat and fat-percentage for 305 days lactation

$Country_i$ fixed genetic effect of the imported from a certain country sires or bred in Bulgaria (**BG**), Germany (**GER**), United States (**USA**), Swiitzerland (**SWI**), Austria (**AUS**)

HYS_j fixed effect of herd-year-season /138 herds, 20 years for first lactation, 118 herds, 18 years for second lactation, 99 herds, 17 years for third lactation/

a_k random effect of animal /it was used relationship matrix without taking in consideration inbreeding, crossbreeding and grouping/

age_l effect of the beginning of the corresponding lactation - co-variable

e_{ijklm} random residual effect

It was applied mixed model treated with mode of sparse storage of coefficients in memory. At the last stage of calculation it were tested the hypothesis:

(country b + country c + country d + country e)/4 - country a = 0

for every country separatly.

Results and Discussion

Proven differences were established with different degree of significance about the effect of the country in which the sire was bred on the milkability of the first and third lactacion for **SWI** and **AUS** (Table 1).

The differences in the significance of the second lactation are possibly due to the fact

that because of the insufficient technological provision for the realization of productivity, adequate to the genetic potential there is alternation of a higher first lactation with relatively lower second lactation and vice versa. This is subject to further research.

The milk fat results for the first lactation significant shows the differences for the effect of the country of import for **AUS** with the effects of the rest of the countries which are similar. For every second and third lactation the differences are proven with the exception of the results for the effect of the sires bred in **SWI** at second and **BG** at third lactation. The levelled effect of the country producer of the sire for the first lactation is probably due to the unfinished growth and the additional variation caused by it.

With the percentage of fatty substances in the milk proven differences were established between the effect of the separate countries, produsers of sires, for first and second lactation with the exception of **BG**. For the third lactation only the differences for the effect of the imported from **SWI** and **AUS** sires are proven.

Apart from the rather generalized results, specific tendencies are observed for some of the countries importers as the alternation of higher with lower productivity and positive tendency of the following lactations of daugthers of the sires, produced in **BG**, **GER** and **SWI**, the negative tendency of the following lactations for the daugthers of the sires imported from **USA** and **AUS**.

The reasons for these differences can find different theoretical explanation, connected with the adaptability of the progeny of the sires produced in different countries to the less favourable conditions of life and breeding in Bulgaria, as well as with the individual features of the imported sires. Obviously, it is necessary that the research in this field continue.

Bibliography

Groeneveld, E. (1990). User's Manual. Institute of Animal Husbandry and Animal Bechavior. Federal Agricultural Research Centre (FAL).

Table 1. Estimation of the net genetic effect of the countryof import or bred in Bulgaria

Country of import	n cows	Milk lactation I	Milk lactation II	Milk lactation III	Milkfat lactation I	Milkfat lactation II	Milkfat lactation III	%-fat lactation I	%-fat lactation II	%-fat lactation III
BG	1562	10.5	-45.9 *	86.9	0.8	-1.8 *	2.3	0.01 *	0.0	-0.02
GER	4834	37.3	11.5	118.1	1.9	1.7 *	4.2 *	0.02 *	0.03 *	0.01
USA	1093	20.0	-65.4 *	-115.2	1.5	-1.2 *	-4.5 *	0.02 *	0.03 *	-0.01
SWI	1159	71.2 *	24.0	213.4 *	2.0	0.0	5.8 *	-0.01 *	-0.02 *	-0.05 *
AUS	121	-139.1 ***	76.0 *	-303.3 **	-6.1 ***	1.3 *	-7.8 *	-0.02 *	-0.02 *	0.08 **

* = P<0,05; ** = P<0,01; *** = P<0,001.