



## Relationships of Some Husbandry Practices with Calf Loss Rate in Dairy Farms: A Case Study of Alacam County of Samsun Province

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### ABSTRACT

In this study, the relationships between some husbandry practices and calf losses in dairy farms were investigated. A total of 39 farms enrolled to Alacam Cattle Breeders Association (CBA) of Samsun, Turkey, were evaluated by structural factors (education level of farm owner: EL, personnel number: PN, experience of farm owner: EF and number of cows: NC) and husbandry practices (individual calf housing: ICH, calving pen: CP and weaning period: WP). The questionnaires for interview, observations on farm level and records of CBA belonging to 2018 and 2019 were examined. While no significant difference was found among the all groups, dead calf per farm ( $0.64 \pm 0.25$ ) and mean of calf loss rate (CLR) per farm ( $3.42 \pm 1.07\%$ ) were assumed within the acceptable thresholds. Presenting more attention on calf rearing methods was suggested to be diminishing approach to decrease the calf mortality in the farms.

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## Introduction

Dairy farming is one of the important activities in animal husbandry in Turkey as many countries of the world. Ensuring the sustainability of the dairy farms by monitoring calvings is the main goal of the enterprises. As known, sustaining a profitable breeding supplies a marked income to the enterprises and the country. In that respect, calf losses, which may be described as the mortality of calves during the calving time or at the post calving period, can be seen a major limitation for the future of dairy farms. Moreover, the health and management of replacement calves are important components of total herd profitability (Admasu and Hassen, 2016). However, major diseases in dairy calves have a complex etiology, due to the interaction of the calf with infectious agents, management and non-genetic factors (Chenyambuge and Mseleko, 2009). Calf loss rate (CLR) in the first months of life varies between 5 and 10%, and the goal in CLR should be below 5% in this period (Stojiljković et al., 2018). The main reason of the high CLR of newborn calves is the inefficiency of the passive immunity transfer. However, determination of

inadequate management practices and improvements in the processing of colostrum feeding can decrease the mortality and also production outcome (Santos and Bittar, 2015). It was reported that adequate hygiene and light and also sufficient air circulation in the calf pens positively affect calf survival and block the occurrence of the most common diseases (Stojiljković et al., 2018).

Until recently there has been some field studies in the literature regarding the herd management practices in dairy cows in Turkey conditions (Tugay and Bakir, 2008; Seker et al., 2012; Boz, 2013; Satilmis, 2019), most of these focused only determination of farm conditions. In other words, there is no sufficient reference in the literature on the association of management factors with calf survival and mortality.

Thus, the objective of this study was to reveal the relationships of calf mortality with some husbandry practices in dairy farms of Alacam county of Samsun province, Turkey.

## Materials and Methods

The study was conducted in 39 households enrolled to Cattle Breeders Association (CBA) in Alacam county of Samsun, located in the Black Sea region of Turkey. The farms those had >10 cows were included to the study. The data were obtained by questioning the farm owners and in cooperation with staff of CBA between June and October 2019. The survey forms were consisted of general information on the farm conditions (education and experience levels of farm owner, number of cows) and calf management practices (individual calf housing, calving pen and weaning period). Change of animal numbers (newborn/dead calves and dead cows) within the last year (from 2018 to 2019) was collected from CBA records and thus, CLR values per farm were calculated. One-way ANOVA and independent simple t-test were performed to determine the factors affecting CLR. Group differences were evaluated by Duncan's multiple range test. All statistical tests were performed by SPSS 17 at the 0.05 significance level.

## Results and Discussion

The change of animal number from 2018 to 2019 is given in Table 1. As seen, the newborn calf number was moderate when regarded that total animal number per herd was recorded to be  $25.84 \pm 2.74$  head. Also, dead calf and cow numbers per farm were determined as considerable low. For a sustainable production, the ratio of dead/newborn calves is seen a crucial case by herd owners. At this point, evaluated values here could be assumed in acceptable thresholds for the future of these enterprises. However, taking additional precautions to decrease the current dead calf level should be regarded as more beneficial process by farm owners.

In this study, it was noted that 82.1% of the breeders have taken health services by a private veterinarian, and remained breeders have consulted to the veterinarian that contracted by CBA. Related to this case, the level of first interfering method of the farmers during the abnormality signs in calves is presented in Table 2. Normally, consulting a veterinarian should be maintained as the first process during the abnormality on animal health. As seen, many breeders preferred this method to eliminate the disorders; however, the level was not reached to desirable rate. The costs for animal care including drugs might be thought as the principal reason of this case. It was noted that the latest veterinarian calling time was calculated to be  $108.53 \pm 21.34$  d (ranged from 1 to 547 d). This period points out that breeders have consulted the veterinarians during the unavoidable cases.

A high rate (74.4%) of the farmers had noted as illiterate (Table 3). Education level (EL) of farm owner has been assumed to be an important factor for tracking innovations. At this point, obtained case here might not be accepted as favorable matter. In a study conducted by Soyak et al. (2007), dairy farmers with illiterate EL of Tekirdag province was calculated to be 59%. This level was recorded to be 79% in Iğdir province (Sahin and Karadag Gursoy, 2016). However, Boz (2013) reported the dairy farmers with illiterate were noted as 32% in the East Mediterranean region. As seen, dairy farmers with

relatively high EL have not preferred dairy husbandry as a profession in different regions of Turkey. The calf loss rate (CLR) was the lowest in the farmer group with primary-secondary education and the rate was the highest in high-university group (Table 3). However, no statistical difference was determined among the groups by education level. Besides, calculated CLR rates of all groups with  $\leq 5\%$  reflected the reasonable levels by herd survival. It was also noted that any calf loss was recorded in 79.48% of all farms. These findings may be assumed to be the remarkable cases for the future of the farms.

The percentage of the farms with 2 or 3 personnel was determined to be 82.1% (Table 3). When it is regarded that cattle breeding has been assumed to be a tiresome and a labor force requesting activity, this case might be noted as a positive fact. Similarly, a high rate of the dairy farmers had 2 personnel in an initial study carried out in the same region (Satilmis, 2019). While there was no statistical difference was determined by CLR in the personnel number (PN) groups, farms with 1 personnel had relatively high rate (Table 3). Besides, farms with 2 personnel had lower CLR with the general mean, and farms with  $\geq 3$  personnel had similar CLR with the general mean. Variation in n numbers of the groups might be the main reason of the obtained insignificant differences in the table.

Table 1. Change of animal existence between 2018 and 2019

Component	n	$\bar{X} \pm S_x$
Newborn calf	39	$11.28 \pm 2.39$
Dead calf	39	$0.64 \pm 0.25$
Dead cow	39	$0.28 \pm 0.12$
Animal number per farm	39	$25.84 \pm 2.74$

Table 2. The first interfering method of farmer if an abnormality occurs in calves

Method	n	Rate (%)
Consulting veterinarian	24	61.5
Attempting cure	3	7.7
Both methods	12	30.8
General	39	100

Table 3. Calf loss rate (%) by some structural factors of the farms

Factors	n	$\bar{X} \pm S_x$
Education level of farmer		
Illiterate	29	$3.74 \pm 1.28$
Primary-Secondary	6	$0.83 \pm 0.83$
High-University	4	$5.00 \pm 5.00$
Personnel number		
1	7	$6.16 \pm 3.14$
2	15	$2.03 \pm 0.94$
$\geq 3$	17	$3.53 \pm 1.95$
Experience of farm owner		
<20 y	13	$6.19 \pm 2.32$
$\geq 20$ y	16	$2.04 \pm 1.06$
Number of cows		
20<	17	$1.23 \pm 0.90$
$\geq 20$	22	$5.12 \pm 1.71$
General	39	$3.42 \pm 1.07$

Table 4. Calf loss rate (%) by calf management practices

Factors	n	$\bar{X} \pm S_x$
Individual calf housing		
Yes	31	3.06±1.21
No	8	4.82±2.39
Calving pen		
Yes	10	1.92±1.45
No	29	3.94±1.35
Weaning period		
≤ 5 mo	18	1.91±0.87
>5 mo	21	4.72±1.83
General	39	3.42±1.07

In this study, dairy farmers with experienced more than 20 y had a high rate (Table 3). Some researchers (Sahin et al., 2001; Sahin and Karadag Gursoy, 2016) reported the experience of the farm owner (EF) as 20.5 y and 25.74 y, respectively. These cases clearly reflected that dairy farming has been conducted as a necessary occupation by the farmers. In Table 3, it is attractive that CLR of inexperienced farmers was three times higher when compared to the second group. Normally, experienced farmers had more information on animal breeding and expecting lower CLR in their farms might be assumed as a normal case. Although the findings presented in Table 3 support this concept, no statistical difference was obtained between the groups.

Number of cows (NC) per farm was similar in farms with  $\geq 20$  and  $< 20$  cows (Table 3). The mean of NC per farm was calculated to be  $25.84 \pm 2.74$ , and this value was lower than some study results conducted in Izmir province (Uzmay, 2017) and Trakia region (Koc and Uzmay, 2018), but higher than the mean of a study (Seker et al., 2012) that carried out in Mus province of Turkey. When it is regarded that NC is one of the income sources of the farms, rearrangements on this case should be advised to herd owners. Furthermore, CLR was more than four times higher in farms with relatively large size, but no statistical difference was obtained between two groups (Table 3). Actually, elevated animal number in the farms adversely affects animal welfare due to causing a restriction on grazing and resting areas (Goncu et al., 2016). Also, obtained findings here show the lack of the applications on calf maintenance in the evaluated farms. At this point, ensuring the sufficient staff and providing equal labor in the middle or large size farms may be exposed as substantial actions.

As seen from Table 4, individual calf housing (ICH) is preferred by many farm owners. In spite of the farms with ICH had a high rate, establishing ICH in other farms should be proposed for modern husbandry programs. Moreover, CLR was relatively low in farms with ICH. However, there was no significant difference between the groups. In connected with this case, in farms with calving pen (CP) had lower CLR up to two times when compared to other farms, but, there was no statistical difference between the groups by CP similar to the ICH. According to Table 4, there was no calving pen in approx. 3/4 of the farms. This case was found to be harmonic with some initial studies (Guler et al., 2017; Satilmis, 2019). As known, individual care and establishing calving pens are the popular approaches to care calves with more attention without any

contact by adults. In this context, housing calves as individual and establishing CP in cattle barns may be seen as the advantageous approaches not only for calf health but also wealth.

In this study, periods for keeping calves with mothers and weaning (WP) were determined to be  $38.85 \pm 9.91$  d and  $5.02 \pm 0.37$  mo. These values might be assumed as relatively high for any commercial cattle farm. Really, the calculated weaning period was higher than those reported by Tugay and Bakir (2008) and Satilmis (2019). As it is understood, some inadequacies are prominent in the examined farms. Accordingly, it was thought that the weaning period or suckling length might be an effective factor on the CLR, therefore, the farms were assessed as two groups (Table 4). In spite of CLR was found as lower about 2.5 times in farms with lower weaning period when compared to other group, this difference was insignificant ( $P > 0.05$ ). This case revealed that keeping calves with their mothers has not maintained any advantage by CLR in the herds. Similarly, Dogan and Koc (2014) emphasized that early weaning of the calves did not have a significant effect on the later performances of the calves.

## Conclusion

In the present study, the relationships between some husbandry practices and structural factors with calf losses in farms enrolled to Alacam CBA were investigated. Of structural factors, EL, PN, EF and NC were not affected CLR. Also, of management practices, no significant effects of ICH, CP and WP were found on CLR. However, estimated dead calf per farm ( $0.64 \pm 0.25$ ) and mean of CLR per farm ( $3.42 \pm 1.07\%$ ) were assumed within the acceptable thresholds. It was impressed that showing more attention on calf rearing methods should be a regarded as diminishing approach to decrease the calf mortality in the farms.

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