

content of its all constituents comparing with goat's milk. Both animal types milk during the beginning of lactation has increased fat content (8,35 and 4,37%), protein content (5,75 and 4,79%), lactose content (5,19 and 4,50%), reduction in the middle of lactation and the highest rate in the end of lactation.

Special feature of sheep's milk is high content of polyunsaturated fatty acids, their quantity is 30% higher, than in goat's milk. Goat's milk differs by high concentration of short chain fatty acids. Other author's research of fatty acid composition testifies about biological full-value of milk of both animal types.

According to the research sheep's milk is full of proline, glutamine acid, serine, histidine, arginine, alanine, tyrosine, and threonine. In goat's milk was discovered the highest amount of the following amino acids: proline, glutamine acid, serine, arginine, histidine and lysine. Both sheep's and goat's milk contains the lowest content of methionine, cysteine, isoleucine, phenylalanine, leucine, glycine and others.

The following nature balance of sheep's and goat's milk constituents provides vast scope of its application in cheese manufacture and as therapeutic product in human nutrition.

**Keywords.** *Lactation, milk of sheep and goat, lipids, fatty acids, amino acids.*

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## VARIABILITY IN GROWTH PERFORMANCE AND SPERM PRODUCTION RATE OF UKRAINIAN BEEF BREED SERVICING BULLS

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**Annotation.** *Age variability in live weight, average daily gain, body measurements and sperm production of Ukrainian beef breed servicing bulls was examined. It was found, that the maximum level of characteristics' variability is typical for young bull calves.*

**Key words:** *Ukrainian beef breed, servicing bulls, variability, live weight, measurements, ejaculate volume, sperm cells density.*

**Rationale.** One of the factors of breeding success is a use of an uneven development of selection traits in herd, in other words its variability. The most of economic traits are characterized by a high range of variability due to their complex hereditary changes. The difference due to those traits between animal units and animal groups is a result of numerous factors' effect, such as management technology, feeding, physiological traits etc.

**Recent researches and papers review.** Heterauxesis and unevenness in growth of tissue, as well as growth retardation with advancing age are biological features of beef cattle. The growth rate is highest within first months after birth, and then it decreases gradually and unevenly. It happens because of the relative decay of synthesis process in growing body, increase of differentiated cells and tissues rate as well as increase of reserve substances in body [5]. The main indicators of sperm production as well as biochemical and morphological indicators of beef breed bulls' sperm have age and breed differences. The impact of bulls' age and breed on morphological and biochemical indicators of sperm is 2,2 to 88,6% [4]. The coefficient of variation in live weight and growth intensity rate of beef bull calves is 7 to 15% that lets us claim about the possibility of selection basing on stated traits [2].

Genetic progress through selection, strengthening of any trait, depends significantly on the coefficient of trait variability among stock under examination.

The work **objective** was a study of variability in growth performance and sperm production rate of Ukrainian beef breed servicing bulls.

**Research data and methodology.** The research was executed following breeding records of the stud farm "Volia", Zolotonosha district, Cherkasy region. The control of bull calves growth (n=52) was performed by means of data processing: live weight of newborn, at the age of 3-;6-; 8-; 12-; 15-; 18 month, and bulls – at the age of 3 years.

The linear growth of bull calves at the age of 12-; 15- 18-month was characterized by measurements: height at the withers, height at hips, width of chest, chest depth, oblique body length, chest girth behind the shoulders.

The reproductive ability of bulls was examined by the main indicators of sperm quantity and quality: ejaculate volume (cm<sup>3</sup>), sperm cells density in ejaculates (bln./cm<sup>3</sup>) and activity (RPM – rectilinear progressive movement of sperm cells, in points), that were determined through standard practice [1]. The total amount of sperm cells in ejaculates was calculated as a product of ejaculate volume and bull's reproductive cells concentration indexes in 1 cm<sup>3</sup> of native sperm, and the amount of sperm cells with rectilinear progressive movement – as a product of the total amount of sperm cells in ejaculates and the sperm cells activity (in points).

Biometrical data processing was performed through mathematical statistics [3] using MS Excel aggregate functions package.

**Research findings and their discussion.** Research revealed a tendency to the dependence of bull calves' live weight variability rate on animals' age. Thus, bull calves have the maximum level of this trait's variation – its variability coefficient among newborn bulls is 16,7%, among 18-month – 12,03% (table 1).

A tendency to the decrease of the coefficient of variation with age among Ukrainian beef breed bull calves is typical also for the average daily gain (table 2). It decreases from 22,8% to 18,0% over the period from 8 to 12-month age (12-15 months).

The variability rate of the linear growth, except for the width of chest, is also decreasing with age, and it was highest (22,8%) among bull calves of 12-month age (table 3).

### 1. Live weight of Ukrainian beef breed bulls, kg (n=52)

| Age, months | M±m      | σ    | Cv, % |
|-------------|----------|------|-------|
| Newborn     | 42±1,6   | 6,9  | 16,7  |
| 3           | 111±3,8  | 16,4 | 14,7  |
| 6           | 218±6,3  | 26,8 | 14,9  |
| 8           | 320±10,5 | 44,4 | 14,0  |
| 12          | 475±17,5 | 74,1 | 15,6  |
| 15          | 552±19,3 | 82,1 | 13,9  |
| 18          | 636±21,1 | 89,3 | 12,0  |

### 2. Average daily gain of Ukrainian beef breed bull calves, g (n=52)

| Age period, months | M±m       | σ     | Cv, % |
|--------------------|-----------|-------|-------|
| 8 – 12             | 1200±37,9 | 273,3 | 22,8  |
| 8 – 15             | 1105±32,9 | 237,3 | 21,5  |
| 12 – 15            | 1080±52,1 | 196,0 | 18,0  |

The analysis of measurements' changes among bull calves has shown, that at the age of 18-month, as compared with 12-month, height at the withers increases by 7,1%, height at hips – by 7,2%, chest depth – by 13,3%, width of chest – by 15,2%, oblique body length – by 10,6%, chest girth behind the shoulders – by 14,4%.

Special attention is given to breeding bull's reproductive ability in his assessment. The sperm production rate, as well as any living organism characteristic, is characterized by continuous age variability.

### 3. Body measurements of Ukrainian beef breed bull calves (n=22)

| Measurements, cm      | Age of measurements, months |       |            |       |           |       |
|-----------------------|-----------------------------|-------|------------|-------|-----------|-------|
|                       | 12                          |       | 15         |       | 18        |       |
|                       | M±m                         | Cv, % | M±m        | Cv, % | M±m       | Cv, % |
| Height at the withers | 126,0±1,00                  | 3,71  | 128,0±1,20 | 3,70  | 135,2±0,9 | 3,41  |
| Height at hips        | 135,1±1,18                  | 4,15  | 137,9±1,06 | 3,62  | 144,9±0,9 | 2,93  |
| Chest depth           | 57,9±1,30                   | 10,56 | 61,1±1,48  | 8,41  | 65,6±1,01 | 7,20  |
| Width of chest        | 43,4±0,56                   | 6,02  | 46,2±0,79  | 8,0   | 50,0±0,8  | 7,34  |
| Oblique body length   | 147,2±1,78                  | 6,86  | 156,8±2,2  | 5,69  | 162,8±1,9 | 5,48  |
| Chest girth           | 177,2±2,29                  | 6,05  | 191,3±2,38 | 5,83  | 202,8±2,3 | 5,34  |

The ejaculate volume among bulls under study has increased over the period from 12-month to 72-month age by 62,2%, sperm cells density – by 38,1%, total amount of sperm cells in ejaculates – by 16,4% (table 4).

At the same time the total amount of sperm cells with RPM in ejaculates increased only by 3,8%, sperm cells activity under 4-years old age – by 4,6%, and then decreased.

#### 4. Sperm production rate of Ukrainian beef breed servicing bulls (n=22)

| Index                  | Bulls' age, months   |           |           |           |           |
|------------------------|--|-----------|-----------|-----------|-----------|
|                        | 12-24  | 25-36     | 37-48     | 48-60     | 61-72     |
| Quantity of ejaculates | 1119   | 1542      | 1686      | 1271      | 1199      |
|                        | Ejaculate volume, cm <sup>3</sup>  |           |           |           |           |
| M±m                    | 4,13±0,05  | 5,17±0,05 | 5,60±0,06 | 5,96±0,08 | 6,70±0,27 |
| σ                      | 1,59   | 2,00      | 2,12      | 2,09      | 2,10      |
| C <sub>v</sub> ,%      | 38,38  | 38,71     | 37,81     | 37,81     | 31,34     |
|                        | Sperm cells activity, points   |           |           |           |           |
| M±m                    | 6,07±0,06  | 5,95±0,05 | 6,20±0,05 | 6,35±0,06 | 5,98±0,16 |
| σ                      | 1,72   | 1,81      | 1,65      | 1,55      | 1,53      |
| C <sub>v</sub> ,%      | 28,31  | 30,50     | 26,60     | 24,45     | 25,58     |
|                        | Sperm cells density in ejaculates, bln./cm <sup>3</sup>                  |           |           |           |           |
| M±m                    | 1,18±0,02  | 1,52±0,03 | 1,37±0,02 | 1,44±0,02 | 1,63±0,06 |
| σ                      | 0,54   | 1,34      | 0,59      | 0,64      | 0,59      |
| C <sub>v</sub> ,%      | 45,46  | 88,84     | 42,99     | 44,08     | 35,99     |
|                        | Total amount of sperm cells in ejaculates, bln./cm <sup>3</sup>          |           |           |           |           |
| M±m                    | 5,13±0,10  | 7,09±0,11 | 7,85±0,13 | 8,88±0,20 | 11,1±0,64 |
| σ                      | 3,47   | 4,34      | 4,56      | 5,25      | 6,38      |
| C <sub>v</sub> ,%      | 67,72  | 61,25     | 58,15     | 59,09     | 57,52     |
|                        | Total amount of sperm cells in ejaculates with RPM, bln./cm <sup>3</sup> |           |           |           |           |
| M±m                    | 3,20±0,07  | 4,45±0,08 | 5,05±0,09 | 5,85±0,15 | 6,52±0,39 |
| σ                      | 2,33   | 2,99      | 3,37      | 3,84      | 3,84      |
| C <sub>v</sub> ,%      | 72,83  | 67,23     | 66,72     | 65,63     | 58,83     |

Research findings indicate a high variability of bulls' sperm production rate: ejaculate volume – 31,3-38,7%, sperm cells activity – 24,5-30,5%, sperm cells density – 35,9-88,8%, total amount of sperm cells in ejaculates – 58,2-67,7%, total amount of sperm cells in ejaculates with RPM – 58,8-72,8%.

The lowest variability of sperm cells activity rate in any age claims our attention. Coefficients of variation in sperm production rate are notably higher, than that in growth performance and linear measurements due to more complex process of genotype realization under particular conditions.

**Conclusion.** The variability of characteristics among Ukrainian beef breed bull calves – more specifically of live weight, average daily gain, body measurements and sperm production rate, depends on their age. Its maximum level is typical for bull calves. The variability of selection traits over the research period is high enough and predetermines the rise of rearing bull calves' selection differential.

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## ИЗМЕНЧИВОСТЬ ПОКАЗАТЕЛЕЙ РОСТА И СПЕРМОПРОДУКТИВНОСТИ БЫКОВ-ПРОИЗВОДИТЕЛЕЙ УКРАИНСКОЙ МЯСНОЙ ПОРОДЫ

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**Аннотация.** Изучено возрастную изменчивость живой массы, среднесуточного привеса, промеров тела и спермопродуктивности у быков-производителей украинской мясной породы. Установлено, что максимальный уровень изменчивости признаков характерен для молодых бычков.

**Ключевые слова:** Украинская мясная порода, быки-производители, изменчивость, живая масса, промеры, объем эякулята, концентрация сперматозоидов.

## МІНЛИВІСТЬ ПОКАЗНИКІВ РОСТУ ТА СПЕРМОПРОДУКТИВНОСТІ БУГАЇВ-ПЛІДНИКІВ УКРАЇНСЬКОЇ М'ЯСНОЇ ПОРОДИ

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*Анотація.* Досліджено вікову мінливість живої маси, середньодобового приросту, промірів тіла та спермопродуктивності у бугаїв-плідників української м'ясної породи. Встановлено, що максимальний рівень мінливості ознак характерний для молодих бугайців.

*Ключові слова:* Українська м'ясна порода, бугаї-плідники, мінливість, жива маса, проміри, об'єм еякуляту, концентрація спермій.

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## МОЛОЧНА ПРОДУКТИВНІСТЬ КОРІВ ГОЛШТИНСЬКОЇ ПОРОДИ ЗАЛЕЖНО ВІД ЛІНІЙНОЇ НАЛЕЖНОСТІ

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*Анотація.* У селекції молочної худоби, і нині розведення за лініями залишається провідним чинником поліпшення порід. Саме тому вивчення молочної продуктивності корів різних ліній голштинської породи в умовах конкретного господарства є актуальним. Дослідження були проведені за даними племінного обліку ТОВ «Українська молочна компанія» Згурівського району Київської області на 3817 коровах, які належали до ліній Старбака, Маршала, Чіфа, Елевейшна, Валіанта та Белла. Встановлено, що рівень молочної продуктивності корів залежить від лінійної належності. Найвищим рівнем молочної продуктивності за першу – 9965 кг, другу – 10915 та третю – 10820 кг лактації характеризувалися корови, які належали до лінії Старбака. Вони вірогідно переважали ровесниць, які належали до ліній Маршала, Чіфа, Елевейшна, Валіанта та Белла.

*Ключові слова:* голштинська порода, лінія, надій, вміст жиру, вміст білка.