

Longevity and milk production efficiency of Latvian local breeds during last decades



Daina Jonkus, Liga Paura, Lasma Cielava
Latvia University of Life Sciences and Technologies
Daina.Jonkus@llu.lv

Introduction. Latvian Brown (LB) and Latvian Blue (LZ) in the DAD-IS lists of FAO database are mentioned LB as local cows breed and LZ as local native breed (FAO, 2019). A local cow breeds are not only important for the conservation of genetic diversity, but are also economically effective on small farms (10 to 30 cows) because they are with higher longevity. During the last decade the number of local breeds' cows and cows which are classified as local is decreasing. **The aim of the study:** to analyse the longevity traits and the amount of energy-corrected milk per day of local dairy cow breeds.

Material and methods. The study was based on the data of LB genetic resources 1770 and LZ 921 cows. For study purposes, from Latvian Agricultural Data Centre were collected data about cows' milk productivity of cows which were born from January 1st, 2000 till December 31st, 2015. The analysed cows are from different parts of Latvia and are located in small farms with the stall housing systems and grazing in pastures. Data about cows' birth, culling and first calving dates, milk yield (kg), milk fat and milk protein content (%) in full lactation and in milking day were included in the dataset. For the analysis of longevity, age at first calving, lifespan, length of productive life and number of days milking were calculated. For analysis the efficiency of milk production, energy corrected milk (ECM) in one life day, in one productive life day and in one milking day for culling and lactating cows were calculated. Life length and ECM yield for lactating cows were recorded from the birth till November 1st year 2018. The milk production efficiency in the paper is characterized with the amount of ECM per one life day, productive life day and per milking day. Milk productivity and longevity of the LB and LZ cows were analyzed based on birth year periods. Data set was divided into three birth year periods: 2000–2005, 2006–2010 and 2011–2015.

Results

The local breeds have lower milk productivity; however, they are characterized by higher longevity. In total 0.7% of the LB and 2.4% of LZ breed cows, which were born between years 2000 to 2005, are still lactating and had closed 7–12 lactations at the end of 2018. From the first study period (2000–2005) 9 LB and 7 LZ cows had on average 8.9 ± 0.42 lactations. The proportion of LB and LZ cows which were born from 2006–2010 and are still lactating was more than 11%, and the proportion in 2011–2015 was around 70% (Fig. 1.).

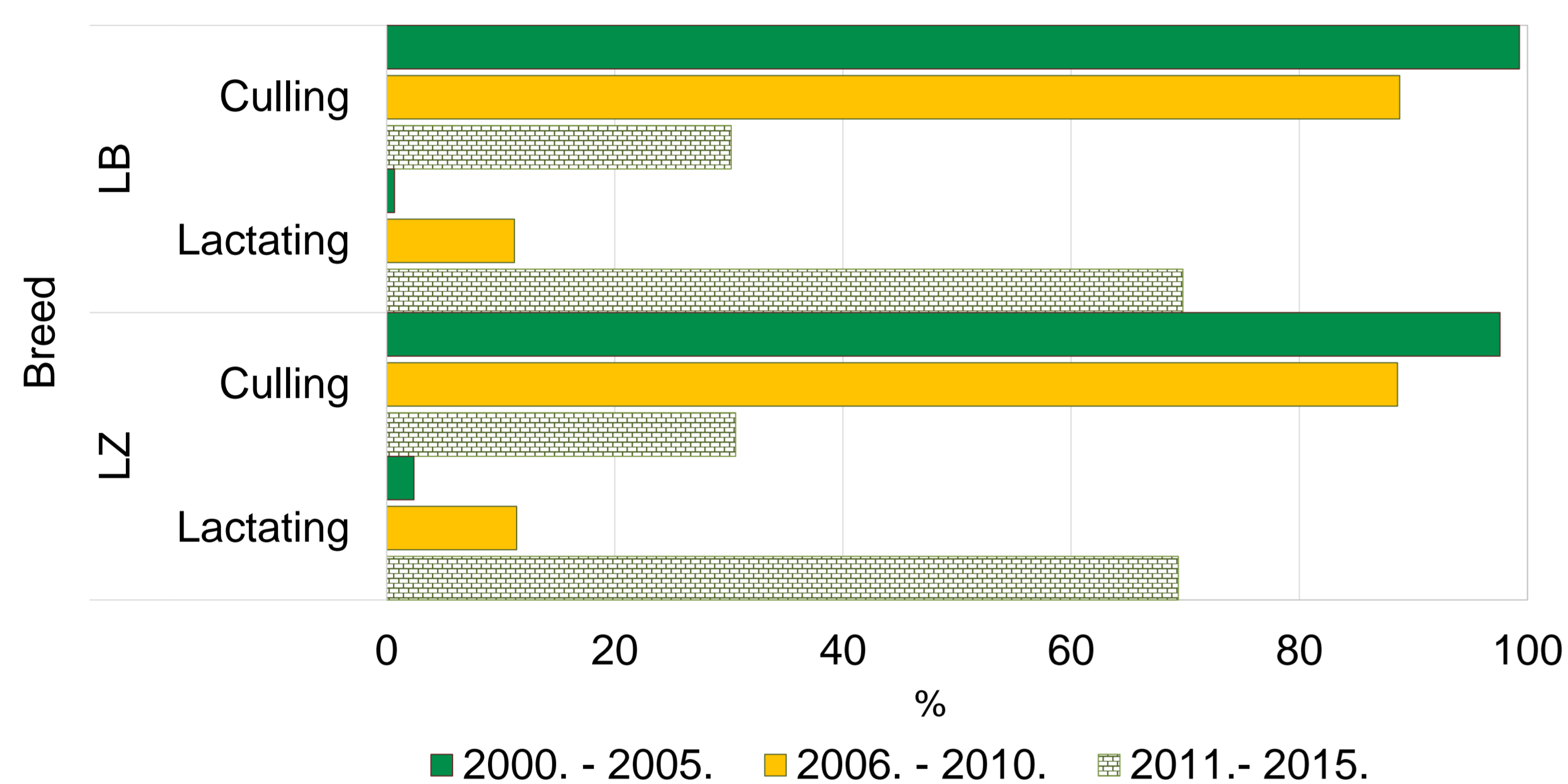


Fig. 1. The distribution of lactating and culling LB and LZ cows by birth year periods.

On average the analyzed culling cows had a lifespan from $1,486.2 \pm 150.4$ to $2,762.8 \pm 55.14$ days and it is decreasing during the time.

Table 1. The average longevity of culling LB and LZ breeds' cows by birth year periods

Period	Breed	N	Longevity traits			
			Age at first calving, days	Lifespan, days	Length of productive life, days	Milking days
2000-2005	LB	1,283	843.0 ± 4.35^a	$2,446.7 \pm 26.22^A$	$1,603.7 \pm 26.43^A$	$1,257.0 \pm 21.52^A$
	LZ	290	830.4 ± 9.15^a	$2,762.8 \pm 55.14^B$	$1,932.4 \pm 55.59^B$	$1,552.2 \pm 45.25^B$
2006-2010	LB	310	853.8 ± 8.85^a	$2,369.7 \pm 53.33$	$1,515.9 \pm 53.76$	$1,125.5 \pm 43.77$
	LZ	333	859.2 ± 8.54^b	$2,349.8 \pm 51.46$	$1,490.6 \pm 51.87$	$1,181.1 \pm 42.23$
2011-2015	LB	39	814.6 ± 24.95^b	$1,486.2 \pm 150.4^A$	671.6 ± 151.58	564.4 ± 123.40^A
	LZ	76	841.9 ± 17.87^{ab}	$1,575.8 \pm 107.7^B$	733.9 ± 108.58	636.2 ± 88.40^B

^{A, B} – significant differences between breeds in one period; ^{a, b} – age at first calving differ significantly between periods for one breed.

2000–2005 birth year period cows had the lifespan an around 2,500 days. LZ cows' lifespan was $2,762.8 \pm 55.14$ days, or 7.6 years and significantly higher than for LB. The average lifespan of LB culling cows was 6.7 years. 2011–2015 birth year period LZ cows had the higher lifespan ($1,575.8$ days) than LB cows ($1,486.2$ days) ($P < 0.05$).

Average lifespan of LB culling cows was 6.7 years. As well in 2011 - 2015 period lifespan of the LZ cows' had significantly higher ($1,575.8$) lifespan than LB cows' ($1,486.2$ days) ($P < 0.05$).

For the milk production efficiency evaluation the milk productivity during the lifetime and productive live time was evaluated.

Table 2. Average lifetime ECM productivity traits of culling LB and LZ breed cows by periods

Period	Breed	Milk productivity traits, kg			
		Lifetime ECM productivity	Life day ECM productivity	Productive life day ECM productivity	Milking day ECM productivity
2000-2005	LB	$19,634.7 \pm 388.23^A$	7.3 ± 0.09	12.3 ± 0.11	15.1 ± 0.12
	LZ	$24,179.9 \pm 816.59^B$	8.0 ± 0.20	12.2 ± 0.23	14.8 ± 0.25
2006-2010	LB	$19,144.9 \pm 789.80$	7.4 ± 0.19	13.0 ± 0.22	16.5 ± 0.24^A
	LZ	$18,830.0 \pm 762.04$	7.3 ± 0.18	12.6 ± 0.21	15.2 ± 0.23^B
2011-2015	LB	$9,537.9 \pm 2,226.73$	5.5 ± 0.53	14.5 ± 0.63	16.7 ± 0.66^A
	LZ	$9,937.1 \pm 1,595.12$	5.7 ± 0.38	13.9 ± 0.45	15.5 ± 0.48^B

^{A, B} – significant differences between breeds in one birth year period.

In general, LZ culling cows had higher lifetime and lifetime productivity, but lower productive life day and milking day ECM productivity. This can be explained by the fact that LZ cows had significantly higher average milking days (1275.8 ± 30.0) at all periods than LB cows (1215.4 ± 19.60) ($P < 0.05$). Taking into account the small number of local cows population in Latvia and their keeping purpose, low milk productivity is not a reason for the culling of these cows. The main goal is to get as many non-inbred calves as possible to preserve genetic diversity.

Conclusions. LZ breed was associated with higher longevity (lifespan, length of productive life, milking days) traits than LB in Latvian dairy herds. From culling and now lactating LB breed cows significantly higher daily ECM yield were obtained in all study periods than it was LZ cows.

The present study shows the number of local LB and LZ breeds cows' with percentage of genes of a local breed through 2000 to 2015 was decreased. This indicates that local breeds have a small population number and breeding organizations need to control the rate of inbreeding.

Acknowledgment: This paper was supported by Latvian Ministry of Agriculture.

