Keeping conditions of cattle related with health and productivity during the winter season in the north-eastern Anatolia

Başaran KARADEMİR[1], Mustafa SAATCI[2], Güler KARADEMİR[2]

[1] Department of Internal Diseases; [2] Department of Animal Husbandry and Nutrition Faculty of Veterinary Medicine, University of Kafkas, Kars 36040-Turkey

Summary: The keeping condition can easily affect expected production and health of farm animals. Therefore, the study was aimed to determine the keeping condition of cattle in northeast Turkey (Kars, Ardahan and Iğdır). This survey-study was performed on randomly selected local farmers and villages in the region (1162 person, 83 villages). The most of the breeders (95.09%) have low educational level (secondary school or below). The most of the animal houses (91.14%) consist of the stone-wall, wood-soil ceiling and stone or concrete floor. The average size of animal houses were 100.45 ± 2.78 m^2 and 305.11 m^3. Ventilations of the barns were rather insufficient, even, 21.69% of breeders reported that the ventilation of the barns was completely closed during the winter. Only 3.12% of the breeders in this region were reported using proper bedding. Again 57.23 % of the breeders reported that they never use any disinfectant agents to cleaning the barns, rest of them said that they only use lime for this aim. It was found out that, generally horse (62.65%), poultry (63.86%) and sheep (4.22%) were kept together with cattle in the same shed. As a conclusion, the cattle keeping conditions in the region were determined poor in quality.

Key words: Cattle, keeping condition, managerial factors, the north-eastern Anatolia.

Kuzey-doğu Anadolu'da kış mevsimi süresince sağlık ve verimle ilişkili sığırların bakım koşulları

Özet: Çiftlik hayvanlarının yetiştirme koşulları kendilerinden beklenen verimi ve sağlıklarını kolaylıkla etkileyebilirler. Bu nedenle çalışmanın amacı, Türkiye'nin kuzey doğusunda sığırların yetiştirme koşullarını ortaya koymaktır. Bu anket çalışması bölgeden rasgele seçilen çiftçiler ve köyler üzerinde yürütülmüştür (1162 kişi, 83 köy). Yetiştiricilerin çoğu (% 95.09) düşük eğitim seviyesine sahiptir (ortaokul veya altı). Ahırların çoğu (% 91.14) taş duvar, tahta toprak tavan ve taş veya beton zemininden yapılmıştır. Ahırların ortalama büyüklükleri 100.45 ± 2.78 m^2 ve 305.11 m^3 şeklindedir. Ahırların havalandırmaları oldukça yetersiz, hatta yetiştiricilerin % 21,69'u ahır havalandırmalarını kış süresince tamamen kapattıkları bildirilmiştir. Bölgedeki yetiştiricilerin yalnızca % 3.12'sinin uygun altlık kullanıldığını bildirmiştir. Yine yetiştiricilerin % 57.23'ü ahır temizliği için hiçbir dezenfektan kullanılmadığını bildirmiş, geri kalanları ise bu amaçla yalnızca kirecin kullanıldığını bildirmişlerdir. Bölgede at (% 62.65), kanatlı (% 63.86) ve koyunların (% 4.22) sığırlarla birlikte aynı ahırda barındırıldıkları belirlenmiştir. Sonuç olarak, bölgedeki sığır yetiştiriciliğinin koşulları kötü kalitede olduğu tespit edilmiştir.

Anahtar sözcükler: Bakım koşulları, yönetimsel faktörler, kuzey-doğu Anadolu, sığır.

Introduction

One of the main aims of cattle breeding is high productivity (7). Physical conditions and applied practice have important effect on health and productivity of cattle (13,14). On the other hand, all the stress factors have negative effect on production (4). Inappropriate hygiene, insufficient ventilation, over stocking rate, unsuitable humidity, misbehaviour of keepers on animals and disorder of feeding–watering can be count in stress factors (1, 7,13,14). Stress can restrict growth and decrease animal resistance to diseases (5).

It is well known that animal health directly affects all kinds of production traits (4,6). Environmental factors play important roles on contamination and spread of diseases (3,12). According to Karademir (8), respiratory and gastro-intestinal diseases are the most widespread and important diseases of the province. Contamination of infectious diseases between different species and ages has an impact on animal health such as calf diarrhoea and bovine malignant catarrh (BMC) (3,12).

As reported in some studies made in the northeastern Anatolia, education levels of breeders have an influence on their job in both livestock health and production (2,18). According to these studies, regional animal keepers have low educational level and inexperience on new animal management techniques. It was also reported by the same researchers that cattle keeping is common agricultural practice in the region and cattle kept in the animal house have unsuitable conditions during the long winter season.

The people in the north-eastern Anatolia deal with agriculture, especially raising livestock. Mainly agricultural activity of the people in Kars, Ardahan and Iğdır provinces is cattle livestock like the rest of the north-eastern Anatolia. Although it was known that cattle keeping are the most agricultural practice in the region, there are no enough study, which can show the real situation and application of this industry. For these reasons, the aim of the study was determine of the keeping condition of cattle in the north-eastern Anatolia (Kars, Ardahan and Iğdır).

Material and Methods

This survey-investigation was carried out on the randomly selected cattle breders (1162 from 83 villages) located in the Kars (556 breeders (b), 39 villages(v)), Ardahan (314 b, 24 v) and Iğdır (292 b, 20 v) province. Cattle breeder and village numbers of these provinces was 62689-386, 18408-237 and 10279-156 respectively (15, 16, 17). This questionnaire study was performed face to face on farmers luxuriated-in local coffeehouses, which was selected randomly in the towns, central or peripheral. Approximately 1% of farmers and 10% of the villages were tried to include in the survey from each town and city centres (Table 1 and 2). Construction of the survey was presented in Table 3. Collected data were presented as percentage.

Table1. Numbers and percentage of towns and villages included in the study
Tablo 1. Çalışmaya dahil edilen köy ve kasaba sayıları ve yüzdeleri

	Number of towns and villages included the study	Total number of towns and villages in the areas	%
Kars	39	386	10.10
Ardahan	24	237	10.13
Iğdır	20	156	12.82
Total	83	779	10.65

Table 2. Numbers and percentage of farmers included in the study
Tablo 2. Çalışmaya dahil edilen çiftçi sayıları ve yüzdeleri

	Number of farmers included the study	Total number of farmers in the areas	%
Kars	556	62689	0.89
Ardahan	314	18408	1.71
Iğdır	292	10279	2.84
Total	1162	91376	1.27

Results

The data were obtained from the a total of 1162 questionnaires in the region (Kars, Ardahan and Iğdır) and presented in Tables (4-7) and explained with text.

Answer for the question 2A (Animal house type): Out of 1162 answers, 1059 (% 91.14) of them stone wall, wood-soil ceiling and stone or concrete floor, 36 (3.10%)

Table 3. The survey form used in the study
Tablo 3. Çalışmada kullanılan anket formu

Name of the province :

1. A) Education of breeder: B) Education of animal keeper

2. A)Type of the animal house (in terms of ceiling, floor and wall construction)
   B) Animal house's; a)Height: …..m   b) Length:…m   c)Width:….m   d)Others:……
   C) Open ventilation area during winter:……m^2

3. A) Type of bedding and changing frequencies:
   B) Do you use disinfector?……..(if yes) Name and application frequencies:

4. a)Do you keep any horse in the animal house……(If yes) How many……..
   b)Do you keep any sheep in the animal house……(If yes) How many……..
   c)Do you keep any poultry or other species in the animal house….......
   d)Do you keep any calf in the animal house……(If yes) How many……..
   e)Do you keep any one year old cattle in the animal house……(If yes) How many…….
   f)Do you keep any two year old cattle in the animal house……(If yes) How many……..
   g)Do you keep any three and over year old cattle in the animal house……(If yes) How many

5. A) Type of keeping adult cattle: Tide, free in the animal house or others…………..
   B) Type of keeping calves: Tied, free in the animal house or others…………..

6. a) Type of watering during the winter: In or out of the animal house……….……
   b) If out of the animal house; distance between the animal house and watering place(m):
   c) Is the watering place private or shared ………….

Table 4. Education levels of cattle breeders and keepers
Tablo 4. Sığır yetiştirici ve bakıcılarının öğrenim düzeyleri

	Breeders		Keeper	
	n	%	n	%
Low education level	102	8.78	532	28.57
Primary	765	65.83	1190	63.91
Secondary	238	20.48	77	4.14
High	56	4.82	63	3.38
Vocational high	1	0.09	0	0.00
Total	1162		1862	

Table 5. Measurements of animal houses
Tablo 5. Ahırların ölçüleri

	n	Mean	SEM	Min	Max
Height (m)	1162	2.93	0.01	1.75	4.25
Length (m)	1162	14.49	0.30	5	70
Width (m)	1162	6.29	0.05	3	16.5
Volume(m^3)	1162	305.11	8.98	39	1890
Indoor area (m^2)	1162	100.45	2.78	18	630
Area for calves(m^2)	987	12.80	0.23	3.5	54
Area for adult cattle (m^2)	1162	98.58	2.61	13.5	603

Table 6. Animal number in each animal house, area and space-volume per animal
Tablo 6. Herbir ahırda hayvan sayıları, herbir hayvan için ahır alanı ve hacmi

	n	Mean	SEM	Min	Max
Calves	1162	4.04	0.11	0	20
1 year old cattle	1162	3.66	0.15	0	30
2 year old cattle	1162	1.71	0.13	0	40
3 and more year old cattle	1162	8.20	0.19	0	40
Horse	728	1.69	0.04	1	5
Sheep	49	18.61	2.59	1	60
Area for per calf (m^2)*	938	3.66	0.09	0.57	16.25
Area for per adult (m^2)*	1113	5.10	0.10	1	26.79
Volume per animal*(calf and aduld) (m^3)	1113	17.23	0.37	3	97.77

* Farmers keeping sheep in the animal house were excluded from the calculation but poultry were ignored. A horse counted in as an adult cattle.

Table 7. Classification of cattle raising types according to animal numbers in terms of products.
Tablo 7. Verim yönlerinde hayvan sayısına göre sığır yetiştirme tipilerinin sınıflandırması

Cattle raising type	Explanation of cattle raising type	Number of animal house	%
Small (S)	Milk or Fattening cattle up to 8 animal	553	47.59
Milk- Fattening (MF)	Milk or Fattening cattle more than 8 animal	174	14.97
Milk-Small (MS)	Milk cattle over 8 and Fattening cattle less than 8 than 8 animal	197	16.95
Fattening –Small (FS) (BS)	Fattening cattle over 8 and milk cattle less than 8 animal	42	3.61
Milk (M)	Maximum 1 Fattening cattle and milk cattle over 8	147	12.65
Fattening (F)	Maximum 1 milk cattle and Fattening cattle over 8	49	4.22

One year old and older cattle were counted in for rearing way.

of them concrete or bricks wall isolated ceiling and concrete floor, 67 (% 5.77) of them were build with the mixed characteristics of above explained two type.

Answer for the question 2C (Ventilation): Out of 1162 answers, 252 (21.69%) of them completely keep close ventilation hole during winter, 910 (78.31%) of them keep open the ventilation hole (0.273±0.01m^2 per animal house and 0.0166±0.001 m^2 per animal, respectively) .

Answer for the question 3A (bedding): Out of 1162 answers, 98 (% 8.43) of them never use any bedding, 1001 (86.14%) of them use dried animal faeces as bedding, 28 (2.41%) of them use a mixture of dried animal faeces and straw, 35 (3.01%) of them use hay, straw, sawdust or mixture of these three materials. Bedding changing frequency; once a day 78 (6.71 %), twice a day 560 (48.19%), three times a day 271 (23.32%), four times a day and over 253 (21.77%).

Answer for the question 3B (disinfection) : Out of 1162 answers, 665 (% 57.23) of them never use any disinfector, 497 (42.77%) of them use lime as disinfector. Out of lime users 226 (45.47 %) once a year, 212 (42.66 %) twice a year, 23 (4.63 %) three times a year, 20 (4.02 %) four times a year, 9 (1.81%) five times a year, 5 (1.01 %) six times a year, 2 (0.40%) eight times a year.

Answer for the question 4A, B, C (keeping other species with cattle in the same animal house) : Out of 1162 answers, 728 (62.65%) of them keep horse, 49 (4.22%) of them keep sheep, 742 (63.86 %) keep poultry.

Answer for the question 4D (cattle number in a animal house) : Out of 1162 answers, 356 (30.64%) of them keep ten or less, 503 (43.29%) of them keep 10-20, 182 (15.66 %) of them keep 20-30, 98 (8.43%) of them keep 30-40, 15 (1.29 %) of them keep 40-50, 6 (0.52 %) of them 60-70, 2 (0.17 %) of them keep 100 and over.

Answer for the question 5A, B (tide or free) : All the breeders have reported that they keep free their cattle in the animal house until 1 year old and tied them after one year old together with adult cattle.

Answer for the question 6A, (watering): Out of 1162 breeders, 420 (36.14%) of them watering animals in the animal house, 141 (12.13%) of them watering animals just out of the animal house, 601 (51.72%) of them watering animals in the common watering place of the village. According to answers of breeders who watering animal out of the animal house, the distance between animal house and water source were averagely 298.96 ± 11.35m with minimum 5 and maximum 1500 m.

Discussion and Conclusion

Education level of breeders and animal keeper is low (95.09%, 96.62% respectively) (secondary school or below) in the scanned region, same result for the eastern Turkey was also reported by Thompson and Hart (18) and Aspinal et al. (2). This condition may have a considerable effect on diagnosis and spreading of contagious animal diseases.

Low standard of hygiene and cleanness of an animal house affect animal health negatively (11). Dirty air in the animal house may cause low oxygen and pH levels in blood gases. This condition may ease metabolic disorders and microbial disease (9, 10). Most of the infectious and parasitic diseases spread with faeces and urine contaminated food and water (3, 12). Because of these, animal house cleaning, disinfections and bedding are very important for animal health and production. The use of bedding is not a common practise for cattle keeping in the region, only 3.12% of keeper use proper bedding. Most of keepers use dried faeces as bedding. This unacceptable practice easily causes mainly foot diseases and contagious infections (12). Similar results, according to bedding and drainage were also reported by Thompson and Hart (18). The only disinfector using in the region is lime but most of the keepers even do not use lime for this aim. This condition may easily laid to microbial and parasitic diseases.

Karademir et al. (10) reported the humidity of traditional animal houses was 60-80% which was better than concrete structure (90-100%). High humidity causes decreasing on blood pO$_2$. Low levels of pO$_2$ reduce activity of lungs macrophages. This situation negatively effects animal's resistance system and animal can easily be caught to infectious diseases (20). In this study common animal house type (traditional) in the region was defined in result section. According to this definition, respiratory disease should have not been expected in the region, but Karademir (8) reported that such-a diseases were widespread in the region. This can be explained with the low ventilation (18) in the animal houses. It also can be an effect of watering practice of animals, which was performed far away from the animal house in cold winter days.

Most of the keepers (87.95%) of this district have 1-30 cattle. This number does not show similarity with the report of Thompson and Hart (18). They reported that 1-6 cows for each family in the Muş-Bingöl region of eastern Turkey. This may be explained with the high number of cattle in Kars-Ardahan-Igdir region.

All the adult cattle in the animal houses keep tied. Calves keep untied in a separate compartment in the same house and use same equipments with adults. This situation may play a very important role for the infectious and parasitic disease transfer from adult to calves (4).

Area and volume for each animal (3.66m^2 per calf, 6.10 m^2 per adult – 17.23 m^3 per cattle) in the houses of the region is suitable with the standards (13, 14).

In this region the most of animal keepers had different species in the barns (poultry 63.86%, horse 62.25%,

sheep 4.22%). Poultry can mechanically transport infectious and parasitic disease among the animals. Also sheep carry Bovine Malignant Catarrh (BMC) disease among cattle (12).

Two-type watering is in progress in the region. Most of animals have water out side of the barn in the wintertime (62.86%). Although this condition may cause decreasing of animal resistance to the infectious diseases it would be a good opportunity for animals to have fresh air. Also having water from common water source of village (tab, spring, pod) play an important role for contagious and parasitic disease contamination such as foot and mouth disease, anthrax, leptospirosis, ascariasis etc. (12,19).

Above-mentioned unenthusiastic conditions of cattle rearing in the region may easily effect the animal health and productivity. It is an inevitable reality that region economy depends on the animal industry. Therefore to make reorganisation on animal management systems may affect animal health and production on encouraging way. It is also an expectation that improving on animal health and production can have a reflection on social economic parameters. The most of the important activity in the region might be to educate the breeders with seminars and courses to develop new and applicable rearing systems.

References

1. **Arıtürk E** (1983): *Hayvan Barınakları.* Genel Zootekni. Ankara Üniversitesi Veteriner Fakültesi Yayınları No. 395 II. Baskı. Ankara. pp 261-266.

2. **Aspinall JM, Thompson KF, Hart ND** (1994): *The role of women in livestock production in eastern Turkey.* Proc New Zealland Soc Anim Prod, **54**, 185-187.

3. **Aytuğ CN, Alaçam E, Görgül S, Gökçen H, Tuncer ŞD, Yilmaz K** (1991): *Sığır Hastalıkları.* Tüm-Vet.Yayınları, No:3, İstanbul.

4. **Baumgartner W** (1999): *Umweltverhaltnisse.* 72-78. In Baumgartner W (Ed): Klinische Propadeutik der Inneren Krankheiten und Hautkrankheiten der haus und Heimtiere. 4. Auflage. Parey Buchverlag, Berlin.

5. **Fell LR, Colditz IG, Walker KH, Watson DC** (1999): *Associations between temperament, performance and immune function in cattle entering a commercial feedlot.* Aust J Exp Agr, **39**, 795-802.

6. **Frangman TJ, Tubbs PC, Henningsen K** (1996): *Influence of weaning site, weaning age, and viral exposure on production performance in early weaned nursery pigs.* Swine Healt. & Prod. **4**, 223-229.

7. **Hinks CE, Hunter EA, Lowman BG, Scott NA** (1999): Effect of breed tpe, sex, methot of rearing, winter nutrition and subsequent grazing treatment on lifetime performance and carcass composition in a 20 mount beef system; carcass characteristics. Animal Sci, **9**, 465-472.

8. **Karademir B** (2001): General condition of animals admitted to Kafkas University, Veterinary Faculty, Internal Medicine Clinics in 1999. Istanbul Univ Vet Fak Derg, **27**, 377-383.

9. **Karademir B, Saatci M, Celebi F, Erdogan HM, Aksoy AR** (1999): *Venous blood gas values in cattle kept indoor.* Kafkas Üniv Vet Fak Derg, **5**, 155-159.

10. **Karademir B, Saatci M, Aksoy AR** (2001): *The effects of different barn types on blood gases of cattle.* Istanbul Univ Vet Fak Derg, **27**, 385-392.

11. **Mehlhorn G** (1987): *Entstehung, ausbreitung und wirkung von schadgasen in der tierproduktion (ubersichtsreferat).* Mh Vet Med, **42**, 346-352.

12. **Radostits OM, Blood DC, Gay CC** (1994): *Veterinary Medicine.* Eighth Edition Bailliere Tindall. London.

13. **Rosenberger G** (1990): *Atmungsapparat.* 242-284 In Die Klinische Untersuchung des Rides., Verlag Paul Parey., Berlin.

14. **Stephan E** (1978): *Stallklima-Meßbesteek, ein Schritt zur Objektiverung der Tierhaltungs bedingungen.* Tierzuchter, **30**, 203-206.

15. T.C. Tarım ve Köy İşleri Bakanlığı, Ardahan Tarım İl Müdürlüğü, Ardahan master planı. 2002. Tarımsal üretim sistemi. Kars. pp 31-34.

16. T.C. Tarım ve Köy İşleri Bakanlığı, Iğdır Tarım İl Müdürlüğü, Iğdır master planı. 2002. Tarımsal üretim sistemi. Kars. pp 35-40.

17. T.C. Tarım ve Köy İşleri Bakanlığı, Kars Tarım İl Müdürlüğü, Kars master planı. 2002. Tarımsal üretim sistemi. Kars. pp 22-23.

18. **Thompson KF, Hart ND** (1994): *Animal production in eastern Turkey.* Proc N Zealand Soc Anim Product, 54, 189-191.

19. **Urquhart GM, Armouf J, Duncan JL, Dunn AM, Jennings FW** (1996): *Veterinary Parasitology.* Second edition. Blackwell Science. Oxford.

20. **Vestweber JG** (1986): *Diseases of the Respiratory System.* 649 – 690. In Howard J.L. (Ed): Current Veterinary Therapy 2. Saunders, Philadelphia.

Yazışma adresi:
Yard. Doç. Dr. Başaran Karademir
Kafkas Üniversitesi, Veteriner Fakültesi
İç Hastalıklar Anabilim Dalı
Paşaçayırı – Kars