# The effect of sire-C position on the economics of pigs fattening

*Vliv otcovské line v C-pozici na ekonomiku výkrmu prasat*

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**Abstract:** The objective of the trial in the test station was to evaluate productive performance with respect to sire-line No. 101, 102, 103 in C-position for LWs × (LW×L) genotype in pigs. The productive performance as to growth capacity, feeding intake and quantitative traits of slaughter value was examinated for 136 hybrid pigs divided in three groups of offsprings of LWs boar No.101, 102,103. The feeding of all pigs were ad-libitum. On the base of obtained results, one could say that inside the LWs-breed, considerable differences exist between lines, importantly affecting the overall economics of fattening.

**Key words:** pig, sire-line, performance, testation, profit formula, economics

**Abstrakt:** Testem byl zhodnocen vliv otcovských linií plemene bílé ušlechtilé (BO) 101,102,103 na produkční užitkovost hybridů prasat genotypu matka-otec (Bu×L) × BO. Produkční užitkovost 136 prasat, rozdělených do tří skupin, krmených ad-libitně, byla hodnocena na podkladě růstové intenzity, denního příjmu krmiva a ukazatelů jatečné hodnoty. Na základě získaných výsledků a použité ziskové funkce, byla prokázána produkční variabilita linií uvnitř plemene, významně ovlivňující celkovou ekonomiku výkrmu.

**Klíčová slova:** prase, otcovské linie, užitkovost, testace, zisková funkce, ekonomika

## INTRODUCTION

With regard to globalization and the related growing competition within the animal husbandry sector and thereby pork production as well, it is important that our pig-keepers could take advantage of the long-term experience of the previous generations, their knowledge and the newest scientific and professional information as effectively as possible, to be able to ensure their competitiveness in the market. Continuous increasing of pig production requires higher demands on the whole set of measures in the area of feeding, feeding technologies, genotypes continuing on to the selection of breeds or lines fixed for the positions of hybridization.

In existence of a number of our local as well as foreign hybridization programs, the breeder, respectively pig producer, must face the necessity to select the appropriate genotype that shall realize both the buyers' requirements and the sufficient fattening profitability. Just selection of breeds used in production of the final hybrid for fattening may not ensure the realization of the objectives presented above. A significant variability of the performance among the individual lines within the used breed significantly influences the achieved production parameters of the final hybrid. Therefore, the breeders may not decide upon their assessment for selection of a convenient line within the used breed, but upon the achieved results on the base of population-tests that may be carried out as the on-station tests as well as on-farm tests.

## REVIEW OF LITERATURE

Well-planned hybridization programs assure effective and quality improvements in pork production. Expressive selection pressure on this production performance results in percentage increase of meat ratio (Dickerson 1969; Webb, Curran 1986; De Vriese, Kainse 1992). Comparability of the obtained phenotype values of performance among each other is necessary for verification of hybridization-effectiveness and other breeding proceedings (Jakubec 1990).

Dickerson (1969) was one of the firsts engaged in evaluation of effectiveness of the hybridization methods with a view to the population differences and the individual components of heterosis and recombination. In pig breeding, Sellier (1976) engaged in optimizing of hybridization systems from the profitability points of view, i.e. by help of the profit formulas. He stated that in case of using the performance for assessment of one of the individual systems of hybridization, the discovered hetorose-effects are substituted in the indexes expressed by the profit formula (Moskal 1976; Jakubec 1987, 1990).

While respecting the specific conditions of each herd, the test is to include all main components of the pig-performance, i.e. the reproduction and production performance with an evaluation of the growth ability, feed conversion as well as the carcass value with respect to convenience of the sire-breed, its concurrence-combination according to individual breed or lines-convenience

Experiments were realized in the frame of the research project MSM 412 100 003.

(Šprysl, Stupka 1990, 1991). The influence of the interaction "genotype × environment" decreases the effectiveness of the achieved genetic improvement, which has been confirmed by Jakubec (1990), Rao, Mc Cracken (1990, 1992), De Hear, De Vries (1993). Therefore, there is an effort within the carried out tests to eliminate the impact of the environment by help of convenient biometric methods and to assess the genetic progress in the population. Among the most important factors for the breeders which significantly influence the fattening profitability in the course of minimizing the organization effort, there is the problem of sire-lines using in a position of fathers of final hybrids as it has been proved in this respect that there are very often more significant differences between the lines inside the breed that among the breeds (Hovorka 1989; Moskal et al. 1989; Svoboda 2001).

## METHODS

Comparison of the production performance, i.e. fattening capacity and carcass value on the pig profitability with respect to the used sire line of LW, was the objective of the carried out test.

The tested pigs were nursed in the same feeding/bedding conditions of the production herd. 136 hybrid pigs were brought in the test-station at an average age of 83 days (since their birth) and a average live weight 28.28 kg. The tested animals were sorted out into the following three groups:

Group 1: 44 barrows and gilts of 101sire-line LWs × (LW×L) genotype at average live-weight 29.68 kg,

Group 2: 54 barrows and gilts of 102sire-line LWs × (LW×L) genotype at average live-weight 29.46 kg,

Group 3: 38 barrows and gilts of 103sire-line LWs × (LW×L) genotype at average live-weight 25.42 kg.

All pigs were penned in pairs (barrow/gilt) according to the testing-methodology of pure and hybrid-bred pigs. Also feeding was carried out ad-libitum by the help of Duräumat self-feeders in the three smooth-conversion phases where the feeding-mixtures (CFM) were fattened acording to the followed receptures and Table 1.

Table 1. Composition of feeding-mixtures (CFM)

| Component (%) | Feeding period | | |
|---|---|---|---|
| | up to 35 kg | 35–65 kg | under 65kg |
| Wheat | 45.0 | 38.8 | 36.2 |
| Barley | 26.8 | 38.4 | 50.0 |
| Soya meal | 25.0 | 20.0 | 11.0 |
| Premix P1 | 3.2 | 2.8 | 0.0 |
| Premix P2 | 0.0 | 0.0 | 2.8 |
| Total | 100.0 | 100.0 | 100.0 |

For evaluation of fattening and growing performance, all pigs were weighted regularly weekly when the following traits were monitored:
– average live-weight (ALW) in kg,
– feeding conversion ratio (FCR ) in kg,
– daily feed intake (DFI) in kg,
– average daily weight gain (ADG) in g.

When achieving the average live-weight of approximately 105.95 kg, pigs were slaughtered and realized within the SEUROP system by the ZP method (Vrchlabský, Palásek 1992; Pulkrábek 2001 etc.).

For carcass value, determination the following traits was monitored for each animal:
– live-weight (kg),
– carcass weight (kg),
– weight of the right half carcass (kg),
– carcass lenght (cm),
– backfat-thickness of the last rib (mm),
– average backfat-thickness (mm),
– lean meat share (%).

All the obtained data were processed by common mathematic and statistic methods and expressed in tables and figures. For the conclusion, the profitability of the test was evaluated with regard to the whole group by the profit-formula (Poděbradský 1980; Župka 1992)

$$Zc = \{c_1 y_1 - [n_1 x_1 + n_2 x_2 + (n_3 : x_3) + A]\} \times r, \text{ while}$$

$$r = 365 : (x_2 + k), \quad x_2 = (y'_1 - y'_0) : x'_2, \quad Zc = Z \times r$$

where:
$Z_c$ = annual profit per capacity unit,
$Z$ = profit per head,
$r$ = annual speed of turnover,
$c_1$ – average sales price per unit of production,
$n_1$ – unit cost of compound feed,
$n_2$ – fixed costs per feeding day (in growing and finishing phase),
$n_3$ – costs per sow and litter,
$A$ – costs of piglet treatment and feeding,
$y_1$ – carcass weight,
$y'_1$ – live-weight of slaughter pig,
$y'_0$ – initial live-weight of fattened pig,
$x_1$ – quantity of consumed compound feed,
$x_2$ – duration of fattening,
$x_2'$ – ADG from live weight $y_0$ to live-weight $y_1$ of the slaughter pig,
$x_3$ – number of reared piglets per sow and litter,
$k$ – number of days between two rounds of fattening.

## RESULTS AND DISCUSSION

The Tables 2a–c show the results of the growing intensity of the tested groups of pigs.

As is obvious out of the Table 2a–c, the initial weights of pigs in the first two groups were almost identical, the weight of the third one was approximately by 4 kilograms lower. Despite the 4-day difference in age of this group compared to the other ones, it is obvious that the piglets of this line had a lower growing intensity even in the pre-fattening period. As regards the pigs of 101 and 102 lines, these reached practically the same weight at the end of the test (108.16 and 108.48 kg) with an almost identical growing intensity expressed by the average daily gain cca 860 grams. The pigs of 103 line were lighter by 7 kilograms at the end of the test and showed a lower average daily gain by approximately 30 grams for the period of the test while having evidently a lower appetite, or more precisely a lower feed intake ($P \leq 0.05$), and the identical feed conversion ratio, which was positively reflected in the total costs.

The Table 3 provides evaluation of the carcass value of the tested line-groups after finishing of the test and after their slaughter. With regard to the fact that the achieved differences in average weight of the monitored group are not statistically significant, the results may be reciprocally compared among the groups as these are not influenced by the weight. Though differences between the carcass value characterizing their quantitative and qualitative traits are approximately identical, not signifi-

Table 2a. Fattening capacity with respect to line – sire-line 101 (*n* = 44)

| Age (days) | Line 101 (*n* = 44) | | | | | | |
|---|---|---|---|---|---|---|---|
| | ALW (kg) | | FCR (kg) | | DFI (kg) | | ADG (g) |
| | $\bar{x} \pm s_x$ | s | $\bar{x} \pm s_x$ | s | $\bar{x} \pm s_x$ | s | $\bar{x}$ |
| 84 | 29.68 $^A$ ± 0.85 | 4.01 | . | . | . | . | . |
| 91 | 35.27 $^A$ ± 1.01 | 4.72 | 3.20 ± 0.26 | 1.20 | 1.55 ± 0.07 | 0.32 | 699 |
| 98 | 40.73 $^A$ ± 1.15 | 5.41 | 2.36 ± 0.15 | 0.70 | 1.79 $^A$ ± 0.07 | 0.33 | 779 |
| 105 | 47.27 $^A$ ± 1.43 | 6.72 | 2.63 ± 0.52 | 2.38 | 2.14 $^a$ ± 0.10 | 0.46 | 935 |
| 112 | 54.34 $^A$ ± 1.66 | 7.76 | 3.15 ± 0.84 | 3.93 | 2.34 ± 0.09 | 0.44 | 1 010 |
| 119 | 60.23 $^A$ ± 1.66 | 7.78 | 3.05 ± 0.22 | 1.02 | 2.35 ± 0.10 | 0.46 | 841 |
| 126 | 65.68 $^A$ ± 1.88 | 8.82 | 4.98 ± 1.22 | 5.73 | 2.53 $^a$ ± 0.09 | 0.41 | 779 |
| 133 | 72.77 $^A$ ± 1.92 | 9.02 | 2.80 ± 0.14 | 0.65 | 2.76 $^a$ ± 0.09 | 0.43 | 1 013 |
| 140 | 79.61 $^A$ ± 1.94 | 9.12 | 3.01 ± 0.16 | 0.76 | 2.84 $^A$ ± 0.09 | 0.44 | 977 |
| 147 | 86.23 $^A$ ± 2.09 | 9.80 | 3.37$^a$ ± 0.26 | 1.20 | 2.91 ± 0.08 | 0.36 | 945 |
| 154 | 92.66 $^A$ ± 2.02 | 9.48 | 3.58 ± 0.25 | 1.16 | 3.06 $^a$ ± 0.08 | 0.36 | 919 |
| 161 | 97.73 $^A$ ± 2.05 | 9.63 | 4.69 ± 0.64 | 2.98 | 2.90 ± 0.07 | 0.35 | 724 |
| 168 | 103.00 $^A$ ± 2.07 | 9.73 | 4.24 ± 0.35 | 1.64 | 2.94 ± 0.07 | 0.33 | 753 |
| 175 | 108.16 $^A$ ± 2.03 | 9.53 | 4.40 ± 0.44 | 2.06 | 2.92 ± 0.06 | 0.28 | 737 |
| Total | 108.16 $^A$ ± 2.03 | 9.53 | 2.96 ± 0.06 | 0.30 | 2.54 $^a$ ± 0.06 | 0.30 | 862 |

Table 2b. Fattening capacity with respect to line – sire-line 101 (*n* = 54)

| Age (days) | Line 102 (*n* = 54) | | | | | | |
|---|---|---|---|---|---|---|---|
| | ALW (kg) | | FCR (kg) | | DFI (kg) | | ADG (g) |
| | $\bar{x} \pm s_x$ | s | $\bar{x} \pm s_x$ | s | $\bar{x} \pm s_x$ | s | $\bar{x}$ |
| 84 | 29.46 $^B$ ± 0.73 | 3.81 | . | . | . | . | . |
| 91 | 35.57 $^B$ ± 0.97 | 5.01 | 1.75 $^a$ ± 0.10 | 0.51 | 1.54 ± 0.05 | 0.25 | 764 |
| 98 | 40.59 $^B$ ± 1.33 | 6.91 | 3.70 ± 0.90 | 4.59 | 1.67 $^b$ ± 0.09 | 0.48 | 717 |
| 105 | 47.09 $^B$ ± 1.64 | 8.52 | 3.54 ± 0.85 | 4.40 | 2.04 ± 0.09 | 0.47 | 929 |
| 112 | 54.22 $^B$ ± 1.67 | 8.69 | 2.28 ± 0.13 | 0.67 | 2.22 ± 0.10 | 0.52 | 1 019 |
| 119 | 60.41 $^B$ ± 1.72 | 8.93 | 2.73 ± 0.13 | 0.67 | 2.36 ± 0.10 | 0.54 | 884 |
| 126 | 66.31 $^B$ ± 1.73 | 8.97 | 3.02 ± 0.15 | 0.78 | 2.45 ± 0.09 | 0.45 | 844$^a$ |
| 133 | 72.98 $^B$ ± 1.91 | 9.94 | 2.96 ± 0.16 | 0.86 | 2.65 ± 0.08 | 0.39 | 952 |
| 140 | 79.28 $^B$ ± 1.89 | 9.84 | 3.08 ± 0.12 | 0.63 | 2.70 ± 0.09 | 0.47 | 899 |
| 147 | 86.59 $^B$ ± 1.98 | 10.28 | 2.85 $^a$ ± 0.14 | 0.72 | 2.85 ± 0.09 | 0.44 | 1 045 |
| 154 | 92.57 $^B$ ± 2.05 | 10.64 | 3.70 ± 0.19 | 1.01 | 2.96 ± 0.07 | 0.39 | 855 |
| 161 | 98.00 $^B$ ± 2.04 | 10.59 | 3.90 ± 0.23 | 1.17 | 2.81 ± 0.06 | 0.31 | 775 |
| 168 | 103.50 $^B$ ± 2.12 | 11.04 | 4.07 ± 0.22 | 1.16 | 2.94 ± 0.06 | 0.32 | 786 |
| 175 | 108.48 $^B$ ± 2.10 | 10.91 | 4.69 ± 0.43 | 2.26 | 2.93 ± 0.05 | 0.25 | 712 |
| Total | 108.48 $^B$ ± 2.10 | 10.91 | 2.86 ± 0.07 | 0.34 | 2.47 ± 0.06 | 0.32 | 868 |

Table 2c. Fattening capacity with respect to line – sire-line 101 ($n$ = 38)

| Age (days) | Line 103 ($n$ = 38) | | | | | | |
|---|---|---|---|---|---|---|---|
| | ALW (kg) | | FCR (kg) | | DFI (kg) | | ADG (g) |
| | $\bar{x} \pm s_x$ | s | $\bar{x} \pm s_x$ | s | $\bar{x} \pm s_x$ | s | $\bar{x}$ |
| 84 | $29.46^{B} \pm 0.73$ | 3.81 | | | | | |
| 80 | $25.42^{AB} \pm 0.79$ | 3.47 | . | . | . | . | . |
| 87 | $30.08^{AB} \pm 1.19$ | 5.20 | $3.15^{a} \pm 0.74$ | 3.23 | $1.46 \pm 0.08$ | 0.34 | 582 |
| 94 | $34.50^{AB} \pm 1.33$ | 5.81 | $3.22 \pm 0.86$ | 3.76 | $1.42^{Ab} \pm 0.10$ | 0.44 | 631 |
| 101 | $40.32^{AB} \pm 1.56$ | 6.82 | $2.69 \pm 0.42$ | 1.84 | $1.88^{Ab} \pm 0.11$ | 0.46 | 830 |
| 108 | $47.42^{AB} \pm 1.55$ | 6.75 | $2.19 \pm 0.11$ | 0.47 | $2.20 \pm 0.11$ | 0.48 | 1 015 |
| 115 | $53.53^{AB} \pm 1.63$ | 7.08 | $2.77 \pm 0.12$ | 0.51 | $2.35 \pm 0.10$ | 0.42 | 872 |
| 122 | $58.29^{AB} \pm 1.59$ | 6.95 | $4.14 \pm 0.92$ | 3.92 | $2.29^{a} \pm 0.12$ | 0.52 | $680^{a}$ |
| 129 | $64.84^{AB} \pm 1.63$ | 7.12 | $3.03 \pm 0.34$ | 1.49 | $2.54^{a} \pm 0.12$ | 0.52 | 936 |
| 136 | $71.13^{AB} \pm 1.62$ | 7.08 | $3.02 \pm 0.21$ | 0.90 | $2.57^{A} \pm 0.10$ | 0.43 | 898 |
| 143 | $78.18^{AB} \pm 1.56$ | 6.80 | $2.95 \pm 0.22$ | 0.95 | $2.81 \pm 0.10$ | 0.44 | 1 007 |
| 150 | $84.39^{AB} \pm 1.70$ | 7.40 | $3.38 \pm 0.21$ | 0.90 | $2.82^{a} \pm 0.09$ | 0.39 | 887 |
| 157 | $89.82^{AB} \pm 1.68$ | 7.31 | $3.70 \pm 0.17$ | 0.76 | $2.80 \pm 0.07$ | 0.31 | 774 |
| 164 | $96.16^{AB} \pm 1.70$ | 7.41 | $3.41 \pm 0.24$ | 1.07 | $2.90 \pm 0.06$ | 0.27 | 906 |
| 171 | $101.21^{AB} \pm 1.62$ | 7.06 | $4.59 \pm 0.50$ | 2.18 | $2.98 \pm 0.07$ | 0.30 | 721 |
| Total | $101.21^{AB} \pm 1.62$ | 7.06 | $2.86 \pm 0.07$ | 0.30 | $2.39^{a} \pm 0.07$ | 0.32 | 832 |

Differences indicate by same type are statistically significant.
For $P \leq 0.01$ is used *A,B*, for $P \leq 0.05$ then *a,b*.

cant (due to the frequency), it is obvious out of the obtained values that a relatively significant difference in lean meat share 1.56% for the benefit of 102 line was discovered between the lines 101 and 102 with identical growing intensity and live-weight. Even more significant difference was discovered between the lines 102 and 103. The 102 line reached a higher carcass weight by 6.38 kilograms and concurrently also a higher lean meat share

Table 3. Carcass value of tested pigs with respect to sire line in pigs ($n$ = 136)

| Indicator | Line 101 ($n$ = 44) | | Line 102 ($n$ = 54) | | Line 103 ($n$ = 38) | |
|---|---|---|---|---|---|---|
| | $\bar{x} \pm s_x$ | s | $\bar{x} \pm s_x$ | s | $\bar{x} \pm s_x$ | s |
| Carcass weight (kg) | 92.73 ± 1.76 | 8.27 | 93.33 ± 1.86 | 9.64 | 86.95 ± 1.41 | 6.15 |
| Weight of the right half carcass (kg) | 45.50 ± 0.89 | 4.19 | 46.22 ± 0.95 | 4.95 | 42.74 ± 0.68 | 2.98 |
| Carcass length (cm) | 88.14 ± 0.69 | 3.26 | 88.78 ± 0.53 | 2.76 | 85.53 ± 0.70 | 3.04 |
| Backfat thicness of the last rib (mm) | 18.68 ± 0.78 | 3.64 | 18.30 ± 0.90 | 4.69 | 17.89 ± 0.90 | 3.93 |
| Average backfat thicness (mm) | 27.45 ± 0.73 | 3.43 | 25.89 ± 0.72 | 3.76 | 25.37 ± 0.75 | 3.29 |
| Lean meat share (%) | 55.60 ± 0.71 | 3.31 | 57.16 ± 0.78 | 4.08 | 55.28 ± 0.78 | 3.31 |

Table 4. SEUROP realization of pig carcass with respect to sire line in pigs ($n$ = 136)

| Class | Line 101 | | | Line 102 | | | Line 103 | | |
|---|---|---|---|---|---|---|---|---|---|
| | $n$ | Carcass weight kg $\bar{x}$ | % | $n$ | Carcass weight kg $\bar{x}$ | % | $n$ | Carcass weight kg $\bar{x}$ | % |
| S | 6 | 81.00 | 13.64 | 14 | 92.43 | 25.93 | 4 | 81.00 | 10.53 |
| E | 18 | 92.89 | 40.91 | 20 | 91.50 | 37.04 | 22 | 87.45 | 57.89 |
| U | 18 | 97.44 | 40.91 | 18 | 96.22 | 33.33 | 10 | 88.80 | 26.32 |
| R | 2 | 84.00 | 4.54 | 2 | 92.00 | 3.70 | 2 | 84.00 | 5.26 |

by 1.88%. It is obvious out of the results, that the 102 line is the most convenient for application in sire position in production of useful hybrids. Also Table 5 confirms these conclusions.

The pigs originated from sire-102 line achieved the highest carcass realization in S quality classes, in particular at the highest average carcass weight in this class. It is obvious that the sire line significantly influences classification of the slaughter pigs, i.e. the realized carcass price per 1 kilogram of meat, which was reflected in the overall evaluation of profitability.

For assessment of profit per capacity unit, the average realized carcass price and own costs of the test were used. These included only the purchase price of the pigs and feed costs except of fix costs of the test, which are different for various production herds. With regard to the fact that the pigs of 101-line were 4 days younger in comparison to the other groups with the lowest live weight, these were corrected (according to the 1st week in the Table 2) for a common age of 84 days. The following Table 5 summarizes the economic evaluation of the monitored groups of pigs with a view to the lines.

As is obvious from the economic evaluation of the monitored groups of pigs, a significant difference between the lines in profit per pig has been obtained, in particular between the lines 102 and 103 by CZK 161.34, resp. 102 and 101 by CZK 132.55. The highest difference of 4.87% for the advantage of 102-line contrary to 101-line was obtained in the rate of profitability. From this point of view in respect to the economic efficiency, the group of pigs after the sire line of 102 seems to be the best as it reported the highest profitability due to the highest intensity of growth and best carcass pigs realization in classes S and E. Line 101 then seems less acceptable. Using the proved significant intra-line differences in the production performance and thereby also in profitability represents another very significant item leading to improvements in profitability rate of the keeping.

Table 5. The economic evaluation with respect to sire line in tested pigs

| Ukazatel | Line 101 | Line 102 | Line 103 |
|---|---|---|---|
| Number of pigs/group | 44 | 54 | 38 |
| Costs in CZK | | | |
| per 1 weaner | 1 780.80 | 1 767.60 | 1 684.80$^{X}$ |
| for for feeds/1 pig in the test | 1 309.95 | 1 259.15 | 1 217.85 |
| overall costs/1 pig | 3 090.75 | 3 026.75 | 2 902.65 |
| 1 per 1 feeding day | 14.39 | 13.84 | 13.38 |
| per 1 kg of weight gain in test | 16.69 | 15.93 | 16.07 |
| Sales in CZK | | | |
| per 1 pig | 3 821.58 | 3 890.13 | 3 604.31 |
| Realized carcass-price | 41.21 | 41.68 | 41.45 |
| Profit per 1 pig | 730.83 | 863.38 | 701.66 |
| Profitability per 1 pig (%) | 23.65 | 28.52 | 24.17 |

Costs = includes only the price for a weaners and feed per pig in the test

Note: Profitability of the tested groups of pigs is based on the previously defined costs of CFM components and realization sales of slaughter pigs. The cost per 1 weaner of 103-line marked

$^{X}$ is related to its cost at the 84 days of age

## CONCLUSION

The test was carried out in the over standard test-station at Ploskov, where the effect of sire C-line in the position of fathers of the final hybrids of the LWs × (LW × L) genotype was verified. The test was carried out on 136 pigs, offspring of boars of a sire line 101, 102 and 103. The traits characterizing the fattening performance and carcass value were monitored in all animals according to the uniform methodology. Subsequently, the results were evaluated by the profit formula. The influence of the sire line within the used breed Large white pure-bred on fattening economy of pigs has definitely been proved by the obtained results. The obtained results act as the means of production-indicator improvements, i.e. production profitability in the production herds as well as fattening farms.

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