Effects of Crossing some Dairy Cattle Breeds with Aberdeen Angus Breed

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Abstract
The aim of this study was to evaluate the productive performances of the Aberdeen Angus x Holstein and Jersey x Aberdeen Angus females reared in intensive system. In the period 0-15 months, the highest average daily gain was recorded in the Aberdeen Angus x Holstein heifers, followed by Jersey x Aberdeen Angus. These results showed the genetic power of Aberdeen Angus to transmit this character, both on the paternal line (the most obvious effect) and on the maternal line. In the Aberdeen Angus x Holstein females, the sire influence led to a decrease in the amount of milk. In the Jersey x Aberdeen Angus cows, the milk yield was 30.3% lower, compared to the Holstein cows, and 43.3% higher, than the Holstein x Aberdeen Angus cows ($p \leq 0.01$). The crossbreeding between dairy breeds and Aberdeen Angus is recommended for profitability of small farms, because F1 females provide a fairly high milk production, and F1 males can be raised for meat.

Keywords: Aberdeen Angus breed, crossing, dairy cattle

1. Introduction

Within the current context of cattle rearing, there is a worldwide trend to use again dual-purpose breeds, the females being used for milk production, while the males for meat production. This trend is not for the large farms, where the specialisation of production is compulsory [1].
Rearing the crossbred calves (local breeds and beef breeds) becomes more expanded, because in the middle and small farms the benefit is double: the milk yield is large enough, while the meat is in large amounts, and of good quality [2].

2. Materials and methods

The purpose of the work was to conduct comparative research on the production parameters of Holstein (H) and F1 cows, reared in an intensive system. The females F1 were obtained by simple industrial cross of Aberdeen Angus x Holstein (AxH), in which the father was Holstein, and Jersey x Aberdeen Angus (JxA), in which the father was Aberdeen Angus.
The following productive parameters were monitored: weight at birth and the age of 15 months, average daily gain, milk yield, percentage of milk fat and milk protein.
The performance data were processed statistically by t test.

3. Results and discussion

At birth, the average weight of heifers was 34.82 kg in Holstein, 39 kg in Aberdeen Angus x Holstein crosses, and 31.33 kg in Jersey x Aberdeen Angus crosses. Compared to Holstein heifers, the body weight was 3.6% higher in the Aberdeen Angus x Holstein, and 5.73% lower in the Jersey x Aberdeen Angus. Although there

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were differences, they were not statistically significant ($p > 0.05$). The larger weight of the heifers at birth did not cause dystocia.
Table 1 shows data on the body weight at 15 months, when the heifers were artificially inseminated.

Table 1. Weight gain and average daily gain (0-15 months)

Breed/ hybrid	Birth weight, kg	Weight at 15 months, kg	Average daily gain, 0-15 months, g
Holstein	34.82 ±2.66	386.67* ±31.56	773.30*±69.18
Aberdeen Angus x Holstein	39.00 ±3.01	443.33 ±28.72	888.64±74.33
Jersey x Aberdeen Angus	31.33 ±2.87	410.00 ±30.14	832.24±70.62

* $p \leq 0.05$

Table 1 shows that the Aberdeen Angus x Holstein heifers had the highest average daily gain. Compared to them, the results of the Jersey x Aberdeen Angus and the Holstein heifers were 14.9% and 6.7% lower, respectively. This shows the power of transmitting this trait from Aberdeen Angus breed to its offspring both through sires (most obvious effect), and through dams. The differences were significant ($p \leq 0.05$).
According to literature data, crossbreeding the dairy breed with Aberdeen Angus resulted in a lower live birth weight, but a higher weight at slaughter [3].

The literature shows that the dairy breeds, like Romanian Black and White, had great abilities for meat in combination with the Aberdeen Aberdeen Angus breed [3,4]. The results confirmed the beneficial effect of the crossbreeding on the average daily gain and specific feed consumption [4].

Table 2 shows the data on the production performance for a normal lactation (305 days).

Table 2. Production performance at the first lactation

Breed/ hybrid	Milk yield, kg	Significance
H	7152.26± 188.83	
A x H	3479.33± 212.05	***
J x A	4987.33± 173.78	**

** $p \leq 0.01$; *** $p \leq 0.001$

Compared to the Holstein cows, the milk yield per normal lactation was 51.4% lower in Aberdeen Angus x Holstein, the differences being very significant ($p \leq 0.001$).
In the Aberdeen Angus x Holstein cows, the influence of the paternal breed caused a significant decrease of the milk yield, knowing that in Aberdeen Angus breed, the milk yield is lower, just to meet the requirements of the suckling calf.
In the Jersey x Aberdeen Angus cows, the milk yield was 30.3% lower, compared to the Holstein cows, and 43.3% higher, than the Holstein x Aberdeen Angus cows ($p \leq 0.01$). The productive superiority of Jersey x Aberdeen Angus to Aberdeen Angus x Holstein was due as a result of the paternal influence of the Jersey breed.
According to literature data, the hybrid resulting from the crossbreeding between Aberdeen Angus and a dairy breed had a lower live weight, crossbred cows lost less weight than the Jersey cows and even increased in body condition scores (BCS) during the lactation period, which implies that less input will be required to regain the target BCS after lactation [5].
Regarding the fat content of milk (Figure 1), compared to the Holstein, the values were 19.3% higher in Aberdeen Angus x Holstein and 30.1% higher in Jersey x Aberdeen Angus. The influence of Jersey breed determined statistically significant differences ($p \leq 0.05$).

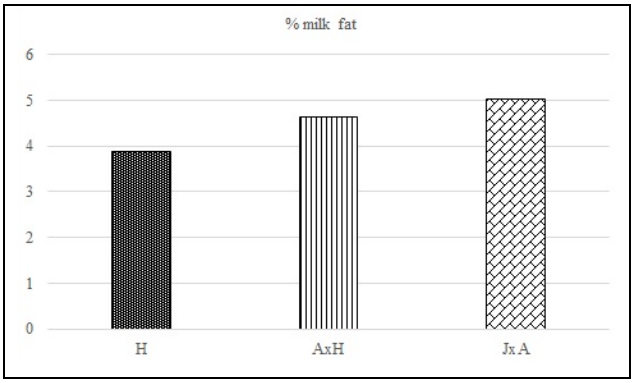

Figure 1. Percentage of milk fat

This trend is also noticed for the protein content of milk (Figure 2), which was 5% higher in Aberdeen Angus x Holstein and 7.2% higher in Jersey x Aberdeen Angus, compared to Holstein cows. The differences were not statistically significant ($p > 0.05$).

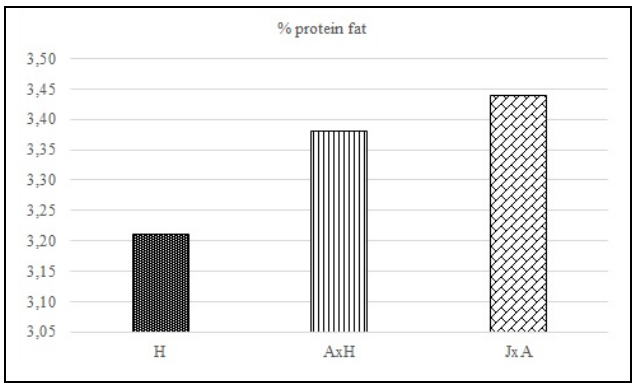

Figure 2. Percentage of milk protein

4. Conclusions

Evaluating the overall process of rearing the F1 hybrids resulting from the cross of Holstein cows and Aberdeen Angus bulls, and from Aberdeen Angus cows and Jersey bulls, produced the following conclusions:

- Compared to the Holstein heifers, the birth weight was 3.6% higher in Aberdeen Angus x Holstein and 5.73% lower in Jersey x Aberdeen Angus. The higher birth weight did not cause dystocia.
- The crossbreeding of a dairy breeds with Aberdeen Angus has significantly improved the body weight and the average daily gain.
- In both Aberdeen Angus x Holstein and Jersey x Aberdeen Angus crossbreeding, milk production decreased significantly.
- The milk fat was higher in Jersey x Aberdeen Angus cows, due to the paternal influence of the Jersey breed.
- The crossbreeding between milk breeds and Aberdeen Angus is recommended for profitability of small farms, because F1 females provide a fairly high milk production, and F1 males can be raised for meat.

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