ATATÜRK ÜNİVERSİTESİ YAYINLARI ATATURK UNIVERSITY PUBLICATIONS

Research Article *Araştırma Makalesi* DOI: 10.17094/vetsci.1528284

Evaluation of Animal Welfare in Dairy farms in Kars Province for Barn and Breeding Conditions

Kars İli Süt Sığırcılığı İşletmelerinde Hayvan Refahının Barınak ve Yetiştirme Şartları Açısından Değerlendirilmesi

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ABSTRACT

This study was conducted in 54 dairy farms, including 48 tie-stall (TS) barns and 6 closed free-stall (CFS) barns, in two different types of farms registered to the TURKVET system in the city center and districts of Kars. The welfare level was determined based on the Animal Needs Index (ANI) 35L Model. Use of yard or pasture (days/year) among the criteria of the freedom of movement category according to barn types; space per animal (m^2/500 kg), management of young and use of yard or pasture (days/year) among the criteria of the social interaction category; softness and cleanliness of the bedding space among the criteria of the floor condition category; the use of open space among the criteria of the light and air conditions category; and cleanliness of stables among the criteria of the stockmanship category; the condition of equipment, condition of integument, cleanliness of animals, and condition of hooves were found to be statistically significant ($P < .05$). The in-barn mean temperature, humidity and temperature humidity index (THI) were 23.76 °C, 37.83% and 68.73, respectively in the tie-stall barns, while the mean temperature, humidity and temperature humidity index (THI) were 22.20 °C, 38.13% and 66.98, respectively, in the closed free-stall barns and no statistical difference was found ($P > .05$). As a result of the research, 2.1% of the closed-tie barns were determined to be borderline suitable, 33.3% partially suitable, 37.5% largely suitable, 27.1% suitable in terms of animal welfare, while no unsuitable or very suitable enterprises were determined. While 16.7% of the closed free-stall barns were suitable and 83.3% were very suitable, no unsuitable, rarely, little, and fairly suitable barns were determined. The breeders and personnel working in relevant units should be trained on animal welfare to increase awareness on welfare.

Keywords: ANI 35/L, animal welfare, barn, dairy farming.

ÖZ

Bu araştırma, Kars merkez ve ilçelerinde TÜRKVET sistemine kayıtlı, farklı iki tip işletmede 48 adeti kapalı bağlamalı ve 6 adeti ise kapalı serbest dolaşımlı olmak üzere 54 adet süt sığırı işletmesinde gerçekleştirilmiştir. Refah düzeyini belirlemede, Animal Needs Indeks (ANI) 35L yöntemi temel alınarak yapılmıştır. Ahır tiplerine göre hareket özgürlüğü kategorisi kriterlerden, avlu ya da mera kullanımı (gün/yıl); sosyal etkileşim kategorisi kriterlerinden, hayvan başına alan (m^2/500 kg), gençlerin yönetimi ve avlu ya da mera kullanımı (gün/yıl); zemin durumu kategorisi kriterlerinden, yatma alan yumuşaklığı ve yatma alan temizliği; ahır içi iklim koşulları kategorisi kriterlerinden, açık alan kullanımı ve bakım kategorisi kriterlerinden, bölme, yemlik ve suluk temizliği, teknik ekipman durumu, deri durumu, hayvanların temizliği ve tırnakların durumunun istatiksel olarak önemli olduğu belirlenmiştir ($P < ,05$). Kapalı bağlamalı ahırlarda, barınak içi sıcaklık, nem ve sıcaklık nem indeksi (THI) ortalamaları sırası ile 23,76 ^{0}C, %37,83 ve 68,73 belirlenirken, kapalı serbest dolaşımlı ahırlarda aynı sıra ile 22,20 ^{0}C, %38,13 ve 66,98 olarak belirlenmiş ve istatiksel bir fark tespit edilmemiştir ($P > ,05$). Araştırma sonucunda, kapalı bağlamalı ahırların hayvan refahı açısından %2,1'nin sınırda uygun, %33,3'ünün kısmen uygun, %37,5'inin büyük ölçüde uygun, %27,1'nin uygun olarak belirlenirken, uygun olmayan ve çok uygun olan işletme belirlenmemiştir. Kapalı serbest dolaşımlı ahırların %16,7'sinin uygun ve %83,3'ünün çok uygun olduğu belirlenirken, uygun olmayan, nadiren uygun olan, kısmen uygun ve oldukça uygun ahır belirlenmemiştir. Hayvan refahı konusunda ilgili birimlerdeki yetiştiriciler ve personelin, bilinçlendirilmesi için eğitim almaları sağlanmalıdır. Hayvan refahı konusunda ilgili birimlerde çalışan yetiştiricilerin ve personelin eğitilmesi sağlanarak refah konusunda farkındalık artırılmalıdır.

Anahtar Kelimeler: ANI 35/L, barınak, hayvan refahı, süt sığırcılığı.

*This study was summarized from the first author's master thesis with same title.

Received/Geliş Tarihi: 05.08.2024
Accepted/Kabul Tarihi: 02.11.2024
Publication Date/Yayın Tarihi:29.12.2024

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Cite this article: Ceco A, Önk K. Evaluation of Animal Welfare in Dairy farms in Kars Province for Barn and Breeding Conditions. *Vet Sci Pract*. 2024;19(3):164-173.

Atıf: Ceco A, Önk K. Kars İli Süt Sığırcılığı İşletmelerinde Hayvan Refahının Barınak ve Yetiştirme Şartları Açısından Değerlendirilmesi. *Vet Sci Pract*. 2024;19(3):164-173.

INTRODUCTION

In recent years, there has been a deficit in the production of animal products as the agricultural lands have gradually reduced and the need for food supply has grown, and it has become necessary to switch to intensive stock farming in order to raise the yield per animal in order to satisfy the demand for these products. Consequently, animals have been removed from their habitats and have come across some problems in terms of welfare.[1,2]

Due to the raising of animals away from their habitats, animal research has been focused on animal welfare in recent years and importance has been placed on conducting studies in this field. It is important to restore the habitual order of cattle removed from their habitats in raising and make every effort to eliminate all kinds of problems that may occur at this point, to create better welfare conditions, and to rear animals in healthy conditions.[2-5]

Improving animal welfare in livestock raising will enhance access to animal food, boost economic returns, provide food safety, and protect animal health. It would also play an important role in improving people's welfare as it would reduce risks to human health.[4,5]

Animal welfare has a multidimensional structure. Therefore, the assessment of animal welfare is based on complementary measures covering all dimensions.[6,7] Currently, three different methods are followed to assess animal welfare: assessment of animal welfare using the four basic principles, good barn conditions for animals, and the animal needs index (ANI) method.[6-10]

The method followed should include a combination of physiological, health and behavioral indicators to assess animal welfare at the farm level in order to be comprehensive, valid, and reliable. There is a wide variation among the welfare assessment methods used in terms of welfare indicators. Several studies following the animal welfare criteria method developed by Bartussek et al.,[11], and named ANI 35L/2000-cattle, have reported that this method is a sensitive and reliable approach for welfare assessment at the farm level.[6,12]

The animal needs index is one of the most widely used methods for assessing animal welfare in cattle. The researcher developed this method as an appropriate and comprehensive assessment tool to meet the need for evaluating animal welfare on farms.[11,13-15]

This study aimed to evaluate animal welfare in dairy farms in Kars province based on ANI 35L criteria for barn and breeding conditions.

MATERIALS AND METHODS

Material

This study was approved by the Animal Ethics Committee of Animal Experiments of the Veterinary Faculty at Kafkas University (Date: 27.05.2021, Number: 2021-096). The material of this study consisted of data obtained from 54 dairy farms registered in the TURKVET system in the city center and districts of Kars in the spring of 2021.

The researcher personally visited these farms and assessed welfare using the ANI 35L/2000-cattle method developed by Bartussek et al.,[11]. The farms included in the study were divided into two groups: tie-stall (TS) and closed free-stall (CFS). The animal welfare in these farms was assessed and compared using the ANI 35L/2000-cattle model.

Method

In the study, the researcher visited the farms, collected data and information through face-to-face interviews with the farmers, and filled out the questionnaires. The theoretical data on the physical structures of the barns on the farms was recorded in the forms as a first stage in the questionnaires. The number of lame cattle in the barns, the state of the animals' superficial wounds, and their body condition scores were determined. The second stage involved the assessment of animal welfare in the farms using the ANI score developed by Bartussek et al.,[11] by assigning scores according to 5 categories and criteria.

Statistical Analysis

The data were analyzed using the SPSS 22.0 statistical software (IBM Company, USA). Mann-Whitney U test was run to analyze whether or not the obtained scores differed statistically between the barn types according to the criteria of the animal welfare category. According to the ANI 35L assessment, the chi-square test was run to compare the barn types in terms of the proportion of farms in different welfare categories.

The researcher measured the temperature (T) and relative humidity (RH) inside the barns to identify temperature stress. Using the formula below, the temperature-humidity index (THI) was calculated based on the temperature values. [16,17]

$$THI = 0.8T + [(RH/100) (T-14.3)] + 46.4$$

RESULTS

The animal welfare was scored according to the categories and criteria specified in the ANI 35L model according to the barn type in the study. The results were evaluated separately according to the welfare measurement categories.

It was determined that the difference between the barn types was statistically significant *(P* < .05) in terms of freedom of movement category, number of days in the yard or pasture criterion. No statistically significant difference was found between the barn types in terms of stall area value (*P* > .05). It was determined that CFS barn types had higher welfare scores than TS barn types in terms of the number of days in the year according to the criterion of yard or pasture use (Table 1).

While there was a statistically significant difference in the criteria scores of the social interaction category, space per animal, the management of young, and the number of days spent in the yard or pasture according to the barn types, there was no statistically difference in the score of the social structure criterion of the herd (*P* > .05). All criteria evaluated in the social interaction category according to the barn type had higher mean values in the CFS barn type than in the TS barn type (Table 2).

Table 1. Evaluation of locomotion category criteria according to barn types.

Criteria	Barn types	n	Mean±SEM	Z	*P*
Available floor area (m^2 /AWU)	Tie-stall	48	-[a]	-	-
	Closed Free-stall	6	1.2±0.45		
	Total	54	1.2±0.45		
Lying down-rising	Tie-stall	48	-[a]	-	-
	Closed Free-stall	6	2.3±0.33		
	Total	54	2.3±0.33		
Stall size and boundaries	Tie-stall	48	1.23±0.17	-	-
	Closed Free-stall	6	-[a]		
	Total	54	1.23±0.17		
Movement of tether (m)	Tie-stall	48	0.0±0.00	-	-
	Closed Free-stall	6	-[a]		
	Total	54	0.0±0.00		
Outdoor areas (yards or pasture) (days/year)	Tie-stall	48	1.0±0.01	6.573	.001
	Closed Free-stall	6	2.8±0.20		
	Total	54	1.7±0.03		

n: sample size; SEM: standard error of the mean; Z: Z-score: p: probability; -[a]: The Mann-Whitney test could not be run for empty groups m^2=square meters; AWU: animal weight unit; m: meter

Table 2. Evaluation of social interaction category criteria according to barn types.

Criteria	Barn types	n	Mean±SEM	Z	*P*
Available floor area (m^2/AWU)	Tie-stall	48	1.22±0.17	2.213	.027
	Closed Free-stall	6	2.33±0.49		
	Total	54	1.35±0.17		
Herd structure	Tie-stall	48	0.98±0.02	0.944	.345
	Closed Free-stall	6	1.08±0.30		
	Total	54	0.99±0.03		
Management of young	Tie-stall	48	0.53±0.02	4.964	.001
	Closed Free-stall	6	0.92±0.08		
	Total	54	0.57±0.02		
Outdoor areas (yards or pasture) (days/year)	Tie-stall	48	1.50±0.01	5.821	.001
	Closed Free-stall	6	2.00±0.22		
	Total	54	1.56±0.03		

n: sample size; SEM: standard error of the mean; Z: Z-score: p: probability; m^2=square meters; AWU: animal weight unit

A statistically significant difference was found between the barn types in terms of the softness and cleanness of the bedding space among the criteria of the floor condition category ($P < .05$). No statistically significant difference was found between barn types in terms of the slipperiness of the bedding space and the activity areas (service roads) among the criteria of the floor condition category ($P > .05$). The CFS barns had the highest rank mean values for the criteria of softness and cleanliness of the bedding space (Table 3).

Table 3. Evaluation of floor condition category criteria according to barn types.

Criteria	Barn types	n	Mean±SEM	Z	*P*
Softness	Tie-stall	48	1.00±0.01	4.038	.001
	Closed Free-stall	6	1.17±0.11		
	Total	54	1.02±0.01		
Cleanliness	Tie-stall	48	0.52±0.05	3.630	.001
	Closed Free-stall	6	1.33±0.11		
	Total	54	0.61±0.06		
Slipperiness	Tie-stall	48	1.02±0.04	0.525	.599
	Closed Free-stall	6	1.08±0.08		
	Total	54	1.03±0.03		
Activity areas	Tie-stall	48	1.27±0.07	1.558	.112
	Closed Free-stall	6	1.17±0.11		
	Total	54	1.26±0.06		
Outdoor yards	Tie-stall	48	-[a]	-	-
	Closed Free-stall	6	1.33±0.11		
	Total	54	1.33±0.11		

n: sample size; SEM: standard error of the mean; Z: Z-score: p: probability; -[a]: The Mann-Whitney test could not be run for empty groups

The difference between the barn types in terms of the use of open space criterion for the in-barn climate conditions category was found to be statistically significant ($P < .05$). No statistically significant differences were determined between barn types in terms of other criteria for the in-barn climate conditions category ($P > .05$). Except for the use of open space (day/hour) in terms of the criteria for the in-barn climate category, the other criteria had similar welfare scores according to the barn type (Table 4).

Table 4. Evaluation of light and air category criteria according to barn types.

Criteria	Barn types	n	Mean±SEM	Z	*P*
Daylight in animal house	Tie-stall	48	1.16±0.08	0.504	.614
	Closed Free-stall	6	1.17±0.21		
	Total	54	1.07±0.07		
Air quality and air flow	Tie-stall	48	0.66±0.06	1.588	.112
	Closed Free-stall	6	0.92±0.08		
	Total	54	0.69±0.05		
Draught in lying area	Tie-stall	48	0.76±0.04	0.669	.503
	Closed Free-stall	6	0.83±0.11		
	Total	54	0.77±0.03		
Noise	Tie-stall	48	0.97±0.02	1.213	.225
	Closed Free-stall	6	0.92±0.08		
	Total	54	0.96±0.02		
Outdoor areas (days/year)	Tie-stall	48	1.47±0.02	1.560	.119
	Closed Free-stall	6	1.75±0.28		
	Total	54	1.50±0.03		
Outdoor areas (hours/day)	Tie-stall	48	1.97±0.02	3.332	.001
	Closed Free-stall	6	1.58±0.20		
	Total	54	1.93±0.04		

n: sample size; SEM: standard error of the mean; Z: Z-score: p: probability

While a statistically significant difference was determined between the barn types in the criteria for cleanliness of stables within the maintenance category, the condition of equipment, cleanliness of animals and condition of hooves ($P < .05$), no statistically significant difference was determined in the criteria of technopathies, condition of integument and animal health ($P > .05$). The CFS barn type had a better condition for animal welfare than the TS barn type in terms of the criteria of the maintenance category (Table 5).

Table 5. Evaluation of stockmanship category criteria according to barn types.

Criteria	Barn types	n	Mean±SEM	Z	*P*
Cleanliness of stables	Tie-stall	48	0.46±0.05	3.013	.003
	Closed Free-stall	6	0.92±0.08		
	Total	54	0.51±0.05		
Condition of equipment	Tie-stall	48	0.43±0.06	3.711	.001
	Closed Free-stall	6	1.00±0.01		
	Total	54	0.49±0.05		
Condition of integument	Tie-stall	48	0.88±0.03	1.376	.169
	Closed Free-stall	6	1.00±0.01		
	Total	54	0.89±0.02		
Cleanliness of animal	Tie-stall	48	-0.29±0.04	2.998	.003
	Closed Free-stall	6	0.25±0.17		
	Total	4	-0.23±0.04		
Condition of hooves	Tie-stall	48	0.33±0.04	2.981	.003
	Closed Free-stall	6	0.75±0.11		
	Total	54	0.38±0.04		
Technopathies	Tie-stall	48	1.49±0.01	1.767	.077
	Closed Free-stall	6	1.42±0.08		
	Total	54	1.48±0.01		
Animal health	Tie-stall	48	0.54±0.07	0.458	.647
	Closed Free-stall	6	0.66±0.25		
	Total	54	0.56±0.07		

n: sample size; SEM: standard error of the mean; Z: Z-score: p: probability

No statistically significant differences were found between barn types for temperature values ($P > .05$). According to the barn types, the average humidity, temperature, and THI values were 37.83%, 23.76 °C, and 68.73 in TS barns and 38.13%, 22.20 °C, and 66.98 in CFS barns, respectively (Table 6).

Table 6. Average temperature, humidity and THI values by barn types.

Parameter	Barn types	n	Mean±SEM	Z	*P*
Humidity (%)	Tie-stall	48	37.83±1.48	0.193	.847
	Closed Free-stall	6	38.13±5.51		
	Total	54	37.87±1.43		
Temperature (℃)	Tie-stall	48	23.76±0.42	1.240	.215
	Closed Free-stall	6	22.20±1.13		
	Total	54	23.59±0.39		
THI	Tie-stall	48	68.73±0.45	0.078	.078
	Closed Free-stall	6	66.98±0.66		
	Total	54	68.54±0.41		

THI: temperature humidity index; n: sample size; SEM: Standard error of the mean; Z: Z-score: p: probability; %: percentage: ℃: Centigrade

A statistically significant difference was determined in terms of scores of the ANI 35L welfare assessment according to barn types ($P < .05$). The scores obtained from the ANI 35/L welfare categories showed that 2.1% of the TS barns were suitable at margin for animal welfare, but there were none in the CFS barns. 37.5% of the TS barns were largely suitable for animal welfare, while 33.3% were only partially suitable. The total scores showed that 27.1% of the TS barns and 16.7% of the CFS barns were suitable for animal welfare. 83.3% of the CFS barns were highly suitable for animal welfare, but none of the TS barns were. The total scores showed that 1.9% of the barns were suitable at margin for animal welfare, 29.6% were partially suitable, 25.9% were suitable, and 9.3% were highly suitable (Table 7).

Table 7. Distribution of different barn types according to their scores in the ANI 35L evaluation.

Total ANI scores	Tie-stall		Closed Free-stall		Total		χ2	*P*
	n	%	n	%	n	%		
<11 (Not suitable with respect to welfare)	-	-	-	-	-	-		
11-16 (Scarcely suitable with respect to welfare)	1	2.1	-	-	1	1.9		
16,5-21 (Little suitable with respect to welfare)	16	33.3	-	-	16	29.6	44.598	.001
21,5-24 (Fairly suitable with respect to welfare)	18	37.5	-	-	18	33.3		
24,5-28 (Suitable with respect to welfare)	13	27.1	1	16.7	14	25.9		
>28 (Very suitable with respect to welfare)	-	-	5	83.3	5	9.3		
Total	48	100.0	6	100.0	54	100.0		

ANI: animal needs index; χ^2: chi-square; p: probability

DISCUSSION

Tethering animals in TS barns imposes severe restrictions and negatively affects animal welfare. Rousing et al.,[18] and Bowell et al., [19] stated that barn types and designs affect animal welfare. The number of tie-stall barn types in dairy farms in Kars province and its districts was quite high and they were not suitable for animal welfare.

It was determined that CFS barn types had higher welfare scores than TS barns in terms of the number of days in the year according to the criterion of yard or pasture use. CFS barns were more suitable for animal welfare than TS barns due to allowing animals freedom of movement and having more space per animal (Table 1). The results of this study are supported by the results of the studies by Seo et al.[20] and Armbrecht et al.[21]. According to the ANI 35L method, TS barns showed insufficient scores in terms of suitability for animal welfare compared to CFS barns. The results obtained in previous studies support the fndings obtained in the current study about having higher points if the farm has a closed free-stall system.[22,23]

The farm owners prefer to use long chains for the animals to be more comfortable in terms of chain length. Although this provides comfort for the movement of animals, 48 out of 54 farms were not suitable for animal welfare according to the ANI 35L assessment due to continuous or seasonal tethering of animals.

Barn comfort has been reported to have an effect on the social interaction behaviors of animals.[24,25] In this study, it was concluded that the CFS barns were suitable for animal welfare according to the ANI 35L since they met the social needs of animals in terms of barn type, space per animal, the management of young, and the number of days spent in the yard or pasture according to the space per animal criterion for social interaction category (Table 2). This is considered to be effective due to the differences in the capacity and herd size of the farms where the study was

carried out and the wide usage spaces in the CFS barns.

According to the ANI 35L model, the highest score should be 10.0 for good animal welfare in the social interaction category. A similar study conducted by Akbay[26] reported that the animals could neither sufficiently meet their social needs nor have a suitable structure for animal welfare in the farms (type 1, type 2, and type 3 in tie-stall systems) where social interaction was researched. In their study, Keçici et al.,[27] reported that social interaction scores ranged between 5.71 and 6.30 in the summer months. This study determined that the score in the social interaction category was 4.47. The different farm sizes and raising methods may have contributed to the low value of the study.

Since floor cleanliness also affects the cleanliness of the animal, it is important for animal welfare. Floor cleanliness is also important for hoof and udder health. According to the criteria of softness and cleanliness of the bedding space, the highest ANI score was determined in CFS barns.

As a result of the animal welfare score evaluation in the study, the score of the floor category was 5.25 points (Table 3) in different farms in the study. This value was higher than the value between 2.92 and 3.9 reported in the study by Keçici et al.,[27], the value between 0.42-2.19 reported in the study by Koçak et al.,[17] in fattening cattle farms with different barn systems, and the value between 3.46-4.56 reported in the study by Keskin[28] in different types of dairy farms. The floor category value found in this study meets animal welfare at a medium level.

Total score of animal welfare for different barn types in the category of in-barn climate conditions was found to be 6.23 in the study (Table 4). This value was lower than the values between 6.57-8.89 reported in the studies conducted by Keskin[28] and Sakar et al.,[29] and, lower than the value of 8.00 reported in the studies conducted by Koçak et al.,[17] in loose housing farms and higher than the value of 2.86 reported in the studies conducted in family type tether systems. Differences were found between barn types in terms of the criteria of use of open space in the category of in-barn climate conditions. Except for the use of open space (day/hour) in terms of the criteria for the in-barn climate category, the other criteria had similar welfare scores according to the barn type.

The total score of animal welfare in different barn types in the stockmanship category was determined to be 4.08 (Table 5). This value was found to be lower than the value of 6.46 reported by Stuoge et al.[30] in fattening and dairy farms in organic farms, lower than the value of 5.21–5.83 reported by Keçici et al.,[27], and lower than the value of 4.53-6.56 reported by Keskin[28]. The cleanliness of stables had a mean score of 0.51 points for animal welfare, and the condition of equipment of 0.49 points among different barn types (Table 5). These two values represent a mean value for welfare conditions. The total value for the animal cleanliness variable was determined to be -0.25, and this value shows that the cleanliness of the animals is insufficient according to the scores of the ANI 35L welfare assessment model.

When the barns in this study were evaluated according to their overall health conditions, it was observed that the TS barns had lower ANI points compared to the CFS barns. A similar study by Koçak et al.,[17] reported that the free-stall barns had a higher score in the animal health criterion than the tie-stall ones. The study is similar in terms of results.

Heat stress affects key behaviors, impacting animal welfare and production. Lacetera[31] and Islam et al.,[32] found that heat stress leads to metabolic dysfunctions, oxidative stress, and immune suppression, causing infections and deteriorating welfare and performance. Additionally, THI trends correlate directly with animal behaviors used to assess health and predict production losses.There was a direct correlation between THI trends and the behaviors of animals, which are commonly used to monitor health status and predict production losses.[33] The temperature-humidity index (THI) is the most widely used environmental indicator of heat stress effects in scientific literature.[34,35]

In the study, it was found that the THI value was 68.73 in TS barns and 66.98 in CFS barns (Table 6). These values were lower than the value (74.59) reported by Koçak et al.,[17] in the TS barns and higher than the value of 61.00 in the CFS barns. These values were between the valuse (48,45-71,80) determmined at different temperatures (thermoneutral, hot and cold seasons) reported by Lovarelli et al.,[36]. This value is similar to the value of 67.43 reported by Sakar et al.,[29]. When the THI inside the barn surpassed that outside, the environmental conditions within the barn were inadequate for ensuring animal welfare, indicating the need for structural improvements.[34]

This study showed differences between total welfare score and barn type (Table 7). While 2.1% of the TS barns were suitable at margin for animal welfare, none of the CFS barns were suitable at margin. It was found that 37.5% of the TS barns were largely suitable for animal welfare, while 33.3% were only partially suitable. According to the total scores,

it was found that 27.1% of the TS barns and 16.7% of the CFS barns were suitable for animal welfare. It was found that 83.3% of the CFS barns were highly suitable for animal welfare, but none of the TS barns were. The total scores showed that 1.9% of the barns were suitable at margin for animal welfare, 29.6% were partially suitable, 25.9% were suitable, and 9.3% were highly suitable. In their study, Keskin[28] reported that 77.3% of the welfare levels of the farms were highly suitable, 13.6% were suitable, 5% were quite suitable, 4.5% were suitable at margin, and none of the assessed farms were partially suitable or unsuitable and showed that the lowest ANI score was 12.5 and the highest ANI score was 38.5, which is different from the results of this study. This is attributed to the season and duration of the study.

In conclusion, free-stall barn type was better for animal welfare than the closed tie-stall barn type. As a result of the ANI assessment, animal welfare and yield can be maximized in these types of barns by eliminating the problems identified in the unsuitable closed tie-stall barns and raising the awareness of the workers about animal welfare and health issues. This study suggests that the use of the ANI 35L method can be recommended for the successful application of the ANI 35L method in farms with different barn types and for the assessment of small family farms that produce using traditional methods for animal welfare. Given the importance of animal husbandry for the future of humankind, increasing the number and quality of similar studies in the region and, consequently, identifying the problems in more detail and introducing effective and feasible solutions to these problems would significantly contribute to both the literature and the farms. Both the environmental conditions and the technical equipment within the housing environment are fundamental components of animal production systems. Consequently, their inclusion in research efforts is pivotal for advancing animal welfare. The ANI 35L method can be suggested for assessing the welfare levels of farms that operate using traditional methods and where it is not feasible to examine many animal-based parameters. Breeders and staff in related units should receive training on animal welfare to raise awareness on the subject. It is important to educate consumers, not just focus on the parameters, to ensure compliance with welfare standards. Multidisciplinary studies conducted at regional and national levels should more effectively must be executed the sustainability of animal welfare and its economic connections. National or international projects developed on animal welfare are expected to contribute positively to educational efforts.

Ethics Committee Approval: Ethics committee approval was obtained from Kafkas University Animal Experiments Local Ethics Committee (Date: 27.05.2021, Number:2021-096)

Peer-review: Externally peer-reviewed.

Author Contributions: Concept - K.Ö.; Design - K.Ö.; Supervision - K.Ö.; Resources - K.Ö., A.C; Data Collection and/or Processing - A.C.; Analysis and/or Interpretation- K.Ö., A.C.; Literature Search - K.Ö., A.C.; Writing Manuscript - K.Ö., A.C.; Critical Review - K.Ö. A.C.

Declaration of Interests: The authors declare that there is no conflict of interest.

Funding: The authors declared that they received no financial support for this study.

Etik Komite Onayı: Etik kurul onayı Kafkas Üniversitesi Hayvan Deneyleri Yerel Etik Kurulu'ndan alınmıştır. (Tarih: 27.05.2021, Sayı: 2021-096)

Hakem Değerlendirmesi: Dış bağımsız.

Yazar Katkıları: Fikir - K.Ö.; Tasarım - K.Ö.; Denetleme K.Ö.; Kaynaklar - K.Ö., A.C.; Veri Toplanması ve/veya İşlemesi - A.C; Analiz ve/ veya Yorum - K.Ö., A.C; Literatür Taraması - K.Ö., A.C.; Yazıyı Yazan - K.Ö A.C.; Eleştirel İnceleme - K.Ö., A.C.

Çıkar Çatışması: Yazarlar çıkar çatışması olmadığını beyan ederler

Finansal Destek: Yazarlar, bu çalışma için finansal destek almadığını beyan etmiştir.

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