Productive qualities of Swiss cows depending on the genotype of bulls

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Abstract. This study highlights the use of European breeding bulls in the selection of breeding stock of Swiss cattle in Uzbekistan in order to improve the productive qualities of cows and create highly productive families. In experimental herds, milk yields of mature cows exceed the requirements of the breed standard by 935 - 1219.4 kg, the ancestors of families are 1627 - 1816 kg higher than the requirements of the breed standard, which indicates their high genetic potential.

1. Introduction. The Swiss breed of dairy and beef cattle is one of the leading planned breeds of Uzbekistan and has been bred in the foothill regions of the republic for more than 90 years. For the first time, these cattle were brought to the republic from the breeding farms of Russia in the second half of the twenties of the last century. This breed is distinguished by its lability, well adapted to the specific climatic and forage conditions of the republic. Cows are characterized by high milk productivity, fat and milk content, longevity, good reproductive ability and other valuable qualities. For the qualitative improvement of the breed in recent years with purebred breeding, high-quality Swiss bulls of the world gene pool are used in selection, which is of current importance in improving the productive qualities of this breed of cattle. Studying the productive qualities of the daughters of different bulls makes it possible to develop effective methods of selection in improving the breed and is relevant in improving the breeding and productive qualities of livestock [1-10]. The aim of the work is to improve the main selection characteristics of Swiss cattle using European breeding Swiss bulls in the selection.

2. Materials and Methods

The research was carried out in the breeding herd of the open joint-stock company "Savay naslchilik chorvachilik" of Kurgantepa, in the breeding herd of the farm named after T. Shokirov of Asaka and the breeding herd "Avaz" of the Kurgantepa districts of the Andijan region of Uzbekistan. The objects of research were first-calf cows and full-grown Swiss cows. The productive indicators of cows have been studied by methods generally accepted in animal husbandry. The origin of the cows has been studied using pedigree records. The conditions for feeding and keeping the cows were the same.

3. Results and Discussions

Studies have shown that the level of milk productivity of cows of the “Savay naslchilik chorvachilik” breeding herd depends on the origin (Table 1).
As can be seen from the data in Table 1, during the 1st lactation, the daughters of different bulls are characterized by an insignificant intergroup difference and the difference in productive indicators turned out to be insignificant. However, it should be noted that the milk yield of first-calf heifers, exceeds the requirements of the standard of the Swiss breed of the republic by 150-291.5 kg, the fat content in milk by 0.30-0.36%, which indicates a fairly high level of their productivity potential. Studied in the same cows of the given herd milk productivity for III and older lactation (Table 2).

### Table 1. Productive indicators of daughters of different breeding bulls for I lactation

| Index                        | Bull manufacturer |
|------------------------------|-------------------|
|                              | Karan             | Bonfire           | Emil              | Jordan            |
| Number of heads              | 233855486         | 811               | 262592786         | 263754486         |
| Milk yield, kg               | 3477.6±131.4      | 3491.5±128.6      | 3350.0±85.7       | 3403.4±59.5       |
| Fat in milk, %               | 3.91±0.02         | 3.90±0.03         | 3.92±0.03         | 3.96±0.02         |
| Milk fat, kg                 | 136.0±5.3         | 136.2±6.0         | 131.3±4.2         | 134.8±4.8         |
| 4% milk, kg                  | 3399.5±107.8      | 3404.2±108.9      | 3283.0±90.0       | 3369.4±61.2       |
| Milk yield per 100 kg of live weight, kg | 802.8±8.8 | 780.8±7.5 | 778.0±6.8 | 787.6±5.0 |
| Live weight, kg              | 433.2±4.4         | 436.0±5.9         | 430.6±4.1         | 432.1±5.2         |

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### Table 2. Milk productivity of cows III and older lactation obtained from different bulls

| Index                        | Bull manufacturer |
|------------------------------|-------------------|
|                              | Karan             | Bonfire           | Emil              | Jordan            |
| Number of heads              | 233855486         | 811               | 262592786         | 263754486         |
| Milk yield, kg               | 4347.8±167.4      | 4419.4±138.5      | 4135.0±73.2       | 4210.4±51.5       |
| Fat in milk, %               | 3.94±0.012        | 3.93±0.01         | 3.96±0.03         | 3.98±0.03         |
| Milk fat, kg                 | 171.3±6.4         | 173.7±5.9         | 163.7±3.3         | 167.6±5.5         |
| 4% milk, kg                  | 4282.6±170.2      | 4342.0±141.2      | 4093.6±78.5       | 4189.3±61.7       |
| Milk ratio, kg               | 882.8±10.7        | 892.6±11.1        | 828.3±9.7         | 848.0±9.9         |
| Live weight, kg              | 492.5±5.3         | 495.1±6.3         | 499.2±5.9         | 496.5±5.9         |

As can be seen from the data in Table 2, full-aged cows of the daughter of the bull-producer Koster, in which milk yield, respectively, by 71.6 are distinguished by higher milk productivity; 284.4 and 209.0 kg, milk fat yield by 2.4; 10.0 and 7.1 kg, milk yield of 4% milk by 59.4; 284.4 and 152.7 kg, milk production coefficient by 9.8; 64.3 and 44.6 kg exceed the indicators of the daughters of the bulls.
Karan, Emil and Jordan. The daughters of all these bulls were distinguished by their high milk production potential. The daughters of Austrian bulls Karan, Koster, Emil and Jordan had milk yield at 1174.8; 1219.4; 935.0 and 1010.4 kg, milk fat yield by 52.9; 55.3; 45.3 and 49.9 kg are higher than the requirements of the Swiss breed standard, the milk production coefficient confirmed the pronounced milk type of the daughters of all bulls... Similar studies were carried out in the pedigree herd of the farm. T. Shokirova of the Asaka district of the Andijan region (Table 3).

The analysis of the data obtained showed that the daughters in this herd of the studied breeding bulls for the 1st lactation are characterized by a fairly high milk productivity and fat-milk content, the milk yield of which is 978.2 (40.76%) - 1312.5 kg (54.69%), the yield of milk fat by 46.3 - 64.1 kg (52.14 - 72.18%) exceeds the requirements of the breed standard. In terms of milk yield, the daughters of a bull Korona surpass the daughters of other bulls by 36.6 - 334.3 kg of milk and their milk yield per 100 kg of live weight was 17.2 - 99.3 kg (P> 0.999) higher than that of their daughters other bulls. We continued to study the productive qualities of these cows for III and older lactation (Table 4 and Figure 1).

The data in table 4 indicate that the milk yield of the full-age daughters of the bull Demon is 514, respectively; 506.9 and 13.2 kg higher (Fig. 1) than the daughters of bulls Peter, Roxy, Corona, milk fat yield by 22.0; 20.4 kg, milk yield of 4% milk by 550.6 and 511.5 kg, milk production coefficient by 76.7 and 113.7 kg exceeds the indicators of the daughters of bulls Peter and Roxy. The milk yield of the daughters of the bulls Peter, Roxy and Crown of Austrian selection was 997.7 - 1005.0 kg (31.18 - 46.83%), the yield of milk fat was 53.7 - 55.3 kg higher than that of the daughters of the Demon bull and the milk yield of the daughters of these bulls exceeds the requirements of the Swiss breed standard by 979, - 1511 kg, or 31.18 - 47.25%.

Table 5 shows the milk productivity of the bred families of cows in 3 generations obtained from different sire bulls in the breeding herd of the Avaz farm of the Kurgantepa region.
Table 4. Milk productivity and live weight of daughters of bulls of different genotypes for III and older lactation

| Index | Bull manufacturer |
|-------|-------------------|
|       | Peter | Roxy | Daemon | Crown |
|       | 1225067 | 209603264 | 195955 | 196097 |
| Number of heads | 15 | 15 | 9 | 6 |
| Milk yield, kg | 4197.7±22.5 | 4205±22.3 | 4711.9±42.5 | 4698.7±47.7 |
| Fat in milk, % | 4.01±0.03 | 4.13±0.03 | 4.12±0.06 | 4.15± 0.05 |
| Milk fat, kg | 172.11±7.9 | 173.7±6.4 | 194.1±8.1 | 195.0±5.3 |
| 4% milk, kg | 840.4±9.0 | 803.4±7.3 | 917.1±7.3 | 910.6±7.6 |
| Live weight, kg | 499.5±3.30 | 523.4±3.16 | 513.8±1.35 | 516.0±2.88 |

Table 5. Milk productivity of ancestors and cows of new families for III and older lactation, obtained from bulls of the Swiss breed of Austrian selection

| Ancestor | Productivity for the highest lactation | Daughters | Granddaughters | Great-granddaughters |
|----------|---------------------------------------|-----------|----------------|----------------------|
|          | milk yield, kg | fat, % | milk yield, kg | fat, % | milk yield, kg | fat, % | milk yield, kg | fat, % |
| Malika   | 5016 | 4.20 | 4935 | 4.20 | 5540 | 4.20 | 4127 | 4.10 |
| Aster    | 5874 | 4.22 | 5256 | 4.25 | 4880 | 4.10 | 3509 | 3.97 |
| Lens     | 5366 | 4.15 | 5523 | 4.25 | 5082 | 4.25 | 4441 | 4.10 |
| Marjon   | 5293 | 4.16 | 6436 | 4.20 | 5301 | 4.30 | 5185 | 4.12 |
| Aster 3566 | 7367 | 4.25 | 5256 | 4.20 | 4885 | 4.10 | 4712 | 4.15 |
| Zoya     | 6895 | 4.20 | 7896 | 4.23 | 5612 | 4.15 | 5528 | 4.20 |
| Branch 1768 | 8518 | 4.26 | 4271 | 4.20 | 4896 | 4.20 | 4577 | 4.25 |
| Sonia    | 4827 | 3.95 | 8537 | 4.20 | 8518 | 4.10 | 5246 | 4.10 |
| Lana     | 5016 | 4.20 | 5313 | 4.30 | 5170 | 4.20 | 4810 | 4.15 |
| Pichanka | 5112 | 4.15 | 5680 | 4.00 | 6120 | 4.20 | 4970 | 4.15 |

As can be seen from the data in Table 5, the families of cows, daughters of different bulls, are distinguished by a high genetic potential for milk production. The ancestors of families obtained from the bull Emil had milk yield by 1816 kg, or 2.66 times more than the requirements of the breed standard, the bull Roxy - by 1627 - 1912 kg (50.0 - 59.0%), the fat content in milk, accordingly, by 0.45 - 0.56%, the milk yield for granddaughters is 1071 kg, or 2.01 times, 1923 kg, or 2.66 times higher than the requirements of the standard of this breed. The milk productivity of granddaughters and great-granddaughters is also distinguished by high productivity indicators and significantly exceeds the requirements of the breed standard, which is confirmed by the data given in Table 5. The results obtained show that in the breeding dairy herds of the Swiss breed, new highly productive families of cows with a high level of milk yield, fat content in milk have been created in 3 generations of the progenitors’ offspring.

4. Conclusions
1. With the qualitative improvement of the Swiss cattle, the use of the European selection of Swiss breeds in the selection of bulls-producers has an improving effect on the level of productive qualities of the offspring.
2. The created new families of cows, bred using Austrian breeding bulls, are distinguished by a high genetic potential for milk production.

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