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# Evaluation of Livestock Husbandry and Management Practices on Cattle Farms in Iğdır Province

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Bu Permission was obtained for this study with the decision of Iğdır University Scientific Research and Publication Ethics Committee dated 02.10.2027 and numbered 2024/26.

**Abstract:** This study was conducted in livestock farms in Central, Karakoyunlu, Aralık and Tuzluca districts of Iğdır province. As part of the study, 280 farm owners were personally interviewed using a questionnaire. The study was conducted to investigate and identify the practices of livestock owners in Iğdır province. Based on the information obtained, the study made suggestions that will contribute to the development of livestock farming. Based on the data obtained, it was found that the average milking time of calves after birth was 93.3±2.8 minutes. The average amount of milk the calves received per day was 3.3±0.1 kg. The average weaning age of the calves was determined to be 4.0±0.1 months. The average time for introducing cows to the bull after heat detection was found to be 9.6±0.3 hours. The average insemination time of the cows after birth (artificial insemination method/bull) was determined to be 66.0±1.1 days. The average number of artificial inseminations and bull inseminations for a pregnancy was 1.7±0.1 and 1.4±0.1 times respectively. This study found that husbandry practices were successful, but animal health and welfare were lacking. To promote sustainable, high-quality production and animal welfare, a long-term production plan supported by state aid and training is recommended.

**Keywords:** Cattle, Animal production, Herd management, Farms

## INTRODUCTION

Agricultural activities are of economic, social and strategic importance as it provides people with sufficient food, creates jobs in the agricultural sector and reduces migration from the village to the city (Alev, 2018). Meeting 40–50% of human protein requirements from animal sources is important (Karakuş, 2011). Fertility in livestock farms depends on the animal species, reproductive performance and management. Therefore, animals without reproductive problems are essential for the sustainability and profitability of the farm (Yılmaz and Çam, 2025). In this context, an economically viable way to develop the livestock sector should be to increase the productivity level per animal by improving the genetic structure of animals together with appropriate environmental conditions and breeding strategies (Tugay and Bakır, 2009). While the basis of profitability in large cattle farms is the principle of producing high amounts of milk from cows and giving birth to one calf per year, the sustainability of profitability depends on the formation of herds with high-yielding and high-quality cows, the regulation of care and feeding conditions and the increase of fertility (Tüzemen and Tankal, 2023).

However, looking at the current situation of Turkish livestock sector animal husbandry, it is easy to see that without the rapid implementation of long-term and constructive measures, Turkish livestock sector will inevitably face hard times (Türkyılmaz, 2010). In this context, the first results of the project initiated in 2001 on fertility control in dairy cattle breeds in Turkey were obtained in 2008, and from 2010, the project was also carried out in combined livestock and meat breeds, which has made a great

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contribution to domestic semen production and the reduction of external dependence in this field (Şahin and Yılmaz, 2023).

This study was conducted to investigate and determine the practices of cattle breeders in Iğdır province. Based on the information obtained, suggestions were made that will contribute to the development of cattle breeding.

## MATERIALS and METHODS

The material of this research was formed by face-to-face survey data obtained from 280 farms owners with a random sampling method from a total of 2862 businesses engaged in cattle breeding in the Central, Karakoyunlu, Aralık and Tuzluca districts of Iğdır province.

In determining the number of surveys used in the study, N, which indicates the total number of cattle farms in Iğdır province, is known, and since the information on variance and standard deviation is not known, the following sampling formula for simple random sampling was used (Equation 1) (Arıkan, 2007; Yamane, 2010).

$$n = \frac{Nxt^2x\ p\ x\ q}{(N-1)\ x\ D^2+t^2x\ p\ x\ q} \quad (1)$$

*n= Number of samples*

*N= Size of the cluster*

*D= Accepted or desired sampling error*

*t= Table value*

*p= Desired ratio to be calculated (0,28)*

*q= 1-p (0,72)*

$$n = \frac{2862\ x\ 1{,}96^2\ x\ 0{,}28\ x\ 0{,}72}{(2862-1)\ x\ 0{,}05^2 + 1{,}96^2\ x\ 0{,}28\ x\ 0{,}72} = 279{,}6$$

Based on the results of the formula, it was decided to conduct a survey of 280 farms. The results for the characteristics that can be summarized by counting in two-dimensional tables are given as numbers and percentages. Non-parametric tests were used when comparing the districts in relation to the various characteristics, as the data did not show a continuous and normal distribution. Therefore, the data was analyzed using the Kruskal-Wallis test.

The differences between the mean values were determined using Tamhane's post hoc multiple comparison test. As the data showed highly divergent values, it was preferred to interpret the median values together with the mean values (Yıldız et al., 2020). The analysis of these statistics was performed using the IBM SPSS 20.0 Statistical Package program (SPSS, 2011).

This study was approved with the decision of the Ethics Committee for Scientific Research and Publication of Iğdır University dated 02.10.2024 and numbered 2024/26.

## RESULTS and DISCUSSION

Before analyzing the livestock structures, the basic characteristics of the farms were determined, including the demographic data of the breeders, the livestock population and the soil type. Due to the wide variation in this data, both the median and the mean were used for the analysis (Table 1).

***Table 1.*** *Descriptive statistics on some farms assets*

| Features examined | N | $\bar{x}$ | $S_{\bar{x}}$ | Median | Min. | Max. |
|---|---|---|---|---|---|---|
| **Age of the producer (years)** | 280 | 46.51 | 0.72 | 46.50 | 20 | 81 |
| **Experience of the breeder (years)** | 280 | 46.5 | 0.72 | 46.5 | 20 | 81 |
| **Total number of cattle (head)** | 280 | 15.3 | 0.96 | 10.0 | 1 | 108 |
| **Total number of sheep (head)** | 73 | 141.2 | 14.08 | 120.0 | 10 | 700 |
| **Total number of goats (head)** | 44 | 11.7 | 1.23 | 10.0 | 2 | 36 |
| **Total area (in decares)** | 273 | 107.6 | 6.23 | 80.0 | 4 | 700 |
| **Number of meadows and pastures (in decares)** | 146 | 10.3 | 1.26 | 5.0 | 1 | 75 |
| **Area under forage crops (in decares)** | 200 | 39.2 | 2.76 | 25.0 | 3 | 250 |
| **Area under silage maize (in decares)** | 32 | 39.8 | 7.55 | 20.0 | 2 | 200 |
| **Area under cereals (in decares)** | 193 | 61.9 | 4.86 | 40.0 | 2 | 550 |
| **Area of the shelter (m2)** | 280 | 161.75 | 9.17 | 120.0 | 11 | 960 |
| **Age of the shelter (years)** | 280 | 10.11 | 0.43 | 8.0 | 1 | 61 |

In this study, the evaluation of practices related to herd management and farm management is presented in Table 2 in accordance with the producers' responses to the survey questions.

When analyzing the demographic characteristics of the growers in terms of education, course attendance, and responses to the course attendance questions, it was found that the majority of growers have a primary school degree (49.3%) and 7.9 attend livestock management courses. When the courses attended by the breeders were examined, it was found that they attended animal husbandry school in the first place, beekeeping course in the second place and veterinary school in the third place (Table 2).

It was found that 96.1% of the farms had mixed production (animal and crop production) and the number of farms with only animal production was very low (Table 2). Nevertheless, the presence of farms dedicated exclusively to animal production was considered important. It can be said that these farmers have a more professional production method.

***Table 2.*** *Statistical data on the demographic characteristics of farmers*

| Features examined | Sub-groups | n | % | Features examined | Sub-groups | n | % |
|---|---|---|---|---|---|---|---|
| | | **280** | **100.0** | | | **280** | **100.0** |
| **The animal breeder Collection status** | Noneducational | 27 | 9.6 | Buying feed | No | 111 | 39.6 |
| | Primary school | 138 | 49.3 | | Yes | 169 | 60.4 |
| | Middle school | 49 | 17.5 | The type of animal feed purchased (Yes, n=169) | Silage | 17 | 10.1 |
| | High school | 53 | 18.9 | | Concentrated | 85 | 50.3 |
| | University | 13 | 4.6 | | Cotton dew | 67 | 39.6 |
| **The milking variety** | Milked by hand | 250 | 89.3 | Registration status of the animal organization | No | 204 | 72.9 |
| | Machine | 30 | 10.7 | | Yes | 76 | 27.1 |
| **Participation to the course** | No | 258 | 92.1 | Which organizations ?(Yes, n=76) | Cooperative | 3 | 4.0 |
| | Yes | 22 | 7.9 | | Cattle breeder Association | 47 | 61.8 |
| **Course topic (Yes, n=22)** | Beekeeping | 5 | 22.7 | | Sheep - Goat Association | 26 | 34.2 |
| | Cattle Breeding | 15 | 68.2 | Registration on the farm is he being held? | Yes | 59 | 21.1 |
| | Veterinary | 2 | 9.1 | | No | 221 | 78.9 |
| **Type of farms** | livestock | 11 | 3.9 | Umbilical cord care | Yes | 152 | 54.3 |
| | Combined | 269 | 96.1 | | No | 128 | 45.7 |

Diler et al. (2022) found that the average age of farms owners in the İspir district of Erzurum province was 55.2 years and a large proportion of them had a primary school education. The research results regarding the educational level of farms owners are similar to the results reported by Tatar (2007), Kaylan et al. (2019), Kaygısız and Özkan (2021) and Diler et al. (2022).

In some studies on participation in a training course on animal husbandry, the participation rate in the training course was reported as 17.60% by Ünlü (2019), 3% by Tapkı (1996), 17% by Koçyiğit et al. (2015) and 34.3% by Bakan and Aydın (2016).

In this study, the evaluation of practices related to herd management and farm management in the farms is presented according to the breeders responses of the breeders to the survey questions in Table 3.

When examining the organizational affiliation of the breeders, it was found that the vast majority of them were not members of any organization related to agriculture. It was found that the breeders who were members of an organization (n=76, 27.1%) were firstly members of the Breeding Cattle Breeders Association, secondly the Breeding Sheep-Goat Breeders Association and thirdly the Agricultural Development Cooperative.

***Table 3.*** *Statistical data on herd management on farms*

| Features examined | Sub-groups | n | % | Features examined | Sub-groups | n | % |
|---|---|---|---|---|---|---|---|
| | | **280** | **100.0** | | | **280** | **100.0** |
| **Is Cow Resentment detection being performed?** | Yes | 272 | 97.1 | Transhumance activity | No | 186 | 66.4 |
| | No | 8 | 2.9 | | Yes | 94 | 33.6 |
| **Artificial insemination** | Yes | 142 | 50.7 | When is the month of departure to the plateau ? (Yes, n=94) | April | 31 | 33.0 |
| | No | 138 | 49.3 | | May | 37 | 39.4 |
| **Why is Artificial insemination?** | Government Support | 59 | 21.1 | | June | 26 | 27.6 |
| | Pure race | 142 | 50.7 | When is the month of return from the plateau ? (n=94) | August | 20 | 21.3 |
| | No disease | 56 | 20.0 | | September | 41 | 43.6 |
| | Government Support and pure race | 14 | 5.0 | | October | 33 | 35.1 |
| | No Bulls | 9 | 3.2 | Milk cooling | Yes | 110 | 39.3 |
| **Artificial insemination the reason for not choosing?** | Impossibility | 5 | 1.8 | | No | 170 | 60.7 |
| | The sperm problem | 30 | 10.7 | Milk cooling method (n=110) | Refrigerant tank | 11 | 10.0 |
| | Failure | 200 | 71.4 | | Refrigerator | 86 | 78.2 |
| | The bull is better | 45 | 16.1 | | Putting an ice mold on milk | 13 | 11.8 |
| **The calf-hosting variety (n=271)** | Tying calf | 60 | 22.1 | When is it time to feed the animals? | Morning and Evening | 268 | 95.7 |
| | Free in the compartment | 201 | 74.2 | | Morning, noon, evening | 11 | 3.9 |
| | Free in the barn | 10 | 3.7 | | Evening | 1 | 0.4 |

Tilki et al (2013) reported in their study conducted in Kars province that 46.12 % of the breeders were members of an agricultural organization and that the Cattle Breeders Association was the first among the organizations they were members of. When the milking practices of the breeders were examined, it was found that the vast majority of them were milked by hand (89.3%). It was found that the milk obtained was cooled in 39.3% of the farms and that the vast majority (78.2%) used refrigerators to cool the milk (Table 3). However, it is interesting to note that on farms where there is no cooling tank or refrigerator, producers freeze PET bottles and fill them into milk containers.

In the study conducted in the Kars province, 81.07 % of the breeders milked the animals by hand and none of the farms studied had a cooling tank (Tilki et al., 2013). In the study conducted by Bakır (2002) in Van province, the hand milking rate was found to be 95.2%. Many researchers have reported that hand milking is widely practiced in different regions of Turkey (Bakır, 2002; Tilki et al., 2013; Koçyiğit et al., 2016; Ünlü, 2019). On the other hand, Yılmaz et al. (2020) reported that 54.3% of farms in Iğdır province, Sezer et al. (2020) reported that 56.2% of dairy farms in Nevşehir province were milked with a milking machine, Kaygısız and Özkan (2021) that 69% of dairy farms in Samsun Tekkeköy district and Yüzbaşıoğlu (2022) that half of the cattle farms in Central district of Tokat province were milked with a milking machine. The evaluation of the farmers' answers to the questions on artificial insemination, oestrus monitoring and calf rearing showed that the farmers' ability to monitor and detect estrus in their cows was very high (97.1%).

In the study conducted in Erzincan province, oestrus monitoring was reported as 86.2% (Özsağlıcak and Yanar, 2021). The breeders stated that 50.7 of them carry out artificial insemination on their farms. About half of the farms do not carry out artificial insemination (Table 3). The breeders indicated that the influencing factors for artificial insemination, in order from largest to smallest proportion, are pure breed, purchase of support, absence of disease transmission, support and absence of pure breed and bulls.

When examining the responses, it was found that the majority of breeders (%50.7 ± 5.0) wanted artificial insemination to obtain breeding animals. However, when examining the reasons why breeders did not want artificial insemination, it was found that the majority of breeders did not want it and stated that it resulted in failure (%71.4 ± 10.7) (Table 3). It was found that 51.1% of breeders in the central district of Erzincan province preferred the artificial insemination method. In a study conducted by Soyak et al. (2007), artificial insemination was preferred in 68.0% of farms, while Tatar (2007) reported that artificial insemination was preferred in 81.0% of farms in Aksaray, while in Ankara province, artificial insemination was used in only 45.1% of farms.

From the growers' responses to the questions about their thoughts on feed and feeding, it was found that 60.4% of growers buy feed. It was found that 50.3% of those who bought feed bought factory feed, 39.6% bought cottonseed and 10.1% bought silage. The proportion of those who bought silage was remarkable. In other words, this can be seen as an indicator that producers are aware of silage. Regarding the feeding time of the animals, it was found that 95.7% of the farms fed their animals twice a day (Table 3). It was also found that 33.6% of producers used the plateaus to feed their animals. It was found that they generally preferred the months of April, May and June to leave the plateaus. They returned from the plateaus in August and September (Table 3). In a study conducted in Van province, it was found that 72.5% of the farms gave their animals three meals and 74.6% two meals with water per day (Bayındır and Demirel, 2008).

With regard to calf rearing, it was found that 74.2 % of farms reared calves in free-range systems and 54.3 % of farms fed calves with the umbilical cord after birth (Table 3).

In animal husbandry, environmental conditions can influence the yields achieved by the animals within a range of 0 to 100 % for some yields. For this reason, the conditions in the barns in which the breeders reared their animals were also investigated in this study.

The breeders' answers to the questions about the barns they use for animal production are listed in Table 4.

***Table 4.*** *Descriptive statistics of shelter assets in farms*

| Features examined | Sub-groups | n | % | Features examined | Sub- groups | n | % |
|---|---|---|---|---|---|---|---|
| | | **280** | **100.0** | | | **280** | **100.0** |
| **The farm plan** | Modern project | 42 | 15.0 | Bedding boxes | Yes | 25 | 8.9 |
| | Modern without a project | 25 | 8.9 | | No | 255 | 91.1 |
| | Traditional | 213 | 76.1 | Type of farm | Semi-open system | 20 | 7.1 |
| **Farm building material** | Concrete | 55 | 19.6 | | Free-closed system | 63 | 22.5 |
| | Adobe | 89 | 31.8 | | Closed system | 197 | 70.4 |
| | Stone | 82 | 29.3 | Is there a calf pens? | Yes | 206 | 73.6 |
| | Briquettes | 54 | 19.3 | | No | 74 | 26.4 |
| **Is there a ventilation system?** | Yes | 250 | 89.3 | Is there a cow stall compartment? | Yes | 173 | 61.8 |
| | No | 30 | 10.7 | | No | 107 | 38.2 |
| **Is there an irrigation system?** | Yes | 73 | 26.1 | Is there drinking water? | Yes | 265 | 94.6 |
| | No | 207 | 73.9 | | No | 15 | 5.4 |
| **Is there a window?** | Yes | 237 | 84.6 | The use of cow bedding | Yes | 74 | 26.4 |
| | No | 43 | 15.4 | | No | 206 | 73.6 |

When examining the breeders' answers to the questions about the barns, it was found that most of them built their barns without a project using the traditional method of barn planning. The main building materials used for the barns were clay and stone. However, it was found that the ventilation and lighting systems, which are part of the basic equipment of a barn, were not present in 10.7% and 15.4% of cases respectively.

In studies conducted in Turkey, Bakır (2002) reported that aeration was 88% sufficient in Uşak province, 82.7% in Erzincan province (Özsağlıcak and Yanar, 2021) and 68% in Van province. The breeders stated that the proportion of irrigation systems (73.9%) is very high compared to the water requirement, which is one of the basic needs of the animals. It was noted that the animals were watered using traditional methods. The presence of farrowing crates on the farms was also very low (Table 4).

In the farms, 70.4% of the barn types have a closed system, and the semi-open system is at a very low level (7.1%), which is very low for the province of Iğdır. This is due to the fact that Iğdır province has microclimatic characteristics in the Eastern Anatolia Region. According to modern breeding principles, it is desirable that the places where the animals are kept are as open or semi-open as possible depending on the climatic conditions. In a study conducted in Iğdır province, 88.3% of the barns of the farms were closed (Yılmaz et al., 2020), and in the study conducted by Köse (2006) in Uşak province, it was found that 76% of the barns of the farms were tie stalls.

The breeders reported that 8.9 %, 73.6 %, 61.8 %, 94.6 % and 26.4 % of the calves on their farms were housed in bedding boxes, calf pens, stalls, drinkers and bedding, respectively (Table 4).

Some characteristics of calf housing on the farms were also investigated. The descriptive statistics of the results are presented in Table 5.

***Table 5.*** *Kruskal Wallis Test test results for calf care in enterprises*

| Applications | Districts | N | *X* | SE | Median | Min. | Max. | KWT* | p |
|---|---|---|---|---|---|---|---|---|---|
| **Duration of colostrum feeding of calves after birth (minutes)** | Central | 70 | 83.6[a] | 4.7 | 60 | 30 | 180 | 14.444 | 0.002 |
| | Karakoyunlu | 70 | 102.7[a] | 5.8 | 120 | 30 | 300 | | |
| | Tuzluca | 70 | 103.7[b] | 5.36 | 120 | 30 | 180 | | |
| | Aralık | 70 | 83.1[a] | 5.8 | 60 | 30 | 300 | | |
| | Total | 280 | 93.3 | 2.8 | 120 | 30 | 300 | | |
| **Milk given to calves daily (kg)** | Central | 70 | 4.0[a] | 0.2 | 4 | 2 | 10 | 38.547 | 0.000 |
| | Karakoyunlu | 70 | 3.0[b] | 0.2 | 3 | 1 | 5 | | |
| | Tuzluca | 70 | 3.0[b] | 0.1 | 3 | 1 | 5 | | |
| | Aralık | 70 | 3.0[b] | 0.1 | 3 | 1 | 6 | | |
| | Total | 280 | 3.3 | 0.1 | 3 | 1 | 10 | | |
| **Calf weaning age (Month)** | Central | 70 | 3.7a | 0.2 | 3 | 3 | 10 | 46.345 | 0.000 |
| | Karakoyunlu | 70 | 3.5[a] | 0.2 | 3 | 2 | 8 | | |
| | Tuzluca | 70 | 4.2[a] | 0.1 | 4.5 | 3 | 6 | | |
| | Aralık | 70 | 4.8[b] | 0.2 | 4 | 3 | 12 | | |
| | Total | 280 | 4.0 | 0.1 | 3 | 2 | 12 | | |

a, b; Differences between mean values with different letters in the same column are significant ($p < 0.001$).
*: Kruskal-Wallis test

It was found that the average time for calves to drink colostrum after birth was 93.3±2.8 minutes. When the duration of calves' milk drinking after birth was examined at district level, it was found to be statistically different in Tuzluca than in other districts ($p<0.01$) (Table 5). In this study, it was determined that the calves received colostrum within the first 2 hours. Koçyiğit et al (2022) found that 99.3% of the farms gave colostrum to the calves, 57.1% of the breeders gave colostrum to the calves for two days and 12.4% for three days. In another study conducted in Erzincan province, the rate of farms giving colostrum was 98.9% and the duration of colostrum was reported as 3 days (Özsağlıcak and Yanar 2021). In studies conducted in Narman and Hınıs districts of Erzurum province, the rate of farms giving colostrum to calves was reported as 53.0% and 75.0%, and the duration of colostrum was reported as 3 days in both districts (Diler et al., 2017; Koçyiğit et al., 2015).

The daily amount of milk given to the calves by the breeders was determined to be 3.3±0.1 kg on average. When the districts were compared, it was found that the daily amount of milk given to the calves was statistically significantly ($p<0.001$) higher in the central district than in the other districts (Table 5). In a study conducted in Izmir, 70.8% of the breeders stated that they gave 1-3 liters of milk to the calves. Although various studies have been conducted on the amount of milk given to calves, the most commonly used method is giving milk at 8% and 10% of live weight (Selvi and Tapkı, 2019).

In the study, an average value of 4.0±0.1 months was determined when examining the weaning age of the breeders' calves. When the weaning age was examined at the district level, it was found that this practice had a statistically significant ($p<0.001$) difference in Aralık district (Table 5). Kaygısız et al. (2022) reported that 92% of calves in Kahramanmaraş province were weaned at 1-3 months of age and 8% at 4-6 months of age. In many studies on weaning age, it was found to be between 2-3 months (Hötzel et al. 2014, Savaş and Yenice, 2016; Kaygısız et al., 2022). Kaylan et al. (2019) When investigating the duration of calf weaning by breeders, it was found that 17.9 % of farms weaned their calves after 3 months, 51.9 % after 4 months and 30.2 % after 5 months. In a study conducted on dairy farms in Konya province, the average weaning age was 68.28 days (Akkuş, 2009).

The weaning age of calves varies depending on factors such as breed, birth weight, health status, care and feeding. For farms that breed dairy cattle, the weaning age should be set at 30-45 days for profitability reasons (Tatar and Esenbuğa, 2022).

The descriptive statistics of the results of the Kruskal-Wallis test for insemination on the farms are shown in Table 6.

***Table 6.*** *Kruskal Wallis Test results for insemination in farms*

| Applications | Districts | N | *X* | SE | Median | Min. | Max. | KWT* | p |
|---|---|---|---|---|---|---|---|---|---|
| **The timing of introducing cows to the bull after detecting signs of estrus (in hours)** | Central | 70 | 7.39[a] | 0.4 | 6 | 2 | 12 | 36.350 | 0.000 |
| | Karakoyunlu | 70 | 11.9[b] | 0. 7 | 12 | 2 | 25 | | |
| | Tuzluca | 70 | 8.5[a] | 0.5 | 12 | 2 | 12 | | |
| | Aralık | 70 | 10.5[b] | 0.5 | 12 | 3 | 24 | | |
| | Total | 280 | 9.6 | 0.3 | 12 | 2 | 25 | | |
| **Postnatal cows (artificial/bull) insemination (day)** | Central | 70 | 67.0[a] | 2.4 | 60 | 40 | 150 | 8.475 | 0.037 |
| | Karakoyunlu | 70 | 69.4[a] | 2.1 | 60 | 45 | 120 | | |
| | Tuzluca | 70 | 61.1[b] | 1.9 | 60 | 40 | 90 | | |
| | Aralık | 70 | 66.3[a] | 2.4 | 60 | 40 | 150 | | |
| | Total | 280 | 66.0 | 1.1 | 60 | 40 | 150 | | |
| **The number of artificial insemination performed for a pregnancy (times)** | Central | 70 | 1.6[a] | 0.1 | 1 | 1 | 3 | 5.478 | 0.140 |
| | Karakoyunlu | 70 | 1.6[a] | 0.1 | 1 | 1 | 3 | | |
| | Tuzluca | 70 | 1.9[a] | 0.1 | 2 | 1 | 3 | | |
| | Aralık | 70 | 1.8[a] | 0.1 | 2 | 1 | 3 | | |
| | Total | 280 | 1.7 | 0.1 | 1 | 1 | 3 | | |
| **The number of mating attempts per bull for successful conception (times)** | Central | 70 | 1.2[a] | 0.1 | 1 | 1 | 4 | 9.047 | 0.029 |
| | Karakoyunlu | 70 | 1.5[b] | 0.1 | 1 | 1 | 4 | | |
| | Tuzluca | 70 | 1.6[b] | 0.1 | 1 | 1 | 4 | | |
| | Aralık | 70 | 1.4[ab] | 0.1 | 1 | 1 | 4 | | |
| | Total | 280 | 1.4 | 0.1 | 1 | 1 | 4 | | |

a, b; Differences between mean values with different letters in the same column are significant ($p < 0.001$).
*: Kruskal-Wallis test

The average time for transferring cows to the bull after heat detection was found to be 9.6±0.3 hours. When the time for introducing cows to the bull after heat detection was examined at the district level, it was found that Central and Tuzluca districts and Karakoyunlu and Aralık districts were similar (Table 6). These similarities were statistically significant ($p<0.001$).

The average duration of insemination of cows (artificial/with bull) after birth was determined to be 66.0±1.1 days. When the duration of insemination of cows (artificial/with bull) after parturition was examined, it was found that the application in Tuzluca district showed a statistically significant ($p<0.05$) difference (Table 6). In a study conducted by Yılmaz and Sarıözkan (2020) in Kayseri, the average duration was 82.9 days and in a study conducted in Amasya, the average duration was 122.4 days (Erdem et al., 2007).

The average number of artificial inseminations per pregnancy was 1.7±0.1. When comparing the districts, it was found that the number of artificial inseminations per pregnancy was similar (Table 6). In a study conducted in Osmaniye, the average number of artificial inseminations was reported as 1.47 (Gül and Karaca, 2022). In some studies, the number of inseminations per pregnancy in Holstein cattle was reported to be 1.65 on average (Tekin and Daşkın (2016)) and between 1.10-2.11 (Kumuk et al., 1999).

It was found that a bull was pregnant on average 1.4±0.1 times. When comparing the districts, it was found that the number of pregnancy visits in the Central district was statistically different ($p<0.05$) (Table 6).

## CONCLUSION

As a result, herd management on the farms was found to be healthy. Practices such as the feeding of calves, the duration of insemination after birth, the duration and amount of colostrum given to calves after birth, and the number of inseminations per gestation were within desired limits, suggesting that breeders' awareness of animal management is trained. It is assumed that the cooperatives of which they are members, the breeders' associations (cattle and sheep/goat breeders' associations) and the training they receive in animal husbandry have an influence on breeders' awareness of animal husbandry. However, many factors affecting animal health and welfare were found to be below the required levels. Therefore, not only breeding practices, but also animal health and welfare on farms should be improved. As in many other sectors, a long-term production plan should be implemented in agriculture in order not to be dependent on foreign countries for animal production and not to become a threat to Turkey. To this end, it is recommended to train breeders in order to sensitize them to sustainable production in which quality products are produced on the farms and animal welfare is ensured. In this context, the relevant institutions and organizations must make more efforts to raise awareness among producers.

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## AUTHOR CONTRIBUTIONS

The authors contributed equally to this study.

## CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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