# ANALYSIS OF AVERAGE VALUES AND VARIABILITY OF LACTATION PRODUCTION INDICES IN THE BROWN BREED POPULATION FROM THE AREA OF SUCEAVA COUNTY

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**Abstract**

*The Brown breed is primarily found in hilly and submontane regions, particularly in the counties of Neamţ, Bacău, Vrancea, Buzău, Prahova, Argeş, Vâlcea, Gorj, and Mehedinţi. This distribution area begins in the N-V of Maramures and follows the course of the Carpathian Mountains. However, the Brown breed began to be exploited in approximately all the counties of N-E Romania, one of the main objectives of the researchers in the field was to increase, through improvement, both milk production and its quality*

*For these reasons, the research was conducted under the conditions of the household exploitation system of Brown breed, one of the major breeds reared in the region of Moldova. 536 animals total, registered in the official production control within the reach of the selection centers in Suceava county, were used in the research.*

**Key words***: quantity, production, fat*

## INTRODUCTION

The local breed Sura de Stepă and Mocăniță were combined with the Swiss-born Schwyz breed to create the Brown breed. At the end of the 19th century, the Schwyz breed was first introduced to Romania. After the Second World War, imports of animals of this breed increased (Gîlcă, 2005; Bielfeldtak et al., 2006).

The Brown breed, which at the time included around 5% of the nation's entire herd, was recognized in 1959 as an autonomous population as a result of the deliberate processes that transformed the local breeds through absorption at a very quick rate and on a pretty big scale. Similar to other European nations that raise it, the Brown breed, of the Schwyz type, belongs to the mixed milk-meat production type, with the production of milk taking precedence (Dănăilă, Rodica et al., 2006; Gîlcă, 2006; Mihalache Roxana et al., 2019).

The Brown breed is primarily found in hilly and submontane regions, particularly in the counties of Neamţ, Bacău, Vrancea, Buzău, Prahova, Argeş, Vâlcea, Gorj, and Mehedinţi. This distribution area begins in the N-V of Maramures and follows the course of the Carpathian Mountains (Acatincăi, 2010; Cziszter et al., 2017).

However, the Brown breed began to be exploited in approximately all the counties of N-E Romania, one of the main objectives of the researchers in the field was to increase, through improvement, both milk production and its quality. Therefore, milk production is to be 5500 kg with 4% fat and 3.4% protein content and 220Kg fat and 187 kg protein respectively (Marchiș et al., 2010; Brown Breed Association).

The problem of breeding and management of dairy cows in private, family farms is of particular importance because the achievement of increased production of milk and meat at minimal costs per unit of the product ensures the increase in the standard of living by improving nutrition both qualitatively and quantitatively (Gîlcă, 2006; Ledinek, Maria et al. 2018).

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For these reasons, in this paper, we follow the results recorded by farms in Suceava county regarding the average values and the variability of production indices for the population of Brown bulls in the area of Suceava county.

## MATERIAL AND METHOD

In this instance, the research was conducted under the conditions of the household exploitation system of Bruna de Maramureş, one of the major breeds reared in the region of Moldova. 536 animals total, registered in the official production control within the reach of the selection centers in Suceava county, were used in the research.

The number of cows in this area were raised, fed, maintained and exploited in private households that differed in terms of ensuring the fodder base and the structure of the rations, through the management of the technological factors of production, the degree of technical equipment, the labor force as and the way of capitalizing the production.

The research carried out consisted of conducting studies at the macroeconomic level and on a sample basis using different sources of information. The selective sample survey method was carried out by interviewing the breeders to obtain data and information not found in current statistics. The information gathered, both at the macroeconomic level and at the sample level, regarding the main biological elements, technological managerial and economic factors, were systematized, processed and interpreted (Confederate Margareta et al., 2005; Baykan, Ozkan, 2017; Wiggans et al., 2017).

The electronic data processing was carried out in the EXCEL program and the phenotypic parameters of the analyzed population were estimated based on the calculation of sample statistics: mean (X), variance (S2), standard error of the mean (SX), standard deviation (S) and coefficient of variation (V%) (Wangchuk et al., 2018).

## RESULTS AND DISCUSSIONS

In the following, the results are presented regarding the productive performances obtained for the first six lactations of the bulls of the Brună breed distributed over the area of Suceava county.

Therefore, for the duration of the total lactation, it can be observed that the first lactation was the longest, namely, of 397.79±16.40 days, being followed by the third lactation where the duration was 372.01±24, 62 days. The lowest value in terms of the duration of total lactation was recorded in the second lactation where the average was 339.18±14.31 days (fig. 1.). As for the values of the variance of the standard deviation as well as those of the coefficient of variation were very high, a fact that gives the analyzed population a very heterogeneous character.

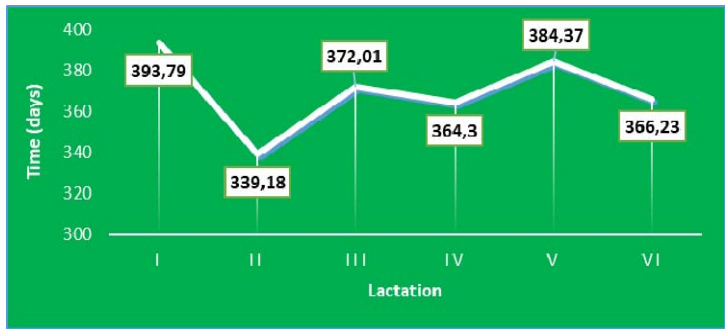


Fig. 1. Average values of the total duration of the milking season

The data on the duration of normal lactation on successive lactations show that it was shorter compared to standard lactation which has a number of 305 days.

Regarding normal milk production during normal lactation depending on the sequence of lactations, the average values were between 2985.56±101.25 kg (at lactation I)

and 3394.14±260.91 kg at lactation V, value which also represents the maximum lactation from the VI lactations analyzed.

Noteworthy is the amplitude of variability that presents extreme limits varying between 39.71 kg and 94.66 kg; therefore, the values of the variance of the standard deviation as well as those of the coefficient of variation highlight the variability of the batches, which is very high, a fact that gives the population a very heterogeneous character. All these aspects highlight the fact that in the area of Suceava county there is the possibility of selection and genetic improvement by retaining more variants and multiplying in the reproduction process of valuable genotypes.

The analysis of the variation string for the amount of milk in the first normal lactation highlights the fact that 4.15% of the analyzed population recorded amounts between 740 - 1557 kg of milk; 60.47% of the bulls studied had to milk production between 1967 kg and 5012 kg and the difference, respectively 33.20%, recorded values that were between 5013 kg and 7516 kg (tab. 1. and fig. 2.)

Table 1 Variability of the milk production per first normal milking season, for the Brown breed population from Suceava country

| Min. – Max. | Absolute frequency | Relative frequency |
|---|---|---|
| **740 – 1148** | 2 | 1.66 |
| **1149 – 1557** | 3 | 2.49 |
| **1558 – 1966** | 2 | 1.66 |
| **1967 – 2375** | 14 | 11.62 |
| **2376 – 2784** | 16 | 13.28 |
| **2785 – 3193** | 9 | 7.47 |
| **3194 – 3602** | 8 | 6.64 |
| **3603 – 4010** | 7 | 5.81 |
| **4011 – 4511** | 10 | 8.30 |
| **4512 – 5012** | 9 | 7.47 |
| **5013 – 5513** | 7 | 5.81 |
| **5514 – 6014** | 9 | 7.47 |
| **6015 – 6515** | 9 | 7.47 |
| **6516 – 7016** | 10 | 8.30 |
| **7017 – 7516** | 5 | 4.15 |


Fig. 2. The range of variation for the quantity of milk, at the first normal lactation, for the Brown breed from the Suceava country

The analysis of milk production on successive lactations highlights the fact that also in the Brown breed bulls from the area of Suceava county there is a good productive precocity, given the fact that in the first lactation a percentage of 86.96% of the maximum lactation was achieved (fig. 3).

Fat content in normal lactation recorded values between 3.75±0.06% in the second lactation and 3.89±0.04% in the first lactation.

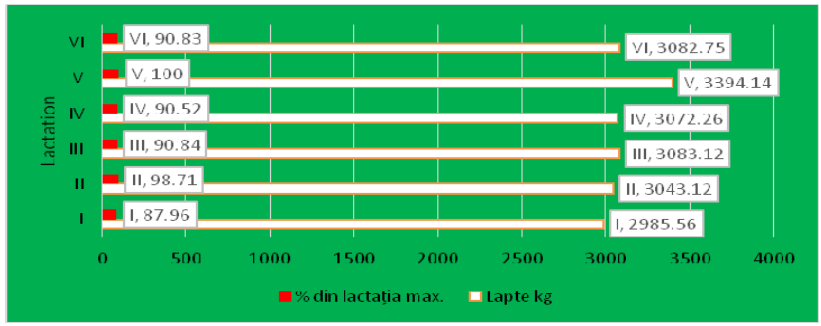


Fig. 3. Variability of the average milk productions per successive milking season

Therefore, the graphic analysis of fat content variability highlights the fact that in the population of Brown bulls from the area of Suceava county there is 44.82% plus variants with a fat level higher than 4.07%, while among the individuals of the population that have a fat content between 3.31% and 4.06% are in the proportion of 53.07%; the difference up to 100% is represented by the 2 minus variants that have a fat content of less than 3.3% (tab. 2. and fig. 4.)

Table 2 Variability of fat content, per first normal milking season, for the Brown breed population from Suceava country

| Min. – Max. | Absolute frequency | Relative frequency |
|---|---|---|
| **3.04 – 3.13** | 1 | 0.83 |
| **3.14 – 3.21** | 0 | 0 |
| **3.22 – 3.30** | 1 | 0.83 |
| **3.31 – 3.38** | 4 | 3.32 |
| **3.39 – 3.47** | 3 | 2.49 |
| **3.48 – 3.55** | 6 | 4.98 |
| **3.56 – 3.72** | 7 | 5.81 |
| **3.73 – 3.81** | 12 | 9.96 |
| **3.82 – 3.89** | 9 | 7.42 |
| **3.90 – 3.98** | 8 | 6.64 |
| **3.99 – 4.06** | 15 | 12.45 |
| **4.07 – 4.15** | 17 | 14.11 |
| **4.16 – 4.23** | 9 | 7.47 |
| **4.24 – 4.32** | 10 | 8.30 |
| **4.33 – 4.40** | 6 | 4.98 |
| **4.41 – 4.49** | 4 | 3.32 |
| **4.50 – 4.57** | 3 | 2.49 |
| **4.58 – 4.66** | 4 | 3.32 |
| **4.67 – 4.74** | 1 | 0.83 |

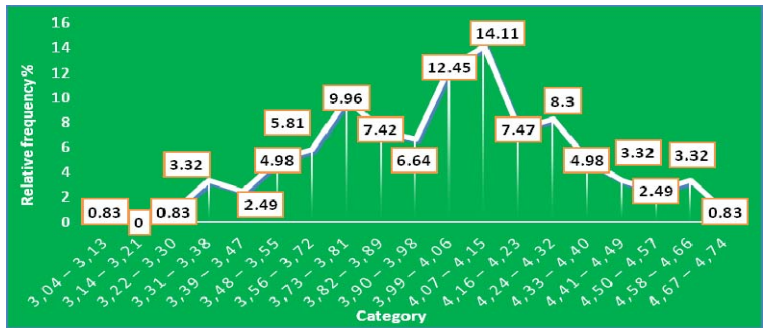


Fig. 4 The range of variation for the fat content, at the first normal lactation, for the Brown breed from the Suceava country

The results regarding the protein content of the Brown breed taurine population from the area of Suceava county are highlighted by milk rich in proteins, which is a characteristic of the breeds from the Schwyz strain.

Table 3 shows the variability of the protein content in lactation I; from the data presented, the marked variability of the population can be highlighted, there are also variants with a protein content between 4.41% and 4.50% (fig. 5.).

Also, 38.18% of the analyzed individuals recorded protein content values between 3.23% and 3.60%; 23.24% of the studied population presented values for the protein level between 3.61% and 3.99%, respectively 21.58% had values that varied between 4.00% and 4.50%.

Table 3 Variability of the protein content per first normal milking season, for the Brown breed population from Suceava country

| Min. – Max. | Absolute frequency | Relative frequency |
|---|---|---|
| **2.84 – 2.96** | 4 | 3.32 |
| **2.97 – 3.09** | 3 | 2.49 |
| **3.10 – 3.22** | 13 | 10.79 |
| **3.23 – 3.35** | 16 | 13.28 |
| **3.36 – 3.47** | 11 | 9.13 |
| **3.48 – 3.60** | 19 | 15.77 |
| **3.61 – 3.73** | 9 | 7.47 |
| **3.74 – 3.86** | 9 | 7.47 |
| **3.87 – 3.99** | 10 | 8.3 |
| **4.00 – 4.12** | 8 | 6.64 |
| **4.13 – 4.24** | 7 | 5.81 |
| **4.25 – 4.37** | 5 | 4.15 |
| **4.38 – 4.50** | 4 | 3.32 |
| **4.41 – 4.50** | 2 | 1.66 |


Fig. 5. The range of variation for the protein content, at the first normal lactation, for the Brown breed from the Suceava country

## CONCLUSIONS

The results of the research regarding the analysis of the milk production indices during successive lactations in the Brown breed bulls from the area of Suceava county highlight the fact that, compared to the average performances found in the Brown breed in the country (according to the official production control data), the studied population has a genetic value inferior, which is highlighted through the prism of average production performances. This inconvenience can be explained by the disappearance from the Suceava area of some performing Brown race nuclei. Also, through the lens of the obtained results, it is possible to observe the

average milk production, which is also lower in private peasant households, the reason can be given by deficiencies in the exploitation technology (poor nutrition) and their decapitalization, although there is a tradition in raising bulls

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