

The Impact of Age at First Calving on First Lactation Performance in Dairy Cows

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Abstract. The subject of this study is a dairy cattle farm with a capacity of 500 Holstein cows. The housing system is a free-stall group system with individual resting stalls. The study included all cows present on the farm as of April 2024 – a total of 425 animals. Based on individual animal records, the age at first calving and the cows' age as of April 2024 were calculated. The average age at first calving in the studied herd was within the optimal and recommended range – 716.26 days (23.88 months), with a high average first-lactation milk yield of 11 495.21 kg. A substantial variation in the age at first calving was observed depending on year of birth and corresponding lactation number. Only 1.18% of the cows calved for the first time before the age of 660 days. The majority of the cows – 90.35% – had their first calving between 22 and 26 months of age. Only 8.47% calved for the first time after 780 days of age. The variation in age at first calving across lactation numbers suggests that insemination of heifers on this farm typically begins after they reach one year of age. The lowest average first-lactation milk yield was recorded in cows that calved before the age of 659 days. In contrast, the highest average first-lactation milk yield was observed in cows that calved for the first time at over 27 months of age – 12 025.54 kg.

Introduction

The issue of optimizing the age at first calving (AFC) in dairy cows remains a challenge in many countries worldwide. The considerable interval between birth and first calving makes it difficult for most dairy producers to assess the impact of their heifer-rearing strategies on both individual animals and overall farm performance (Mourits et al., 2000). According to these authors, the importance of heifers in dairy production is not sufficiently recognized and is often misinterpreted by farmers.

Determining the optimal time for insemination in heifers is complex, as it must ensure the full utilization of their genetic potential for high productivity. On the one hand, economic considerations are of great importance, while on the other, the physiological status and health of first-calving cows are crucial. According to Levina et al. (2019), the physiological characteristics of heifers must be carefully evaluated prior to breeding. A thorough understanding of the factors affecting milk production efficiency can reduce costs and improve productivity.

In their study, Fodor et al. (2020) found that both very early and delayed insemination of heifers negatively affect milk production. Age at first calving is a key factor strongly influencing milk yield and milk composition (Pirlo et al., 2000; Petraskiene et al., 2007; Salomończyk and Guliński, 2010), reproductive performance (Evans et al., 2006), and longevity (Ojango et al., 2005). Reducing AFC also contributes positively to genetic progress by shortening

the generation interval and enabling earlier progeny testing of young bulls. Conversely, later breeding of heifers results in higher rearing costs (Turiello et al., 2020). Extending AFC beyond 750 days does not improve lactation performance, reproductive traits, or health status (Ettema et al., 2004).

Vargas-Leitón et al. (2023) reported that AFC significantly affects the profitability of dairy farms, noting that a heifer typically does not become profitable until her second lactation. Earlier AFC may reduce rearing costs due to lower feed and labor requirements (Tozer and Heinrichs, 2001). Similarly, Kusaka et al. (2023) suggest that early breeding of heifers may lead to increased profitability.

The average age at first breeding in Holstein heifers has decreased by nearly three months – from 28.6 to 25.7 months – clearly indicating a trend among farmers toward reducing AFC (Fodor et al., 2018).

However, current data on the impact of AFC on subsequent dairy cow performance are not always consistent. These discrepancies may partly result from differences in genetics, management practices, feeding, and other factors across studies and countries (Shook, 2006).

Berezkina et al. (2020) demonstrated that age at first insemination has a significant effect on milk yield, reproductive performance, health status, and postpartum complications in heifers. Proper farm management can improve the economic efficiency of animal utilization without compromising reproductive performance or adversely affecting milk productivity, even with early breeding (Kepkalo et al., 2024).

Therefore, farmers require precise and evidence-based information to support informed management

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decisions regarding heifer growth rates and rearing strategies.

The aim of this study is to assess reproductive performance, specifically age at first calving, and its association with subsequent milk yield in a high-producing dairy farm in Bulgaria over recent years.

Materials and Methods

The study was conducted in a commercial dairy farm located in the central part of Southern Bulgaria. The farm has a capacity of 500 Holstein dairy cows. The animals are housed in free-stall group pens with individual cubicles for resting. Milking is performed twice daily in a "herringbone" milking parlor. Cows are fed ad libitum with a total mixed ration (TMR), formulated according to their physiological status and level of milk production.

The study included all cows present on the farm as of April 2024 specifically, those born between 2014 and 2022, amounting to a total of 425 animals. Of these, 329 cows had completed at least one normal lactation. Data on pedigree, birth dates, calving dates, and milk yield for all completed lactations were obtained from the farm's records. The cows included in the analysis were daughters of 29 different sires.

Age at first calving and age of the animals as of April 2024 were calculated based on individual animal data. For better approximation, AFC was used in the statistical models as a fixed factor categorized into six classes: 1 – up to 659 days; 2 – 660 to 689 days; 3 – 690 to 719 days; 4 – 720 to 779 days; 5 – 780 to 809 days; and 6 – over 810 days.

Basic statistical analyses were performed using appropriate modules from the software packages MS Excel and STATISTICA (StatSoft Inc.).

To examine the influence of controlled factors on age at first calving, the following linear model was applied:

$$Y_{ijk} = \mu + G_i + Sire_j + e_{ijk},$$

where Y_{ijk} is the dependent variable (age at first calving), μ is the overall mean, G_i is the fixed effect of year of birth, $Sire_j$ is the fixed effect of sire, e_{ijk} is the effect of random residual variation not explained by the fixed effects or the overall mean (μ).

To assess the influence of the studied factors on first-lactation milk yield, the following linear model was used:

$$Y_{ijklm} = \mu + G_i + Ag_j + Lk + Sire_l + e_{ijklm},$$

where Y_{ijklm} is the dependent variable (milk yield in first lactation), μ is the population mean, G_i is the

fixed effect of year of birth, Ag_j is the fixed effect of AFC class, Lk is the fixed effect of lactation number reached, $Sire_l$ is the fixed effect of sire, e_{ijklm} is the effect of random residual variation not explained by the fixed effects or the overall mean (μ).

Analysis of variance (ANOVA) was used to obtain least square means (LSM) for the fixed factor classes in both models. These LSM represent the sum of squares calculated as deviations from the model-derived mean value of the respective trait.

Results and Discussion

Table 1 presents the mean values and variation of the studied traits in the herd. The average age at first calving for all cows present at the time of the study ($n = 425$) was 716.26 days (equivalent to 23.88 months), with considerable individual variation from 655 to 872 days, or 21.83 to 29.07 months, respectively. The average age of all lactating cows in the herd was 1456.58 days, or 3.99 years, ranging from young primiparous cows under two years of age (681 days) to nearly 10 years (3600 days).

By subtracting the mean AFC from the average age of the cows, it is evident that the average productive lifespan of the current herd is slightly over two years, which corresponds to approximately two lactations.

The average milk yield per lactation was calculated only for cows that had completed a lactation of normal duration (between 240 and 305 days), comprising 329 animals. The remaining 96 cows were primiparous and still in lactation but had not yet reached 240 days as of April 2024.

The mean milk yield was 11 966.17 kg, with values ranging from 5143.18 kg (typically among first-lactation cows) to 22 690.12 kg in cows at later lactations.

In order to maximize economic efficiency in dairy farming, several studies suggest that the optimal age at first calving should range between 23 and 24.5 months (Pirlo et al., 2000; Ettema and Santos, 2004). Achieving this target is considered feasible at a population level, provided that proper management and conditions are in place. However, in some countries, the average AFC remains higher. For instance, the mean AFC for Holstein cows is 26.5 months in the Canadian province of Quebec (Pietersma et al., 2006); 28 months in Sweden (Wejdmark, 2014); 30.7 months in Egypt (Hammoud et al., 2010); and 29.5 months in Honduras (Vargas-Leitón et al., 2023).

Table 1. Mean values and variation of the studied traits in the farm

Trait	Number	$\bar{x} \pm Se$	SD	min	max
AFC, days	425	716.26 \pm 1.912	39.427	655.0	872.0
Age, day	425	1456.58 \pm 28.001	377.263	681	3600
Milk yield, kg	329	11 966.17 \pm 168.41	3054.71	5143.18	22 690.12

Note: AFC= age at first calving.

In Bulgaria, data from previous years indicate that AFC has historically been higher than the recommended range. Gergovska and Yordanova (2011) reported an average AFC of 892.1 days (29.7 months) for 1,460 Black-and-White cows calving during the period 1995–2006. Lower values were reported by Penev et al. (2014) – 26.6 months in seven farms. Valchev et al. (2020) found an average AFC of 29.68 months across five farms in Southern Bulgaria, with values ranging from 28.79 to 30.33 months.

In a study conducted on 1200 cows, Siriak et al. (2022) found that when the AFC was under 22 months or over 34 months, a persistent trend toward reduced productive lifespan and overall productivity of the animals was observed.

In the present study, the evaluated farm exhibited a notably lower AFC of 716.26 days or 23.88 months, which falls within the internationally recommended range. This outcome indicates an effective reproductive strategy, high-quality feeding, and overall excellent herd management. Compared with previously cited Bulgarian studies, a substantial improvement in this trait is evident.

According to Kusaka et al. (2023), advances in genetics and nutritional management have led not only to increased milk yields but also to faster growth rates and greater body weight at first calving. As a result, a decreasing trend in AFC is being reported in many countries for modern Holstein heifers.

The average milk yield per standard lactation in the studied farm is significantly higher than the national average reported by the Bulgarian Executive Agency for Selection and Reproduction in Animal Breeding (Yordanov et al., 2017), which is 5,300–5,600 kg for Black-and-White (Holstein-type) cows, with 3.6–3.8% fat content and 3.2–3.3% protein. These results further highlight the high productivity and biological efficiency of the herd under investigation.

Fig. 1 presents the distribution of cows, expressed as a percentage of the total herd, according to AFC

in days. The lowest proportion of cows (1.18%) had an AFC below 660 days (up to 22 months), followed by those with an AFC over 810 days (more than 27 months) at 3.06%. The highest percentage of cows (60.0%) calved for the first time between 660 and 719 days of age (23–24 months), followed by those with an AFC of 720 to 779 days (24–26 months), accounting for 30.35%. In total, it can be stated that the majority of cows in the herd at the time of the study – 90.35% – had their first calving between 22 and 26 months of age. A total of 8.47% of the animals calved for the first time at over 780 days of age, or more than 26 months.

Gergovska (2011) reported that in approximately 34% of Black-and-White cows, first calving occurred relatively late – at 27–30 months of age with 22.9% calving for the first time at 30–33 months. According to Valchev et al. (2020), among the farms they investigated, the highest proportion of cows first calved at 28–30 months of age (29.53%), while 38.06% calved for the first time at an even more advanced age over 31 months. Only 7.58% of cows calved before 24 months of age.

Te Plate-Church (2002) points out that numerous studies recommend an age at first calving between 20 and 24 months as optimal. However, the ideal age may vary between herds, depending on specific management and environmental conditions.

According to various economic assessments, each additional month of delay beyond 22 months in age at first calving results in a financial loss of approximately \$100 per cow, primarily due to missed production opportunities. Nonetheless, the author emphasizes that body weight at first calving is a more critical factor than age alone.

Meyer et al. (2004) argue that adopting a universal recommendation for a specific AFC may be inappropriate for all cattle breeds or farming systems, as such recommendations might not align with individual farm management goals or production capabilities. Each dairy farm operates under unique

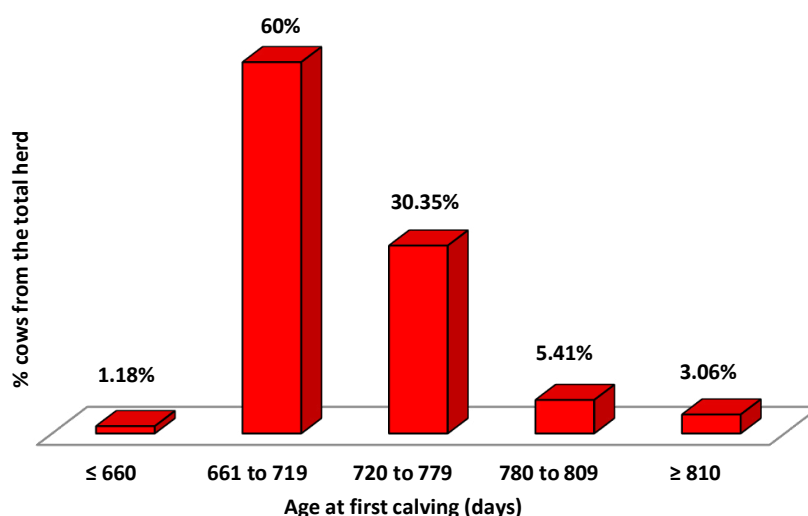


Fig. 1. Percentage of cows depending on age at first calving (days)

management strategies and environmental conditions, making the attainment of an “ideal” AFC and body weight at first calving a complex target. This is further supported by the comparison between our results and those of other national studies, which, although conducted over similar timeframes, reflect differences likely stemming from variations in herd productivity and management practices.

In Bulgaria, like in several other countries, heifers are rarely weighed or subjected to body measurements prior to insemination, which would otherwise serve as a reference for assessing their physical development. Decisions about breeding readiness are most often based on subjective visual assessment. Mourits et al. (2000) report that in the Netherlands, 95% of farmers rely primarily on age to determine the timing of first insemination.

Fig. 2 illustrates the distribution of cows by lactation number at the time of the survey. A strikingly high percentage of cows (39.78%) were in their first lactation. Cows in their second lactation represented 24.47%, slightly more than half of those in their first lactation.

The proportion of cows in their third lactation was 16.47%. Together, cows in their first to third lactation made up the predominant portion of the herd – 80.70%. Cows in their fourth lactation or beyond accounted for 19.30% of the herd. Only a few individuals had reached their sixth or seventh

lactation. These results indicate that a significant proportion of cows entering their first lactation are culled for various reasons before reaching their second or third lactation.

Other authors from different countries have also reported a relatively short productive lifespan for dairy cows. The average productive age of Swedish dairy cows has been estimated at second lactation (Carlén, 2013) to 2.5 lactations (Carlén and Eriksson, 2013). This implies that a cow having her first calf at 30 months of age may not be able to repay the investment in her rearing costs before being culled.

Table 2 presents the results of the analysis of variance regarding the influence of controlled factors on age at first calving.

The year of birth had a statistically significant effect on AFC ($P < 0.05$), whereas the sire did not. As previously noted, the cows were sired by 29 different bulls, with two, three, or more bulls being used in a given year, and some sires being used across multiple years. This suggests that the primary factor affecting AFC is management decisions made over the years, potentially also reflecting the quality of the youngstock and the conception rate at first service in heifers.

Fig. 3 presents mean values of the least squares (LS) obtained from the analysis of variance model for age at first calving by year of birth. It is notable that cows born in 2014 and 2015 had the highest average AFC,

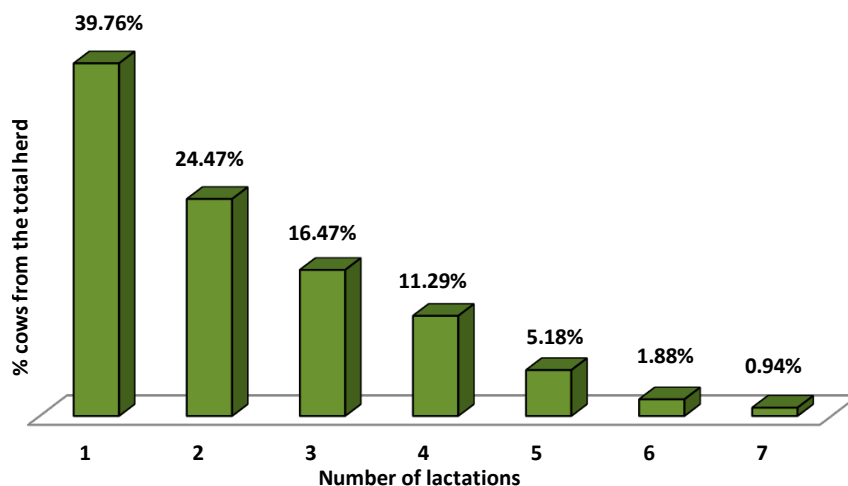


Fig. 2. Percentage of cows by number of lactations

Table . Analysis of variance for the effect of controlled factors on age at first calving

Source of Variation	Degrees of Freedom (df = n - 1)	Age at First Calving	
		MS	F P
Model (overall)	34	2943.36	1.35
Year of birth	6	3327	2.20*
Sire	28	1315	0.87
Error	390	1512	

Note: * – significant at $P < 0.05$; ** – significant at $P < 0.01$; *** – significant at $P < 0.001$; – no significant effect.

747.33 and 730.0 days, respectively, or slightly over 24 months. However, we cannot conclude that heifers in the herd were generally bred at older ages during this period (i.e., 2016–2017), as the sample includes only a small number of cows that had reached their sixth or seventh lactation at the time of the study. Nevertheless, these results may indicate that a higher age at first service, which is typically associated with better physical development, could be a contributing factor to increased longevity in dairy cows. To confirm such a hypothesis, a broader, longitudinal study over multiple years would be required.

Research findings regarding the relationship between AFC and cow longevity are inconsistent. Eastham (2018) suggests that cows calving for the first time between 22 and 26 months are more likely to survive to a second calving. However, this appears to be more reflective of early lactation management practices than of AFC itself. The study by Gävan et al. (2014) reported that survival to second lactation was highest (86.66%) in cows with an AFC of 25–27 months, followed by those calving at 28–30 months (84.21%). In contrast, cows calving at less than 24 months had significantly lower survival rates (71.40%).

Among cows born in 2016, a markedly lower average AFC of approximately 23 months was observed, with a gradual increase in AFC noted

among animals born in subsequent years, reaching an average of 24 months for those born in 2020 and 2021. The data presented for 2022 is incomplete and includes only those animals that had calved by the time of analysis; the remaining animals born that year are expected to have their first calving by the end of 2024.

The above findings are further supported by the data presented in Table 3, which shows the distribution of cows according to age at first calving by their current lactation number at the time of examination. The highest mean AFC was observed in cows that had reached their seventh lactation at 743 days, or nearly 25 months. Conversely, the lowest mean AFC was found in cows at their fourth to sixth lactation, ranging from 697 to 707 days, or slightly over 23 months. However, the range of variation (min-max) reveals that most lactation groups include animals with both low AFC values down to 21.8 months and high AFC values up to 29.1 months. The only exception is the group of cows at their seventh lactation, all of which exhibited AFC values strictly within the 24 to 25 months range.

The variability observed in the other groups, particularly those in their first lactation, indicates that in the farm, insemination of heifers generally begins after they reach one year of age, provided they have attained the required physical development. Delayed

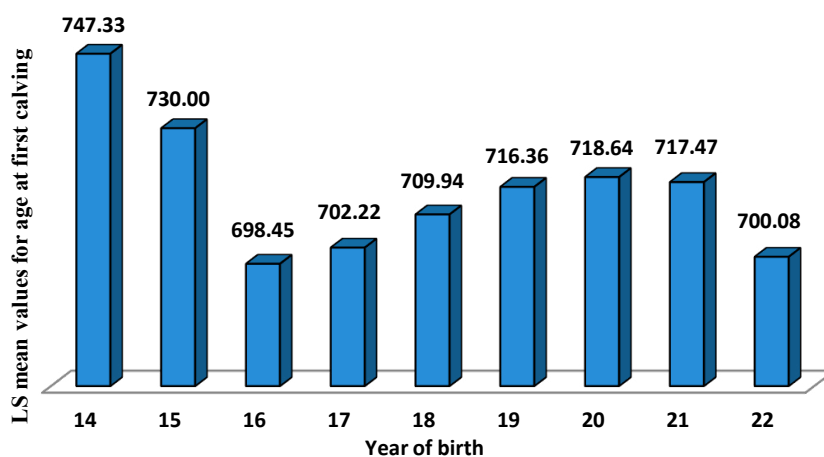


Fig. 3. Means of least squares for age at first calving (days) by year of birth of the cows

Table 3. Mean values and variation in age at first calving of cows according to the number of completed lactations

Number of Lactations	Number	Age at First Calving (Days)			
		$x \pm Se$	SD	min	max
First	169	719.75 ± 3.05	39.68	663	872
Second	104	721.60 ± 4.09	41.74	655	872
Third	70	712.43 ± 4.47	37.37	656	808
Fourth	48	707.21 ± 5.92	41.05	655	804
Fifth	22	697.59 ± 5.41	25.49	674	775
Sixth	8	699.13 ± 6.65	18.81	681	736
Seventh	4	743.00 ± 7.25	14.49	730	757

or omitted insemination due to underdevelopment can lead to breeding at older ages.

Age at first calving is a function of the age at first insemination combined with the reproductive efficiency of the animal. The decision of when to initiate insemination is primarily a management decision. It is generally based on the heifer's age but is also influenced by nutrition and health status. Poor growth during the rearing period, caused by undernutrition and/or disease, has been associated with delayed first insemination and first calving (Brickell et al., 2009; Johnson et al., 2011). Reduced fertility can lead to substantial variation in AFC, often resulting in significant differences between the target and the actual AFC achieved.

Table 4 presents the average milk yield and its variation for all normal lactations (from first to seventh) of all cows present at the time of the survey. The mean milk yield for all first lactations is high – 11 523.28 kg – with some individual yields reaching up to 22 344.36 kg. Average milk yield gradually increases to a peak at the third lactation – 12 562.90 kg – and remains above 12 000 kg through the sixth lactation. Although few in number, cows reaching the seventh lactation have an average yield of 10 550.45 kg per lactation. Maximum yields exceeding 22 000 kg per lactation were recorded in cows from first to third lactations. After the third lactation, maximum

values noticeably decline to below 20 000 kg.

As observed, in addition to milk yield, the number of cows reaching later lactations significantly decreases after the third lactation. This suggests that, beyond the natural decline in milk production with advancing age (or lactation number), high-producing animals in early lactations may have been culled for various reasons. All factors included in the analysis of variance model have a significant effect on milk yield during the cows' first lactation, as shown in Table 5. The most significant factors are the sire of the cow ($P < 0.001$) and the lactation number reached ($P < 0.001$), followed by the year of birth ($P < 0.01$), with age at first calving AFC having the least, yet still significant, effect ($P < 0.05$).

Pytlewski and Antkowiak (2021) also found a significant effect ($P \leq 0.01$) of age at first calving on most of the analyzed first-lactation milk yield traits in Jersey cows.

Year of birth and the lactation number reached are largely interrelated factors. As can be seen from the presented means of least squares (LS means) for the first-lactation milk yield, the milk productivity of first-lactation cows is lowest among those born in the earlier years 2014 and 2015 (just over 8700 kg) and gradually increases exceeding 11 000 kg from 2017 onwards (Fig. 4).

A similar trend was observed regarding the average

Table 4. Mean values and variation in milk yield per consecutive lactation of the cows included in the study

Number of Lactations	Number	Milk Yield for Standard Lactation (from 240 to 305 days)			
		$\bar{x} \pm \text{Se}$	SD	min	max
First	329	11 495.21 \pm 157.98	2865.43	5457.93	22 344.36
Second	226	12 061.53 \pm 203.83	3064.21	5143.19	22 284.67
Third	113	12 561.90 \pm 269.91	2869.20	4443.30	22 690.22
Fourth	53	12 071.04 \pm 288.28	2098.67	7221.18	16 939.40
Fifth	22	12 367.99 \pm 624.00	2926.83	7422.25	18 427.90
Sixth	7	12 188.31 \pm 1240.74	3282.68	8435.30	17 493.39
Seventh	4	10 550.45 \pm 1109.85	2219.70	7823.33	13 245.66

Table 5. Analysis of variance for the effect of controlled factors on age at first calving

Source of Variation	Degrees of Freedom (n – 1)	Milk yield in first lactation	
		MS	F P
Model (overall)	41	19 778 904	3.02***
Year of birth	5	22 656 673	3.45**
Age at first calving	4	35 078 928	3.22*
Number of lactations	6	47 964 386	7.31***
Sire	25	17 722 585	2.70***
Error	287	6 558 112	

Note: * – significant at $P < 0.05$; ** – significant at $P < 0.01$; *** – significant at $P < 0.001$; – no significant effect.

milk yield during the first lactation of cows that reached later successive lactations (Fig. 5).

The lowest average first-lactation milk yields were recorded in cows that reached the seventh and sixth lactations, amounting to 8772.56 kg and 9553.0 kg, respectively. These were cows born in 2014–2015.

In our view, high-yielding heifers are often subjected to more intensive exploitation and experience higher levels of stress, as well as an increased risk of metabolic and reproductive disorders. As a result, they are more frequently culled at an earlier stage, while the herd tends to retain more resilient and better-adapted animals, which are often characterized by more moderate levels of productivity.

The highest average milk yield during the first lactation was observed in the youngest cows currently in their first lactation – 12 045.05 kg. This indicates not only good feeding and management practices implemented on the farm during the study period but also a well-executed selection strategy focused on productivity. In recent years, an increase has also been reported in the first-lactation milk yield of the daughters of the sires used.

Table 6 presents the LS mean values for first-lactation milk yield in cows, depending on their age

at first calving. As shown in Table 3, AFC within the same birth year and successive lactation number ranged from under 22 months to over 25 months. This provides a good basis for evaluating the effect of AFC on the first-lactation milk yield independently of the other two factors.

The lowest first lactation milk yield was recorded in cows with an AFC of less than 659 days (under 22 months), as shown in Table 6. These cows also had the lowest maximum milk yield – 13 495.14 kg. In cows with an AFC between 660 and 809 days (over 22 to 27 months), the first-lactation milk yield was similar – slightly above 11 000 kg – and some of them reached maximum yields of over 20 000 kg. The highest average first-lactation milk yield was observed in cows with an AFC above 27 months – 12 025.54 kg, although this group included a relatively small number of animals.

Pirlo et al. (2000) reported that reducing the age at first calving has a negative impact on both milk yield and milk fat percentage during the first lactation. However, the main reason farmers are reluctant to reduce AFC is the widespread belief that early calving negatively affects productivity and longevity.

The results of Sawa et al. (2019) indicate that

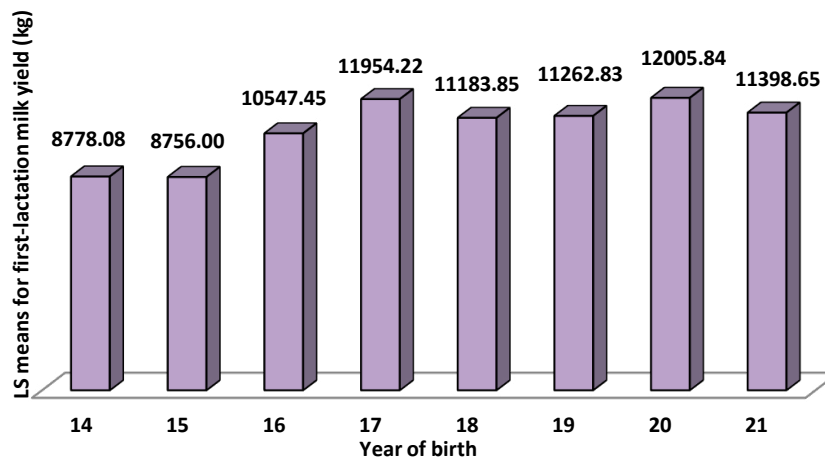


Fig. 4. Means of least squares for first lactation milk yield by year of birth

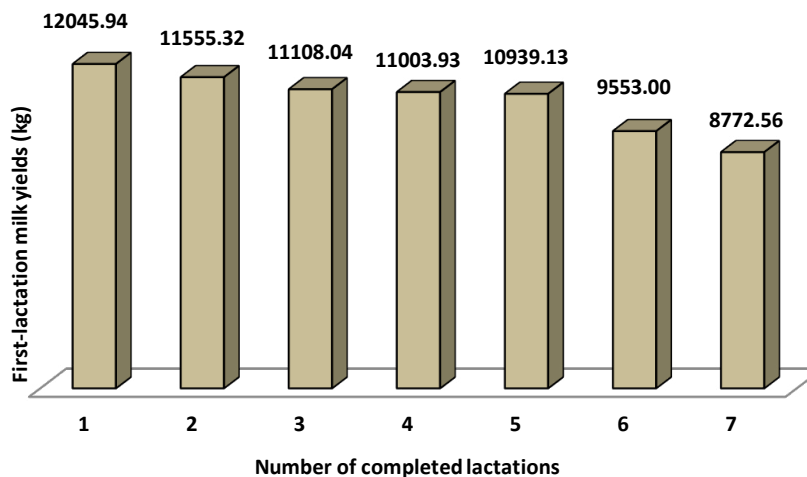


Fig. 5. First lactation milk yield by number of completed lactations

Table 6. Average values and variation of milk yield in first lactation depending on the AFC

Age at First Calving (AFC)	Number	Milk Yield in First Lactation (240 to 305 days)			
		$\bar{x} \pm \text{Se}$	SD	min	max
Up to 650	7	10 330.16 \pm 1239.94	2772.58	7339.31	13 495.14
From 660 to 719	197	11 635.94 \pm 197.03	2785.41	5457.93	21 159.91
From 720 to 779	98	11 373.02 \pm 290.41	2874.83	5875.68	22 344.46
From 780 to 809	18	11 795.75 \pm 753.85	3198.31	8226.06	21 170.49
Over 81	9	12 025.54 \pm 1519.14	4296.77	8267.70	21 333.87

heifers inseminated by 470 days of age have the lowest productivity, while those first inseminated at 711–720 days show the highest milk yield. Further increases in AFC are associated with significant milk losses for producers. According to Elahi Torshizi (2016), if AFC is less than 22 months, milk yield losses during the 305-day first lactation can amount to 590–800 kg.

According to Costigan et al. (2025), when heifers have an AFC between 738 and 768 days and a body weight at first calving between 516 and 550 kg, the productive parameters are optimal.

According to data from Pytlewski and Antkowiak (2021), the highest average daily milk yield (21.9 kg) was recorded in cows calving between 26–28 months of age, while the lowest was observed in cows that calved at the youngest ages.

The study by Mohd et al. (2013) point out that earlier artificial insemination of heifers, even when their development is adequate, results in lower milk yield, especially during the first lactation. On the other hand, Eastham et al. (2018) report that in Holstein cows, a lower AFC (21 months) improves udder health and reproductive indices while also extending the productive lifespan of the animals. According to Kusaka et al. (2023), an AFC of 22.5 months may be associated with better cow survivability and higher lifetime productivity compared with cows with higher AFC, without compromising reproductive performance.

Steele (2020) concludes that most studies suggest that the optimal AFC is between 22 and 25 months. Moreover, both low and high AFC appear to have adverse effects on one or more of the productive or functional traits in dairy cows.

Conclusion

The average age at first calving of cows in the studied farm falls within the optimal and recommended range – 716.26 days (23.88 months) – accompanied by a high average first-lactation milk yield of 11 495.21 kg. A considerable variation in AFC was observed across different birth years and corresponding successive lactations.

Only 1.18% of the cows had an AFC below 660 days (under 22 months). The majority of the cows in the herd at the time of the study – 90.35% – calved for the first time between 22 and 26 months of age. Only 8.47% had their first calving at over 780 days, or more than 26 months of age.

The variation in AFC by successive lactation indicates that insemination of heifers on this farm generally starts after 12 months of age. Failure to conceive or postponed insemination due to insufficient development results in later breeding.

The lowest first-lactation milk yield was recorded in cows with an AFC below 659 days (under 22 months). The highest average first-lactation milk yield was observed in cows with an AFC over 27 months – 12 025.54 kg – although this group was small in number. Cows with an AFC between 660 and 809 days (22 to 27 months) showed similar milk yields, slightly over 11 000 kg, and some of them reached maximum yields exceeding 20 000 kg.

These results indicate that a very low AFC (under 22 months) has a negative impact on first-lactation productivity. Allowing an additional one or two months before first calving (resulting in AFC above 22 months) appears to support better body development in heifers, leading to improved milk production during their first lactation.

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