Longevity and productivity of black and white cows from a large dairy farm

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ABSTRACT: The performed experiments involved analyses of longevity and life yield of culled cows taking into account causes of culling. Cows culled because of udder diseases and agalactia were characterised by the worst longevity.

INTRODUCTION

Milk production economy strongly encourages improvement of the so-called non-productive traits, which include, among others, length of animal utilisation and their health conditions. Another important problem for breeders is the knowledge of causes of cow culling in their herd and ways of its reduction.

MATERIAL AND METHODS

The experimental material comprised a population of cows (270 animals) which were culled in years 1993-1999 from a large commercial herd: Rolgos” in Paruszew. The culled cows were of black and white breed of varying proportion of HF cattle genes. Milk yield of the entire population of cows in the last year of experiments amounted to 6365 kg of 4.10% fat and 3.35% protein content.

Animals were kept on shallow litter in a stanchion system and were milked twice a day using an Alfa Laval milking pipeline machine. Feeding rations were formulated according to INRA system.

Data gathered in the experiment comprised information from the farm breeding files as well as documents from official milk recordings of cows found on the farm.

Cows, which were culled on the farm, were characterised on the basis of the following parameters: days of life, age at first calving, life yield, yield per day of life. In order to secure a more accurate comparison of cows, the amount of produced milk was converted into FCM (4% fat) for each yield.

When analysing the removal of cows from the herd, the following culling causes were taken into consideration: sale for further rearing, poor yields, udder diseases, sterility, infectious diseases, old age, leukaemia and accidents.

The performed statistical calculations employed the SAS® statistical program (1991). Significance of differences within the examined population was calculated using the method of comparison of the least mean squares (LSMEANS). Mean and standard deviations for individual traits were calculated using the MEANS procedure, while the FREQ procedure was employed to calculate frequencies. The analysis of variance used the GLM procedure.

RESULTS

Table 1 shows the longevity and life yield of culled cows in years 1993-1999. It was found that, from 1944 onwards, a steady increase in milk yield in the herd of culled cows was recorded. This resulted, in 1999, in the highest life FCM milk yield (18 683 kg) and FCM milk yield per day of life (4.20 kg). These means differed highly significantly when compared with their mean counterparts from previous years. On the basis of the obtained results, it can be said that the examined farm followed a program aimed at improving milk yields and, simultaneously, at increasing longevity of animals. From the beginning of the experimental period, the age of first calving increased and was the highest in 1996 (878 days) and later was slightly lower (approximately 840 days).

It is evident from Table 2 that cows culled because of udder diseases calved later than others (878 days), while those culled because of old age and accidents calved earlier (820 and 831 days, respectively). The cow that lived longest – 12.19 years (4448 days) and produced 10.14 kg of milk per day of life was the one that was culled because of old age. Cows culled because of udder diseases were found to live the shortest – 3.95 years (1441 days). On the other hand, the worst milk yields per day of life (1.63 kg) were observed in cows culled because of low productivity.

CONCLUSIONS

1. The highest longevity (5.92 years), the highest life yields (18 425 kg of milk, 754.2 kg fat, 606.5 kg protein and 18 683 kg FCM) and the highest yields per day of life (4.14 kg of milk, 0.17 kg fat, 0.14 kg protein and 4.20 kg FCM) were observed in cows culled in 1999. This can probably be attributed to severe selection carried out for these traits.
2. A correlation was found between longevity, yield and the cause of culling of cows from the herd. Cows culled because of udder diseases and sterility were found to live shorter (3.95 years) than other animals

Table 1. Longevity and life yield of cows culled in years 1993-1999.

Specification	Year of culling cows						
	1993	1994	1995	1996	1997	1998	1999
N	28	24	20	37	54	55	52
Age at calving days	**782 Aa**	**830**	**860 a**	**878 A**	**839 a**	**844 A**	**848 A**
sd	***90,08***	***155,51***	***155,98***	***123,56***	***126,69***	*96,64*	*119,23*
Days of life	**1266 A**	**1194 B**	**1496 Ca**	**1764 ABCa**	**1890 AB**	**1744 Aba**	**2160 ABC**
sd	*307,38*	*410,62*	*480,85*	*491,59*	***658,90* C**	*763,54* **E**	*809,52* **DE**
	Yield of life cows						
Milk kg	**5482 A**	**4152 B**	**7655 Ca**	**11605 ABD**	**13457 AB**	**12647 AB**	**18425 ABC**
sd	***3217,25***	*4481,23*	*5668,21*	*6450,24* **a**	*8779,96***CE**	*9000,98***CF**	*10806,63***DEF**
Fat kg	**214,6 A**	**147,9 B**	**295,5 Ca**	**448,8 ABDa**	**533,8 AB**	**507,5 AB**	**754,2 ABCD**
sd	*141,53*	139,82	*215,61*	*248,96*	*334,25* **CE**	*348,94* **CF**	*445,57* **EF**
Protein kg	**152,3 A**	**115,2 B**	**241,2 Ca**	**364,4 ABDa**	**428,9 AB**	**406,7 AB**	**606,5 ABC**
sd	*89,17*	*100,91*	*171,94*	*195,01*	*270,92* **CE**	*259,40* **CF**	*338,71* **DEF**
Milk FCM kg	**5412 A**	**3879 B**	**7495 Ca**	**11374 ABD**	**13390 AB**	**12672 AB**	**18683 ABC**
sd	*3390,43*	*3846,92*	*5498,41*	*6299,57***a**	***8505,42*CE**	*8817,66***CF**	*10981,42***DEF**
	Yield for day of life						
Milk kg	**1,23 A**	**0,93 B**	**1,72 Ca**	**2,61 ABDa**	**3,02 ABC**	**2,84 ABC**	**4,14 ABCD**
sd	*0,72*	*1,01*	*1,72*	*1,45*	*1,97***E**	*2,02***F**	*2,43***EF**
Fat kg	**0,05 A**	**0,04 B**	**0,07 Ca**	**0,10 ABDa**	**0,12 ABC**	**0,11 ABC**	**0,17 ABCD**
sd	*0,03*	*0,03*	*0,05*	*0,05*	*0,07***E**	*0,08***F**	*0,10***EF**
Protein kg	**0,03 A**	**0,03 B**	**0,05 Ca**	**0,08 ABDa**	**0,10 ABC**	**0,09 ABC**	**0,14 ABCD**
sd	*0,02*	*0,02*	*0,04*	*0,04*	*0,06***E**	*0,06***F**	*0,08***EF**
Milk FCM kg	**1,22 A**	**0,87 B**	**1,68 Ca**	**2,56 ABDa**	**3,01 ABC**	**2,85 ABC**	**4,20 ABCD**
sd	*0,76*	*0,86*	*1,24*	*1,42*	*1,91***E**	*1,98***F**	*2,47***EF**

Significant values at: p≤0,01 (A,B,C...), p≤0,05 (a,b,c...)

Table 2. Life yield of culled cows taking into consideration cause of culling.

Specification		Causes of culling cows					
		Ssale for breeding	Low milk yield	Udder diseases	sterility	Advanced age	accidents
N		7	52	5	144	1	61
Age at calving	days	**878**	**836**	**888**	**845**	**820**	**831**
	sd	*122,33*	*144,67*	*132,29*	*124,75*		*97,89*
Days of life		**1898**			**1810 A**		
	sd	*486,35*	**1447 A**	**1441**	***642,86***	**4448**	**1782 A**
			731,71	*562,02*			*708,80*
		Yield of life cows					
Milk	kg	**15427 a**		**8190**		**45119**	
	sd	*6840,57*	**7238 Aa**	*6466,46*	**12830 A**		**13082 A**
			8504,34		*8301,49*		*10007,22*
Fat	kg	**624,8 a**	**278,4 Aa**	**326,0**	**510,2 A**	**1768,0**	
	sd	*290,56*	327,48	*265,05*	***326,13***		**530 A**
							416,00
Protein	kg	**517,3 a**	**214,5 Aa**	**265,0**	**411,6 A**	**1190,0**	**424,0 A**
	sd	***233,51***	*246,91*	*203,85*	***260,07***		*324,20*
Milk FCM	kg	**15544 a**		**8166**		**44568**	
	sd	*7077,07*	**7072 Aa**	*6557,03*	**12785 A**		**13177 A**
			8288,91		***8193,35***		*10223,79*
		Yield for day of life					
Milk	kg	**3,47 a**	**1,63 Aa**	**1,84**	**2,88 A**	**10,14**	**2,94 A**
	sd	*1,54*	*1,91*	*1,45*	*1,87*		2,25
Fat	kg	**0,14 a**	**0,06 Aa**	**0,07**	**0,11 A**	**0,40**	**0,12 A**
	sd	*0,06*	*0,07*	***0,06***	0,07		*0,09*
Protein	kg	**0,11 a**	**0,05 Aa**	**0,06**	**0,09 A**	**0,27**	**0,09 A**
	sd	*0,05*	***0,06***	*0,04*	*0,06*		*0,07*
Milk FCM	kg	**3,49 a**	**1,59 Aa**	**1,84**	**2,87 A**	**10,02**	**2,96 A**
	sd	*1,59*	***1,86***	*1,47*	*1,84*		*2,30*

Significant values at: $p \leq 0,01$ (A,B,C...), $p \leq 0,05$ (a,b,c...)