ARAŞTIRMA MAKALESİ   RESEARCH ARTICLE

Examination of dairy cattle farms in Burdur province in terms of animal welfare

Burdur ili süt sığırı işletmelerinin hayvan refahı yönünden incelenmesi

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ARTICLE INFO	ABSTRACT
	This study aims to assess the status of dairy cattle farms in Burdur province with regard to animal welfare. A total of 56 dairy cattle farms were visited, and face-to-face interviews were conducted with owners. Findings revealed that 32.1% of dairy cattle breeders had received vocational training, with 19.6% having undergone training solely in animal nutrition, and 12.5% possessing information and training specifically related to animal welfare. Most breeders (91.1%) preferred the semi-open shelter type and the eastern direction (67.9%) as the long-axis direction. Concrete was preferred construction material for shelter bases in the majority of cases (98.2%). However, it was noted that certain aspects crucial to animal welfare, such as the loading ramp, vaccination route, and urinary tract, were not adequately incorporated into the planning process. Manure cleaning was typically performed every six months (32.1%), with 60.7% utilizing a tractor for assistance. In the observations made, it was determined that the cows had hoof problems (53.6%) and lameness was low (33.9%). It was determined that the legs (44.0%), thighs (44.9%), and udder-abdomen area (44.2%) of the cows were dirty. It was determined that cows had an average body condition score of 2.25-3.5 (38.9%) and a rumen fill score of 3 (38.1%). It was determined that the cows had easy access to water and were fed in two meals (91.1%) in the morning and evening. The results showed deficiencies regarding animal welfare in the planning and management of shelters in dairy cattle farms in Burdur province.
	ÖZET
	Bu araştırmada, Burdur ili süt sığırcılığı işletmelerinin hayvan refahı açısından durumlarının değerlendirilmesi amaçlanmıştır. Çalışmada 56 süt sığırı işletmesi ziyaret edilmiş ve işletme sahipleri ile birebir yüz yüze yapılan görüşmeler gerçekleştirilmiştir. Süt sığırı yetiştiricilerinin %32.1'inin mesleki eğitimlerinin olduğu bunların %19.6'sının sadece hayvan besleme ile ilgili eğitim aldıkları, %12.5'inin ise hayvan refahı hakkında bilgi ve eğitimlerinin olduğu belirlenmiştir. Yetiştiricilerin büyük çoğunluğu (%91.1) yarı açık barınak tipi ve uzun eksen yönü olarak doğu yönünü (%67.9) tercih etmişlerdir. Barınakların büyük çoğunluğunda (%98,2) taban yapı malzemesi olarak beton tercih edilmiştir. Ancak yükleme rampası, aşı yolu ve idrar kanalı gibi hayvan refahını ilgilendiren yapı kısımlarına planlamada yer verilmediği belirlenmiştir. Barınakların %60,7'sinde gübre temizliği genellikle traktör yardımı ile altı ayda bir (%32.1) yapılmaktadır., Yapılan gözlemlerde, ineklerde tırnak problemlerinin olduğu (%53.6), topallık durumunun az olduğu (%33.9) belirlenmiştir. İneklerin bacaklarının (%44.0), uyluk kısımlarının (%44.9) ve meme-karın bölgesinin (%44.2) kirli olduğu belirlenmiştir. İneklerin ortalama 2.25-3.5 arasında (%38.9) vücut kondisyon skoruna sahip oldukları ve rumen çukuru skorunun 3 olduğu (%38.1) tespit edilmiştir. İneklerin suya rahatça ulaşımları sağlanırken besleme sabah-akşam iki öğünde (%91.1) yapıldığı belirlenmiştir. Elde edilen sonuçlar Burdur ili süt sığırı işletmelerinde barınakların planlanması ve yönetiminde hayvan refahı ile ilgili eksikliklerin olduğunu göstermiştir.

INTRODUCTION

Urbanization, along with the rise in education and economic status, as well as the influence of the media, civil society, and consumer awareness, has contributed to heightened scrutiny of animal welfare, particularly within the dairy industry. Consumers are increasingly questioning the methods and conditions under which animal products are produced and reach their tables (Ünal, 2007). When discussing animal welfare, itis essential to consider not only environmental conditions but also the physical health and psychological well-being of animals (Koknaroglu & Akunal, 2013).

In dairy cows, for example, lameness, mastitis, reproductive problems, abnormal behaviour, physiological discomfort, or injury are indicators of poor welfare. Poor welfare may be due to poor herd management, but increased production may make this situation more widespread. As milk yield increases, mastitis, lameness, and reproductive problems tend to increase. More problems arise when cows, which are well adapted to high-fibre feed and moderate milk yield, are overloaded beyond their normal biology, that is, are under stress. This stress increases the risk of poor welfare, especially in high-yielding cows (Broom, 2000). In addition, the shelter conditions of cows, who spend most of their lives in closed areas (for example, the design of feeding, resting and walking areas), the re-establishment of the order they are used to, the cattle that are removed from their natural environments to eliminate the negativities that occur in farms where intensive animal production is carried out, and any problems that arise in this process. It is important to make efforts to eliminate all kinds of negativities and to raise animals in healthier and more welfare conditions (Arnott et al., 2017; Bewley et al., 2017).

The quality of animal products and the health of newborn calves are directly influenced by the environment and care-feeding conditions in which the animals live. Therefore, the study aimed to assess the current state of dairy cattle farms in Burdur province, where a significant portion of the population relies on animal husbandry for their livelihood. The objective was to examine shelter and breeding conditions and evaluate them in terms of animal welfare.

MATERIALS and METHODS

The study was planned to be conducted voluntarily in 56 dairy cattle farms in Burdur province, each housing 100 or more animals (An average of 195.50±20.79).

A form was devised to compile data gathered from the farms. This form encompasses information regarding shelter infrastructure and the animals housed within, care and feeding protocols, assessment of animal cleanliness, evaluations of body condition scores, details about lameness incidents, and information about the breeders, including their experiences and training background.

The cow cleanliness scoring system, as outlined by Aytekin et al. (2021), involves assessing the cleanliness of specific body parts of cows, including their legs, thighs, and udder-abdomen region. Each part is assigned a cleanliness score ranging from 1 to 4, with 1: clean, 2: some dirty, 3: dirty, 4: very dirty. The cleanliness assessment was conducted by the authors of the article.

Cows with a body condition score (BCS) ranging from 1 to 2 (with an average of 1.75) are categorized as thin; cows with a BCS between 2.25 and 3.50 (with an average of 3) are considered to be in good condition; cows with a BCS falling between 3.75 and 5 (with an average of 4.25) are defined as being fatty (Hutu & Onan, 2019).

Rumen score, as evaluated by Hulsen (2008), involves assessing the left rear side of cows and assigning points ranging from 1 to 5:

Score 1: The para lumbar fossa behind the last rib is deeper than a hand's width,

Score 2: The para lumbar fossa behind the last rib is a hand's width deep,

Score 3: The para lumbar fossa behind the last rib is still visible,

Score 4: The para lumbar fossa behind the last rib is not visible,

Score 5: The lateral protrusions of the lumbar vertebrae are not visible because the rumen is full.

Statistical analysis

The data obtained in our study were analyzed using the IBM SPSS 25.0 statistical calculation program. The chi-square tests were applied to analyze the data. The Kruskal-Wallis test was utilized to evaluate differences between values obtained concerning characteristics such as the total number of animals and levels of factors with more than two levels, such as experience and educational status. Similarly, for the characteristics mentioned above, the Mann-Whitney U test was applied to determine differences between levels of factors with two levels, such as receiving/not receiving education on animal husbandry.

RESULTS AND DISCUSSIONS

Breeders' education on animal husbandry and the training they received

It is observed that the majority of breeders, constituting 67.9%, have not received any training in animal husbandry, as depicted in Figure 1. This indicates that training in the profession is relatively low, with only 32.1% of breeders having received such training.
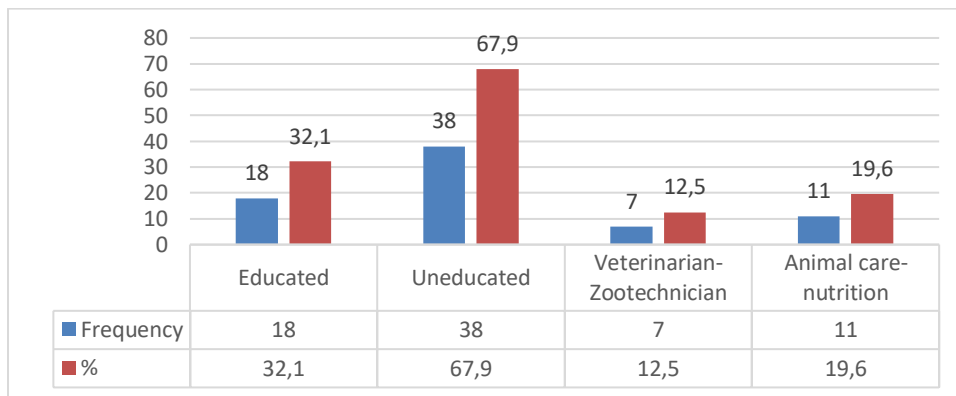

	Educated	Uneducated	Veterinarian-Zootechnician	Animal care-nutrition
■ Frequency	18	38	7	11
■ %	32,1	67,9	12,5	19,6

Figure 1. Educational status of breeders regarding animal husbandry and the training they received regarding animal husbandry

Şekil 1. Yetiştiricilerin hayvancılık ile ilgili eğitim durumları ve hayvancılık ile ilgili aldığı eğitimler

The data obtained in our study aligns with findings from previous studies conducted in Türkiye, which also indicate that the majority of breeders lack vocational training in animal husbandry. For instance, Köseman and Şeker (2016) reported that 64.5% of breeders in Malatya province and Koçak (2020) found that 93.8% of breeders in Ankara province did not have vocational training in animal husbandry. Similarly, our study reflects this situation, indicating a prevailing trend of inadequate vocational training among breeders in the country.

According to Figure 1, among the trained individuals, only 12.5% are veterinarians and zootechnicians. Furthermore, 19.6% of individuals received training solely on animal care and nutrition from the relevant ministry, and they reported having no knowledge about animal welfare.

The education of breeders and individuals working in the sector plays a crucial role in reducing stress in animals, improving welfare, and ultimately increasing productivity (Kauppinen et al., 2012). However, the data suggests that there is a significant gap in training related to animal welfare among individuals involved in animal husbandry. For instance, in Afyonkarahisar province, only 3% of dairy cattle breeders and employees received training in areas related to animal welfare, despite 32.7% receiving general animal husbandry training (Şahanoğlu, 2014). Similarly,

in Malatya province, only 3.5% of breeders had training in animal husbandry (Köseman & Şeker, 2016). In Ankara, while 40% of employees in dairy cattle enterprises received training, only 6.7% received training specifically on animal welfare (Öcal, 2020). These findings underscore the need for more comprehensive training programs that encompass not only animal husbandry practices but also focus on animal welfare to ensure the well-being of livestock and enhance productivity in the sector.

Shelter type and long axis direction of farms

The majority of breeders, accounting for 91.1%, expressed a preference for semi-open shelters, as illustrated in Figure 2. Conversely, only 7.1% of breeders chose the open shelter. This tendency towards semi-open shelters contrasts with previous findings in Burdur province, where Elmaz et al. (2010) reported that 51.9% of shelters were closed, 27.2% were open, and 20.9% were semi-open.
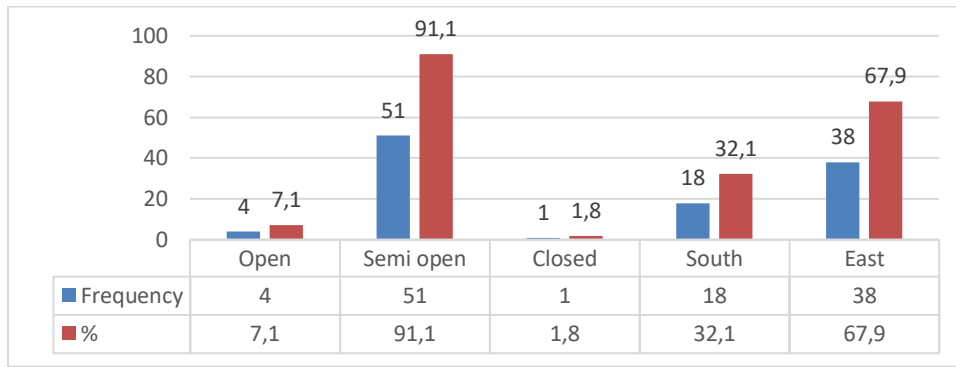

	Open	Semi open	Closed	South	East
■ Frequency	4	51	1	18	38
■ %	7,1	91,1	1,8	32,1	67,9

Figure 2. Type of shelter preferred by breeders
Şekil 2. Yetiştiricilerin tercih ettiği barınak tipi ve uzun eksen yönü

Studies indicated that breeders generally prefer closed shelters for their livestock, irrespective of the region. For instance, in Diyarbakır province, 87% of breeders favoured closed shelters (Denli et al., 2013), while in Isparta province, 64% of dairy cattle breeders preferred closed (stall) shelters (Yılmaz & Yardımcı, 2014). Similarly, in Malatya province, Köseman and Şeker (2016) reported that 45.3% of shelters were closed-attached, 9.2% were closed-free, and 13.3% were semi-open shelters. In another study in Diyarbakır province, Tutkun et al. (2017) found that 89% of breeders preferred closed shelters, with 8% preferring semi-open shelters.

Furthermore, in the Ondokuz Mayıs district of Samsun, Satılmış and Atasever (2022) determined that breeders favoured closed shelters at a rate of 96.6%. In the Polatlı district of Ankara, breeders preferred closed shelters at a rate of 86.5%, according to Koçak (2020). In the central district of Erzincan, Özsağlıcak and Yanar (2022) stated that 95% of breeders preferred closed shelters, while the Aşkale district of Erzurum, Koçyiğit et al. (2023) reported preferences of 46.2% for closed stalls, 52% closed without stalls and 1.8%of for closed free stalls.

In Burdur province and its districts, it has been observed that 67.9% of shelters were constructed with their long axes oriented towards the east, while 32.1% were oriented towards the south, as depicted in Figure 2. This preference for east-oriented shelters is notable because it aligns with strategies recommended for adapting to climate change. Research suggests that animal shelters oriented in an east-west direction can effectively mitigate the impacts of climate change. Such orientation minimizes the direct entry of sunlight into the shelter, thereby providing better thermal comfort for the animals (Kumar et al., 2021). Therefore, the preference for east-oriented shelters among breeders in Burdur province indicates a potential adaptation strategy for enhancing animal welfare in the face of climate change.

The preferred material for shelter floor, lighting and ventilation

The preferred materials for shelter floors among breeders are illustrated in Figure 3. Notably, breeders overwhelmingly prefer concrete as the floor material, with a preference rate of 98.2%. Only a small percentage, 1.8%, chose a hard compacted soil (HCS) floor. The primary reason cited for choosing concrete floors is their ease of cleaning and durability. However, it's worth noting that concrete floors have been associated with an increase in foot problems, which can adversely affect animal welfare (Manninen et al., 2002).

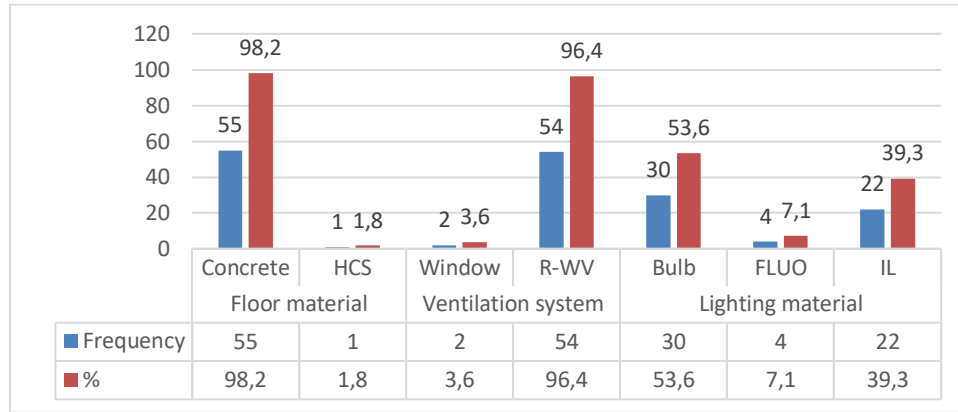|	Concrete	HCS	Window	R-WV	Bulb	FLUO	IL
	Floor material		Ventilation system		Lighting material		
■ Frequency	55	1	2	54	30	4	22
■ %	98,2	1,8	3,6	96,4	53,6	7,1	39,3

Figure 3. The material preferred by breeders for shelter floor, lighting and ventilation

HCS: Hard compacted soil, R-WV: Strip ventilation between the roof and walls, FLOU: Fluorecent, IL: Industrial lighting

Şekil 3. Yetiştiricilerin barınak tabanında, aydınlatılmasında ve havalandırmasında tercih ettikleri malzeme

HCS: Sert sıkıştırılmış Toprak, R-WV: Çatı-duvar arası şerit havalandırma, FLOU: Floresan, IL: Endüstriyel aydınlatma

This preference for concrete floors is consistent with findings from various studies conducted across different regions of Türkiye. For instance, Elmaz et al. (2010) found that 73.1% of breeders in Burdur province preferred concrete, 2.4% preferred stone and 24.5% preferred HCS as a floor material for shelter. Güler et al. (2017) reported that in Erzurum province's Narman district, 43.8% of breeders preferred concrete, 32.7% preferred stone, and 23.6% preferred HCS for shelter floor. In Uşak province, Alapala Demirhan and Yenilmez (2019) found that 76% of breeders preferred concrete for shelter floors. Öcal (2020) stated that 93.33% of breeders in Ankara province preferred concrete and 6.67% preferred HCS. Similarly, in the Polatlı district of Ankara province, Koçak (2020) found that 82.3% of breeders preferred concrete, 16.7% preferred HCS, and 1.0% preferred litter. Bakır and Kibar (2020) reported that in Muş province, 78.6% of breeders preferred concrete and 21.4% preferred HCS. Özsağlıcak and Yanar (2022) noted that in the central district of Erzincan, 98.2% of breeders preferred concrete, 0.3% preferred HCS, 1.0% preferred wood, and 0.5% preferred ceramic andesite. These findings highlight the widespread preference for concrete as the floor material for shelter floors among breeders in various regions, underscoring its perceived advantages in terms of cleanliness and durability. However, it's essential to consider potential welfare implications, particularly regarding foot health, associated with concrete flooring.

In the examined shelters in Burdur province, it was found that 3.6% of them preferred Windows as the ventilation system, while 96.4% preferred strip ventilation between the roof and walls (R-WV), as Figure 3. Ensuring good ventilation in shelters is crucial for maintaining the comfort of animals, as emphasized by Kumar et al. (2021). Inadequate ventilation poses a significant risk factor for respiratory diseases, particularly pneumonia, which is one of the most common diseases in cattle herds. Effective ventilation plays a vital role in preventing respiratory and other diseases, as respiratory pathogens such as bacteria and viruses cannot survive for long periods in environments with proper ventilation (Anonymous, 2023). Interestingly, in a previous study conducted in Burdur

province, breeders predominantly preferred windowed systems (87.8%) and chimney systems (24.4%) in shelters (Elmaz et al., 2010). However, the current study reflects a shift in preference from closed shelter systems to semi-open shelter systems in Burdur province, which has also influenced the choice of ventilation systems in shelters. Similar trends have been observed in other regions as well. For instance, in the Narman district of Erzurum, Güler et al. (2017) found that 33.7% of shelters had ventilation holes, while 67.3% preferred chimney systems. In Muş province, Bakır and Kibar (2020) reported that 90.8 of shelters had ventilation chimneys. Additionally, Koçak (2020) observed that in shelters in the Polatlı district of Ankara, 64.2% preferred window+chimney systems, 15.8% preferred window alone, 4.2% preferred ventilation chimneys, and 1.1% preferred R-WV systems. However, challenges with providing sufficient ventilation have been reported in some areas. For example, Satılmış and Atasever (2022) noted that in Samsun province, sufficient ventilation could not be achieved because breeders preferred closed-type shelters. Similarly, in cattle farms in the Eyyubiye district of Şanlıurfa, Doğanay and Yanar (2023) found that 43% of ventilation systems consisted of shelter ventilation windows, 9.6% ventilation chimneys, 48.9% R-WV, and 39.3% ventilators or fans.

In the examined shelters, it was found that 53.6% of them used bulbs for artificial lighting, 39.3% used industrial lighting (IL), and 7.1% used fluorescent (FLUO) lamps, as shown in Figure 3. Lighting plays a crucial role in the livestock industry due to its significant impact on cattle. It actively contributes to increasing milk production, fertility, and dry matter intake in cows. For optimal conditions, an illumination level of 160-200 lux is recommended for cattle shelters. Cows may have difficulty recognizing objects in the presence of shadows or varying light intensities within the shelter, which can lead to injuries due to impaired visibility (MacGregor & Campbell, 2024). LED lamps are often recommended as the primary lighting option on farms due to their durability, energy efficiency, lower heat production, and minimal maintenance requirements (MacGregor & Campbell, 2024). However, preferences for lighting options vary across different regions in Türkiye. In the current study, bulbs appear to be the preferred choice. Similarly, Şahanoğlu (2014) reported that breeders in Afyonkarahisar province predominantly preferred bulbs (88.1%) for lighting in their shelters, and the lighting level was deemed sufficient. In contrast, other regions exhibit different lighting preferences. For instance, Güler et al. (2017) found that windows were preferred for lighting in shelters in the Narman district of Erzurum. In Ankara province, Öcal (2020) reported that FLUO lamps were the preferred lighting option for a majority of breeders (86.67%) Conversely, in the Polatlı district, Koçak (2020) noted that breeders predominantly preferred bulbs (80.9%) and industrial lighting (IL) (2.1%), with the preferred lighting type being deemed sufficient for 52.1% of the respondents. Similarly, Özsağlıcak and Yanar (2022) found that the majority of breeders (94.2%) in the central district of Erzincan preferred the natural window system for lighting. In the Eyyubiye district of Şanlıurfa, Doğanay and Yanar (2023) observed that lighting through openings and windows between the roof and wall was commonly used by the majority of breeders (72.4%).

Animal loading ramp and vaccination route status in shelters
In the shelters examined, 55.4% have animal loading ramps for facilitating animal transportation, while 23.2% have vaccination routes for administering vaccinations and treatments, as depicted in Figure 4.

The presence of loading ramps for transporting animals and vaccination routes for administering treatments directly impacts animal welfare (Karslıoğlu Kara & Koyuncu, 2011). Loading animals onto transport vehicles, especially, is a critical aspect of transportation that can significantly affect animal stress levels (Van de Water et al., 2003). Furthermore, injuries sustained during animal handling can result in significant losses in animal production. During the care of animals, such as vaccination and medication administration, direct contact between animals and personnel occurs, posing risks to both parties. Injuries sustained during these activities not only increase stress in animals but also lead to productivity losses. Therefore, minimizing direct contact with animals is essential. The presence of vaccination routes or corridors plays a crucial role in preventing or reducing the occurrence of injuries during these animal-related practices, thus contributing to the overall welfare of the animals (Anitaş & Göncü,

2021). These facilities help in streamlining the vaccination and treatment processes, reducing stress on both animals and personnel and ultimately improving productivity and welfare outcomes.
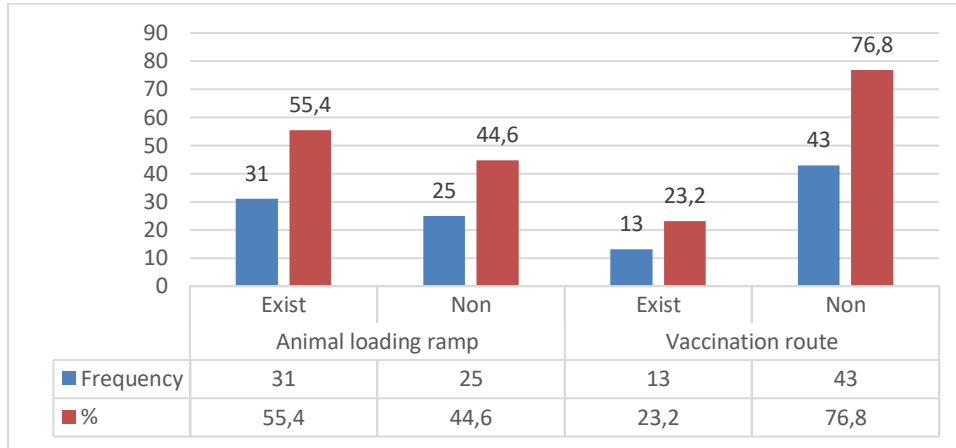

Figure 4. Presence of animal loading ramps and vaccination routes in shelters

Şekil 4. Barınaklarda hayvan yükleme rampası ve aşı yolu varlığı

Waste management

The accumulation of faeces and urine within the enclosure can lead to various issues such as poor hygiene, mastitis, and lameness in cows, which are significant concerns for both the welfare and productivity of the animals (Warnick et al., 2001; Schreiner & Ruegg, 2003; Zdanowicz et al., 2004). Cow faeces may contain infectious bacteria and contribute to the transmission of diseases such as Johne's disease (Stabel, 1998), posing risks not only to the health of the animals but also to human health. Therefore, proper management of manure and sanitation within the enclosure is essential to maintain a healthy environment for the cows and minimize the spread of diseases. However, it's noteworthy that a majority of farms in Burdur province lack a urinary canal, as indicated in Figure 5. Only 23.2% of farms have urinary canals installed. Additionally, in accordance with Figure 8, the majority of breeders (60.7%) opt to remove faeces from the shelter floor once a month with the aid of a tractor. Conversely, those employing automatic scrapers for cleaning purposes (35.7%) engage in manure removal twice a day.
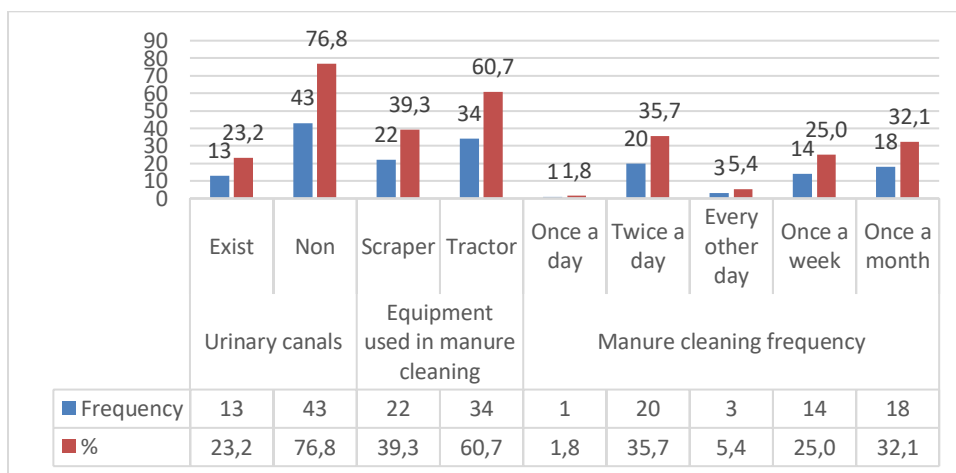

Figure 5. Presence of animal urinary canals, equipment used in manure cleaning and frequency of cleaning in shelters

Şekil 5. Barınaklarda idrar kanalı varlığı, gübre temizliğinde kullanılan ekipman ve temizlik sıklığı

The absence of urinary canals can have detrimental effects on the air quality within shelters, leading to the accumulation of harmful gases resulting from urine accumulation (Koçak, 2020). Additionally, it contributes to the prevalence of foot and hoof problems among animals (Denli et al., 2013), while the manure of cows lying in stalls falls into the absence of urinary canals, aiding in maintaining cleanliness, especially in the udder part (Yılmaz and Yardcımcı, 2014). Research indicates that 74.5% of shelters in the Narman district of Erzurum (Güler et al., 2017), and 81.1% of shelters in Ankara province (Koçak, 2020) are equipped with urinary canals.

The cleaning of cow walking paths is recommended to be performed at least twice daily (Anonymous, 2024a). In Ankara province, it was found that 96.8% of breeders manually removed faeces from shelter floors, with 63.5% cleaning the shelter twice a day and 26% doing so once a day (Koçak, 2020). Cleaning frequencies of every other day, once a week, and once a month were reported to be low at 2.1%, 4.2% and 4.2%, respectively. Bakır ve Kibar (2020) noted that in Muş province, 90.3% of breeders clean shelters daily, with 84.9% using manual methods and 15.1% employing automatic scrapers. In the central district of Erzincan, it was reported that 97.5% of cleaning operations were carried out manually, with 1.5% using automatic mechanical scrapers, and 1% using tractors for faeces removal from shelter floors (Özsağlıcak & Yanar, 2022). Doğanay and Yanar (2023) indicated that in the Eyyubiye district of Şanlıurfa, manpower was utilized for shelter cleaning at a rate of 80%, while scrapers and tractors were employed at rates of 5.9% and 14.1%, respectively.

Watering and feeding of cows

The freedom for animals to access water and feed is a critical aspect of welfare criteria (WOAH, 2023). During inspections, it was noted that shelters were designed to facilitate easy access to water, with all examined shelters ensuring that animals can access water whenever needed. In Malatya, breeders water their animals with varying frequencies: 50.2% water them twice a day, 2.6% water them once a day, and 3.6% water them more than twice a day. Additionally, 43.6% of animals have free access to water (Köseman & Şeker, 2016). In the central district of Erzincan, 15.6% of animals have free access to water through the use of automatic waterers (Özsağlıcak & Yanar, 2022). In the Polatlı district of Ankara, breeders water their animals with 51% doing so twice a day, 2.1% once a day, and 2.1% three times a day. Moreover, 44.8% of animals have free access to water (Koçak, 2020).

Considering the age, physiological status, and productivity of the cattle, it is imperative to establish an appropriate feeding regimen, ensuring fresh feed is provided and replenished twice a day. Inadequate and inappropriate feeding practices can lead to reduced productivity, as well as the onset of various diseases and potential fatalities (RSPCA, 2021). Nonetheless, it is essential to ensure that all animals have continuous access to ample clean and fresh water daily, except under circumstances requiring intervention by a veterinarian (RSPCA, 2021). In Burdur province, it was reported that breeders feed cows in two meals, both in the morning and evening, accounting for 91.1% of cases (Figure 6).
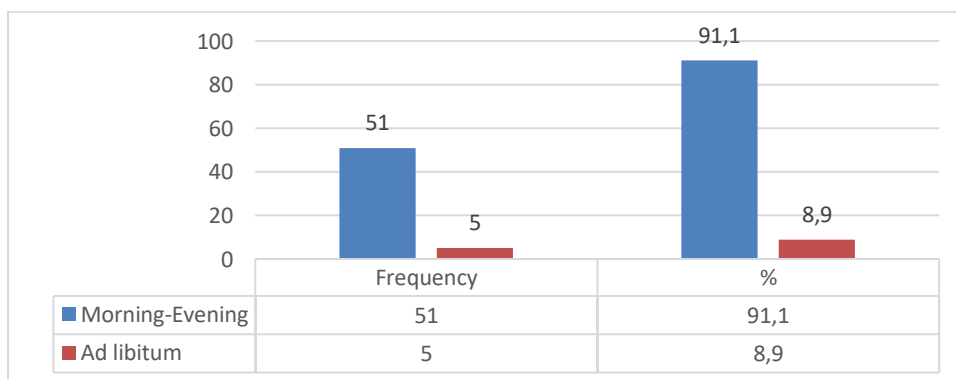

	Frequency	%
Morning-Evening	51	91,1
Ad libitum	5	8,9

Figure 6. Nutritional management of cows
Şekil 6. İneklerin beslenme yönetimi

Breeders have affirmed that they abstain from providing mouldy feed to animals, recognizing the detrimental effects such feed can have. Moldy feeds are known to be less palatable, potentially leading to a reduction in dry matter intake. Consequently, this can result in decreased feed consumption, leading to diminished live weight gain or milk production. Moreover, mouldy feed poses health risks to animals, including the development of respiratory diseases. Additionally, feeding cattle with mouldy feed can pose hazards to human health, as breeders or workers may be susceptible to lung diseases from inhaling mould spores (Anonymous, 2022). According to Koçak (2020), 95.8% of breeders in the Polatlı district of Ankara affirm that they do not provide mouldy feed to animals, reflecting a conscientious approach towards animal welfare and human health concerns.

Cows' health and cleanliness

In Burdur province, 53.6% of breeders reported experiencing hoof problems (Figure 7). Among those facing hoof issues, 55.4% stated that they conducted hoof care themselves, while 44.6% declared seeking treatment under the guidance of a veterinarian. Additionally, lameness cases were documented in 33.9% of the farms.
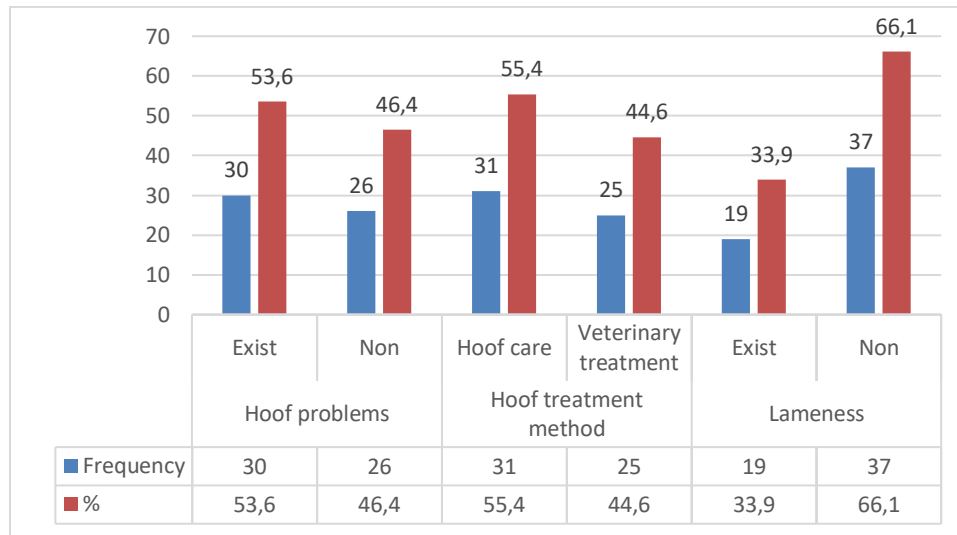

	Hoof problems		Hoof treatment method		Lameness	
	Exist	Non	Hoof care	Veterinary treatment	Exist	Non
Frequency	30	26	31	25	19	37
%	53,6	46,4	55,4	44,6	33,9	66,1

Figure 7. Hoof problem, treatment method, lameness

Şekil 7. Tırnak problemi, tedavi yöntemi, topallık

Any disease-causing pain in the feet or legs of animals inevitably leads to lameness, resulting in economic losses if left untreated (İzci & Sulu, 2022). Lameness is consistently indicative of poor welfare, sometimes reflecting a very state of welfare (Greenough & Weaver, 1997). The incidence of lameness in dairy cows varies globally, with rates of 35-56% in the United States, 59.5% in the United Kingdom, and over 83% in the Netherlands (Broom, 2000). In Türkiye, Yaylak et al. (2007) reported lameness incidence in dairy cows ranging from 13% to 58%, while the average incidence was found to be 28.2%. In Diyarbakır province, 79% of breeders stated they do not perform hoof care but do so in cases of illness (21%) (Şahanoğlu, 2014). Similarly, in Afyonkarahisar province, 85.1% of breeders were reported not to perform nail care (Öcal, 2020). Conversely, in Ankara province, the incidence of lameness in dairy cattle farms was reported to be 2.3%, with 86.7% of lame cows observed (Öcal, 2020). In the Polatlı district of Ankara, Koçak (2020) found that 79.2% of breeders did not encounter hoof problems, and those who did either sought veterinary assistance or performed hoof cutting and care themselves. In the Ondokuz Mayıs district of Samsun, 94.8% of breeders do not engage in hoof care (Satılmış & Atasever, 2022).

In Burdur, 75% of breeders inject their cows against internal and external parasites once or twice a year. Controlling parasites in animals is crucial not only for animal welfare and human-animal interaction but also for minimizing the risk of potential human infections (Deplazes et al., 2016). Both internal and external parasites pose significant health

and production risks to cattle herds. Reduced performance or productivity of cows can increase susceptibility to diseases and elevate the risk of mortality (Smith, 2023). Therefore, combating parasites in agricultural operations is vital for the welfare of animals as well as for human health. According to Şahanoğlu (2014), 89.1% of breeders in Afyonkarahisar province apply treatments against internal-external parasites, typically 2.03 times a year. Similarly, Koçak (2020) noted that nearly all breeders in the Polatlı district of Ankara face challenges related to parasites. Additionally, 31.3% of breeders prefer using pills once or twice a year for parasite control, while 8.3% opt for biannual internal-external parasite injections, and 2.1% prefer annual injections. Satılmış and Atasever (2022) reported that parasitic diseases were prevalent (25.5%) in the Ondokuz Mayıs district of Samsun.

A significant proportion (71.4%) of shelters and milking parlours are equipped with foot baths at their entrance. The purpose of a foot bath is to disinfect and clean the cow's hooves to prevent lesions. Foot baths play a crucial role in preventing the spread of infectious lesions and reinforcing the hoof walls to prevent non-infectious lesions, particularly effective in preventing conditions like hairy heel warts (Reiter & Bewley, 2024). Consequently, foot baths have become essential equipment in animal shelters. Şahanoğlu (2014) noted that farms in Afyonkarahisar province lack foot baths, posing a risk to the health and welfare of the animals. Conversely, in Ankara, it has been reported that nearly all farms are equipped with foot baths. However, it has been observed that the rate of ketosis in farms without foot baths is three times higher compared to those with foot baths (Öcal, 2020).

In Burdur, 67.9% of the breeders reported conducting general cleaning before disinfection, while 39.3% stated that they perform disinfection once a month. Cleaning and disinfection are essential practices to safeguard the welfare and health of high-yielding animals, such as dairy cows, particularly in modern shelters characterized by high animal density and productivity (Anonymous, 2024b). Thorough cleaning and disinfection play a crucial role in reducing pathogen levels and breaking the disease cycle. Given that dairy cattle farms cannot readily evacuate all animals from the shelter, reducing bacteria in the shelter surroundings is paramount. Different practices regarding disinfection processes exist in dairy cattle farms across the country. For instance, Elmaz et al. (2010) noted that only 11.7% of farms in Burdur province utilized disinfectants, with the majority (88.3%) not employing any disinfectant. Similarly, Yener et al. (2013) reported that 62.5% of dairy cattle breeders in Şanlıurfa province did not apply disinfection in their shelters, while 37.5% did so for protective purposes. Denli et al. (2013) indicated that breeders in Diyarbakır province did not carry out any disinfection processes inside and outside the shelter. In contrast, Koçak (2020) observed that cattle breeders in the Polatlı district of Ankara used various substances for disinfection. Among them, 51.1% reported using disinfectant substances, 19.7% used whitewash, and 16.8% used lime. Additionally, Özsağlıcak and Yanar (2022) stated that 55.9% of farms in the central district of Erzincan conducted general cleaning of the shelter once a year.

Maintaining cleanliness among cows is crucial for ensuring hygienic milk production and promoting the welfare of dairy cows. Body cleanliness scoring involves subjectively assessing the degree of manure contamination in various parts of the cow's body (Aytekin et al., 2021). Upon evaluation, it was observed that 44% of the cows in the shelter were categorized as very dirty (Figure 8). Additionally, the breakdown revealed that cows were clean at a rate of 10.1%, slightly dirty at a rate of 33%, and very dirty at a rate of 12.8%.

In the examination conducted in the shelters, it was observed that the thighs of the cows were dirty at a rate of 44.9% (Figure 8). The breakdown of cleanliness levels among the animals in shelters is as follows: 10.3% were classified as clean, 32.7% as slightly dirty, and 12.1% as very dirty.

It was observed that 44.2% of the cows in the shelters were dirty in the udder-belly area, while 10.6% were clean, 32.7% were slightly dirty, and 12.5% were very dirty (Figure 8).
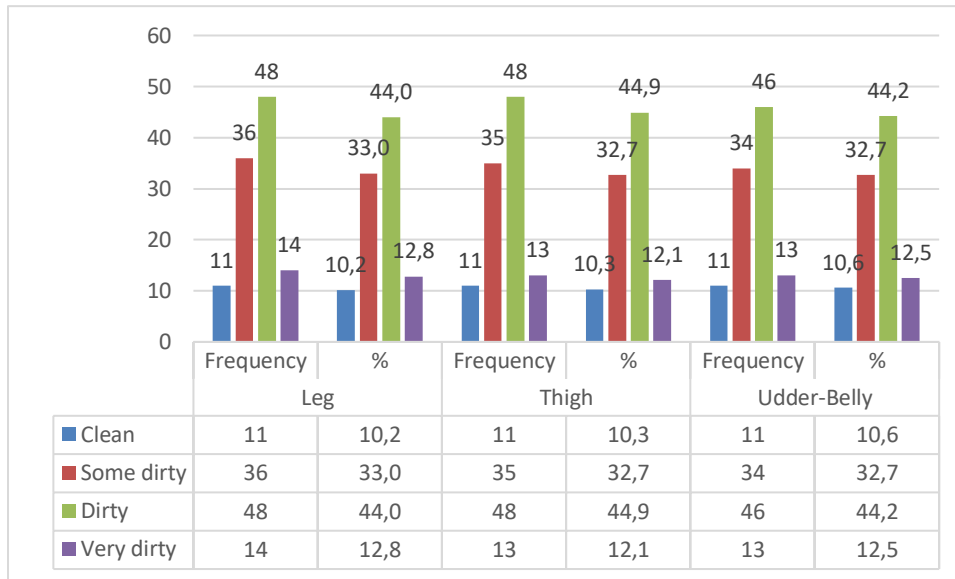
Figure 8. Cleanliness of the legs, thighs and udder-belly areas of the cows

Şekil 8. İneklerin bacak, uyluk ve meme-karın bölgesi temizlik durumu

As noted, during shelter visits in Burdur province, it was observed that cows were generally dirty. The cleanliness of cows is crucial for ensuring hygienic milk production and promoting the welfare of dairy cows. The body cleanliness score serves as a key indicator for evaluating the success of manure management on farms. However, this score is influenced by various factors such as climate conditions, farm financial resources, and animal behaviour (Sant'Anna & Paranhos da Costa, 2011).

Poor hygiene on the farm heightens animals' exposure to environmental pathogens, thereby increasing the incidence of mastitis (Schreiner & Ruegg, 2003). Mastitis, a prevalent issue in herds, is characterized by an increase in somatic cell count and bacterial presence in milk. It poses significant risks to human health (Manlongat et al., 1998), diminishes milk and dairy product quality, and reduces milk yield (Miller et al., 1993; Yalçın et al., 2000). Several studies conducted in Türkiye have reported similar findings regarding cow cleanliness. For instance, Şahanoğlu (2014) reported very dirty cows following shelter inspections in Afyonkarahisar province. Öcal (2020) noted that 60% of cows in Ankara province shelters were dirty, with 13.3% classified as very dirty and 26.7% as clean. Similarly, in the Polatlı district, Koçak (2020) found that 67.7% of cows were very dirty, 30.2% were slightly dirty, and only 2.1% were clean.

Body condition score of cows

During the shelter visits, it was observed that 38.9% of the cows had body condition scores between 2.25 and 3.5 (Figure 9).

Body condition serves as a critical indicator of welfare and herd management in dairy cows. It is closely linked to the health and metabolic status of the cow, as well as the composition of milk during lactation (Huang et al., 2019). Essentially, body condition reflects the animal's body fat reserves, which can be utilized during periods when the cow cannot consume adequate energy to meet its needs. This typically occurs early in lactation for high-producing cows, but can also arise due to illness, poor-quality forage, or restricted feed intake. When cows experience weight loss, they require more feed than usual to regain normal body condition. Ideal condition scores are typically between 3.0-3.25 during the dry period and at birth, and between 2.25-2.75 during peak lactation (Anonymus, 2021). Maintaining optimal body condition is crucial for ensuring the health, productivity, and welfare of dairy cows.
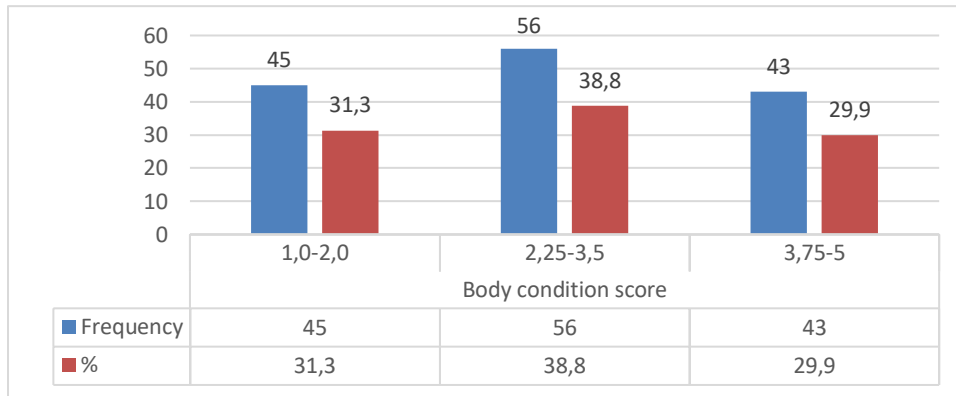
Figure 9. Body condition scores of cows

Şekil 9. İneklerin vücut kondisyon skorları

Rumen score of cows

During shelter visits, the rumen pits of the cows were evaluated (Figure 10). Rumen fullness serves as a valuable indicator of the animals' nutritional status (Hulsen, 2008). The observed rumen pits generally indicate that 38.1% of the animals have a good nutritional status. However, itis worth noting that the rates of score 2 and score 4 are not negligible, accounting for 32% and 29.9% respectively. This suggests variations in the nutritional status among the observed cows, with a portion showing less optimal rumen fullness.
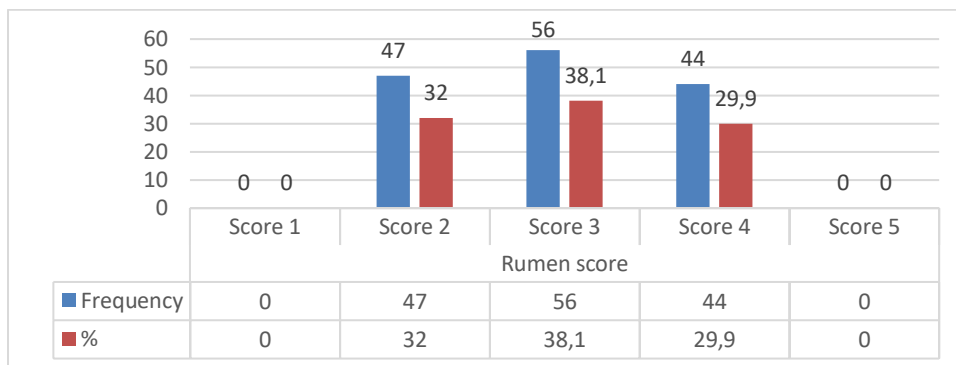

Figure 10. Rumen scores of cows

Şekil 10. İneklerin rumen skorları

Score 3 is generally considered a desirable score in dairy cows, indicating that the cows consume sufficient amounts of feed and that the feed remains in the rumen for the required duration (Hulsen, 2008). The observation that 38.1% of the cows in the shelters visited in Burdur province have a rumen score of 3 suggests that these cows are in the ideal nutritional state, with no adverse welfare implications regarding nutrition. Score 2 in dairy cows is typically observed in the first week after calving. However, if observed in later stages of lactation, it may indicate insufficient feed consumption or rapid passage of feed through the digestive system (Hulsen, 2008). The examination conducted in the shelters revealed that 32% of the cows had a rumen score of 2. Due to the mixed housing of cows in shelters, it is challenging to determine whether these animals are indeed in the first week post-calving. Therefore, it is presumed that the nutrition of these animals is inadequate. Score 4 in dairy cows is suitable for cows approaching the end of lactation or in the dry period (Hulsen, 2008). Although the mixed housing of cows in farms complicates evaluation, it may indicate that the cows with a score of 4 in the examined farms are nearing the end of lactation.

In conclusion, most dairy cattle breeders in Burdur province lack formal training in animal husbandry. Those without Veterinary-Zootechnics education have only taken animal care and nutrition courses, lacking knowledge of animal welfare. Despite varying educational backgrounds, breeders generally prefer semi-open shelters with an east-oriented long axis, suitable for the region's climatic conditions. The east-long axis direction is particularly favoured by university graduates and individuals with master's/doctoral degrees. Shelters typically feature strip ventilation on the roof and walls, lighting bulbs, and concrete flooring. While about half of the shelters have animal-loading ramps, most lack a designated vaccination route. New entrants to the sector tend to prefer vaccination methods on their farms. Urinary canals are lacking in most shelters, with tractors commonly used for manure removal from walking paths. Manure removal frequency varies, with tractors employed monthly and scrapers twice daily.

All cows have unrestricted access to water and are fed twice daily. Hoof problems are prevalent, especially among newer breeders, although lameness is less common. Vaccination against internal and external parasites typically occurs monthly or bi-monthly, with foot baths at the shelter and milking parlour entrances. Disinfection generally follows general cleaning in most shelters.

The legs, thighs, and udder-belly areas of cows are frequently dirty. Rumen scores generally indicate adequate nutrition, while body condition scores range from 2.25 to 3.5, with significant occurrences in lean and very fat cows. The results suggest that while some animal welfare criteria are considered in shelter planning for farms with 100 animals or more in Burdur province, significant managerial deficiencies persist. Breeders should be educated on the importance of care, nutrition, and animal welfare, with encouragement to seek government support to address these shortcomings. Detailed explanations of observed welfare deficiencies are essential for breeder understanding and motivation.

STATEMENT OF CONFLICT OF INTEREST
The authors of the article declare that they do not have any conflict of interest. This study is a part of the first author's master's thesis.

AUTHOR'S CONTRIBUTIONS
HD: Collecting data and writing the draft version of the article, SÖ: Advisor, writing the final version of the article, HİY: Interpretation and analysis of data regarding shelters.

STATEMENT OF ETHICS CONSENT
The procedures applied in the study were deemed appropriate and approved by Isparta University of Applied Sciences Animal Experiments Local Ethics Committee (29.03.2023/10.1051).

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