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RESEARCH ARTICLE

An Evaluation of the Welfare in the Large and Small Animal Transportations Made from Sarıkamış [1]

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Summary

Transporting is an essential part of animal welfare and it has a special importance for a huge country like Turkey. Study aimed to evaluate the animal transports from Sarıkamış-Kars (North-east) to the other parts of the country according to rules of Ministry of Agriculture, and Rural Affairs, Turkey and European Union. Total records of 105.015 animals between the years of 2004 and 2006 were analyzed. The space allowed per animal in the vehicles calculated according to number of animals and capacity of the vehicle, and these calculations were compared with the standards of EU. The study involved an interview with the 54 drivers using a questionnaire in December 2006. Feedlot and scarifies festival were in the first places among the transportation reasons. Survey results showed that none of the vehicle has any equipment for food and water supply. Also there was no any special ventilation system and standard loading (un)loading ramp, but saw dust bedding was standard for all of them. Most of the journeys (52%) were more than 8 hours, and this was a problem for the animal welfare. Forming professional companies dealing with the animal transportation may solve the detected problems.

Keywords: *Animal transporting, Welfare, Transport condition, Duration, Distance, Turkey*

Sarıkamış'tan Yapılan Büyükbaş ve Küçükbaş Hayvan Nakillerinde Refahın Değerlendirilmesi

Özet

Nakiller hayvan refahının önemli unsurlarından biri olup, Türkiye gibi geniş coğrafyaya sahip ülkeler için ayrı bir öneme sahiptir. Bu çalışmada Sarıkamış Tarım İlçe Müdürlüğünce yapılan sevklerin Tarım ve Köyişleri Bakanlığı ve Avrupa Birliğinin kuralları bakımından değerlendirilmesi amaçlanmıştır. 2004 ve 2006 yıllarında nakil yapılan toplam 105.015 hayvanın kayıtları analiz edilmiştir. Nakil esnasında her bir hayvan için ayrılan yer, hayvan sayısı ve aracın kapasitesi göz önüne alınarak hesaplanmış ve Avrupa Birliği kurallarıyla karşılaştırılmıştır. Çalışmada ayrıca 2006 yılının Aralık ayında 54 araç sürücüsü ile yapılan anketten de faydalanılmıştır. Besi ve kurban bayramı sebebiyle yapılan nakiller ilk sırada gelmektedir. Anket sonuçlarına göre araçlarda suluk ve yemlik olmadığı belirlenmiştir. Ayrıca araçlarda havalandırma sistemi ve yükleme rampası da bulunmamakla birlikte her araç altlık olarak kaba talaş kullanmaktadır. Yapılan nakillerin %52'si 8 saatten fazla olan mesafelere gerçekleştirilmiştir. Çalışmada tespit edilen aksaklıkların hepsi profesyonel olarak hayvan nakli ile uğraşan şirketlerin sektöre entegre olması ile çözülebilir.

Anahtar sözcükler: *Hayvan nakli, Refah, Nakil şartları, Süre, Mesafe, Türkiye*

INTRODUCTION

Meaning of the welfare for an animal is very well explained by Broom [1]. He also mentioned that animal welfare is directly related with the environment where animal in it. These environments could be a farm, a house, a garden, a street or a vehicle. New rules governing the protection of animals during transport came into force on January 2007 with other elements coming into force in 2008 and 2009. The regulation, which applies to Europe, covers the transport of all animals as part of an *'economic activity'* [2]. Animal welfare is one of the new introduced concepts to the livestock production systems in Turkey and livestock industry of the country will face the related issues on the way of European Union integration. Transporting is an essential part of this concept and it has a special

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importance for a huge country like Turkey. North-East part of Turkey is accepted as a reserve of both the fattening materials of the farms in the west and slaughtering materials for crowded cities. Therefore a routine transportation is taking place from east to west and this action is inevitable for both sides.

The significant position of the transporting in livestock production is always in the programme of the sector. For example, the incidence of bovine respiratory disease or *''shipping fever''* following transportation of feedlot calves has been documented and studied in detail [1-5]. Farm animals housed at different space allowances are routinely transported as a common management practice especially in the beef industry. Animals housed at reduced space allowance have been reported to show a degree of chronic stress and associated physiological changes [3-5]. Buckham Sporer et al.6 reported more vital effect of transportation with mentioning that "Transportation stress in young bulls alters expression of neutrophil genes important for the regulation of apoptosis, tissue remodelling, margination, and anti-bacterial function". Also a detailed study was conducted by Ünal et al.[7] to evaluate the welfare of the animals transported for slaughter. According to their reports [7]; although allowed space was adequate for the evaluated cattle and lambs in lower liveweights, it was not adequate for the heavier animals. Also duration of the transport in their study [7] was in the range of the rules.

From animal welfare and economic points of views, the transport of animals is regarded as an acute physical stressor stimulating an associated psychological response [8]. Transportation stress affects many aspects of health, production and welfare of cattle [5]. Therefore some legislations on animal transportation were planned in both Europe and Turkey to keep the animals in welfare condition during the journey [9,10].

This study aimed to evaluate the animal transports from Sarıkamış-Kars to the other parts of the Turkey according to rules of Ministry of Agriculture and Rural Affair and European Union.

MATERIAL and METHODS

Animal Material

Records, belong the animals were sent from Sarıkamış with the permission of the District Office of the Ministry of Agriculture and Rural Affairs between the years 2004 and 2006, were used in the study. Total records of 105.015 animals were analyzed in the study. Animals were divided into two main groups as large and small. They also sub-classified as calf, bull, cow, heifer, lamb, sheep, goat and horse. The space allowed per animal in the vehicles calculated according to number of animals and capacity of the vehicle, and these calculations were compared with the standards of EU *(Table 1)*.

Vehicles

Total 3.162 vehicles involved to the transportations were examined in three years. These vehicles were divided into three groups according to their characteristics and capacity (9.45 m^2, 13.2 m^2, 17.3 m^2).

Survey

The study involved an interview using a questionnaire to the 54 lorry drivers in December 2006. Equipments and furnishes of the vehicles were also controlled by personal inspection. The questionnaire consisted of 3 parts: part 1 designed to determine experience of the driver and co-driver on animal transport, part 2 was about the furnishing of the lorry, part 3 included questions on management at transporting and journey. A copy of the questionnaire is obtainable on demand.

Statistical Analyses

Basic frequency distributions were run to determine the animal numbers during the management applications of transportation. Chi-square test was used to compare the differences between proportions with the assist of Minitab statistical package.

RESULTS

Numbers of transported animals from Sarıkamış in studied years were presented according to categories in *Table 2*. Total 105.015 animals were sent from Sarıkamış with 3.162 consignments in three years and statistical differences were defined between the animal categories $P<0.001$, $X^2=801$. It can be thought that less number in equine could cause this difference, but repetition of the analyses without equine group showed that significant difference was also exist between small and large ruminant numbers $P<0.001$, $X^2=739$. The numbers of the bulls were more than other categories in large ruminants and followed by

Table 1. *Allowed space for each animal during transport in EU standards*

Tablo 1. *AB standartlarına göre nakil anında bir hayvan için ayrılan alan*

Type of Animal	Space (m^2)
Small calves (50kg)	0.30-0.40
Medium calves (110kg)	0.40-0.70
Heavy calves (200kg)	0.70-0.95
Medium cattle (325kg)	0.95-1.30
Heavy cattle (550kg)	1.30-1.60
Very heavy cattle (>700kg)	1.60
Shorn sheep and lambs of 26 kg and over <55kg	0.20-0.30
Sheep > 55kg	0.30
Unshorn sheep	0.30-0.40
Heavily pregnant ewes	0.40
Heavily pregnant ewes >55kg	0.50
Goats - <35kg	0.20-0.30
Goats 35kg to 55kg	0.40
Goats >55kg	0.40-0.75
Heavily pregnant goats	0.40-0.50
Sheep/Goat	0.30-0.40
Lamb/Kid	0.26-0.30
Adult horse	1.75
Young Horse (6-24 month)	1.20
Foal	1.40

(Anonymous [19])

heifer, cow and calf. Lambs were in the first place for the small ruminants, second and the third places were occupied with sheep and goat respectively. Horses were only equine in the transportation records and 95% of them were sent to city Van.

Numbers of the consignments according to seasons were detailed in *Table 3*. While spring had the minimum number, maximum number was observed in autumn P<0.001, X^2=10658.

Feedlot, sacrifice festival, slaughter, pasture, breeding, selling, moving and harness were the reasons of the transportations. Feedlot was in the first place among these reasons with the 52% rate. Other reasons followed the feedlot with the rates of 26%, 12%, 4%, 3%, 2.2%, 0.7%, 0.1% respectively. Animals were sent to 55 different cities from Sarıkamış, Ankara and Istanbul were in the first places. Transport parties were also evaluated according to geographical regions (P<0.01) and the results were demonstrated in *Table 4*.

Places allowed for each animal in the defined categories during the transportation were listed in *Table 5*. *Table 6* demonstrates the distance and the duration of transportations. Statistical significances determined that large ruminants were sent to further distance with the longer duration than the small ruminants (P<0.001).

Survey results showed that none of the vehicle has any equipment for food and water supply. Also there was no any special ventilation system, weatherproof roof and standard (un)loading ramp, but all of them used the saw dust for bedding. Brake time in every 3 hours was performed in 67% of the total consignments. Education level of the lorry drivers was determined as 44% primary-middle school, 33% high school and 22% university, and 61% of the drivers have experience for animal transport. Most of the animals (87%) were roped constantly all the way of journey.

Table 2. *Animals sent from Sarıkamış according to years and categories*

Tablo 2. *Sarıkamıştan yıllara ve kategorilere göre gönderilen hayvanlar*

Years	Party Number	Calf	Bull	Cow	Heifer	Lamb	Sheep	Goat	Equine*	Large animals*	Small animals*	Total
2004	884	826	7.971	1.837	2.457	9.191	4.742	76	10	13.091	14.009	27.110
2005	1.057	1.430	9.049	2.005	4.336	10.025	7.429	115	40	16.820	17.569	34.429
2006	1.221	1.779	10.496	2.145	2.997	17.376	8.349	218	116	17.417	25.943	43.476
Total	**3.162**	**4.035**	**27.516**	**5.987**	**9.790**	**36.592**	**20.520**	**409**	**166**	**47.328**	**57.521**	**105.051**

** Statistical analyses were applied among the groups of Equine, Large animal and Small animal according to years. Differences were significant between each of them. (P<0.001)*

Table 3. *Number of transportation in the season*

Tablo 3. *Mevsimlere göre nakil sayıları*

Years	Season			
	Spring	Summer	Autumn	Winter
2004	616	3.800	10.435	12.259
2005	42	2.374	17.330	14.683
2006	2.587	10.486	21.659	8.744
TOTAL	**3.245**	**16.660**	**49.424**	**35.686**

P<0.001, Each number for a season in the years statistically differs from others

Table 4. *Transportations according to geographical regions*
Tablo 4. *Coğrafi bölgelere göre yapılan nakiller*

Years	East	South-East	Middle	Black Sea	Marmara	Mediterranean	Aegean
2004	2.522	3.715	7.714	909	7.520	1.043	3.687
2005	4.444	4.271	8.589	602	9.700	1.729	5.094
2006	9.026	8.826	10.645	1.145	5.390	1.740	6.704
Total	**15.992**	**16.812**	**26.948**	**2.656**	**22.610**	**4.512**	**15.485**

P<0.001 X^2=2.513 Each number for a region in the years statistically differs from others

Table 5. *Allowed space per animal during the transport*
Tablo 5. *Nakil sırasında bir hayvan için ayrılan alan*

Type of animal	Party Number	Animal Number	Mean of animal number in each party	Mean space per animal (m^2)
Large Ruminant	2.545	47.328	19	0.84±0.03
Small Ruminant	285	20.929	73	0.41±0.04
Lamb/Kid	314	36.592	117	0.16±0.005
Equine	18	166	9	1.45±0.19
Total	**3.162**	**105.015**	**54**	**0.72±0.06**

Table 6. *Evaluation of the transportations' number in terms of distance and duration*
Tablo 6. *Nakillerin mesafe ve sure bakımından değerlendirilmesi*

Type of animal		Distance		Duration				Total (n)
		<1000 (km)	1000< (km)	≤8 (h)	8-16 (h)	16-24 (h)	24≤ (h)	
Large Ruminant	Calf (n)	61	118	96	84	59	0	179
	Bull (n)	257	1213	235	628	745	1	1.470
	Cow (n)	247	158	20	64	106	0	405
	Heifer (n)	34	457		176	295	0	491
	Total *	**599 (24%)**	**1.946 (76%)**	**387 (15%)**	**952 (37%)**	**1.205 (47%)**	**1 (0.04%)**	**2.545**
Small Ruminant	Sheep (n)	177	95	135	75	62	0	272
	Lamb/Kid (n)	184	130	143	75	96	0	314
	Goat (n)	10	3	9	3	1	0	13
	Total *	**371 (62%)**	**228 (38%)**	**287 (48%)**	**153 (25%)**	**159 (27%)**	**0**	**599**
Equine!	Horse (n)	18	0	18	0	0	0	18
General		**988**	**2.174**	**692**	**1.103**	**1.366**	**1**	**3.162**

*P<0.001 *Differences were statistically significant between total number of large and small ruminants in distances and in durations*
!=Equine were not included the analyses

DISCUSSION

Obtained data gave an opportunity to evaluate the animal movement from east to other the parts of Turkey, under the Sarıkamış sample. As can be seen in *Table 1*, a constant increase in the animal number has been detected in every category according to successive years; this condition shows that animal transportation will continue gradually more in following years. The most number of transportations were accumulated in the seasons of autumn and winter because of the inadequate feed for the animals in the region. Therefore animals were sent to the regions where the more and cheaper feed is available. Significantly more animals were sent to Middle Anatolia and Marmara regions (P<0.05). Marmara is the most crowded region in Turkey, therefore animals were sent there for slaughter, but

animals were sent to Middle Anatolia as fattening materials for the feedlot farms; this reason was also clearly supported with the more number of calves and bulls in the parties were sent to the region ($P<0.05$). Gallo et al.[11] supported the corresponding study mentioning that transporting of the animals from the producing area to the crowded cities is inevitable, therefore precautions have to be applied to keep the animals in welfare condition during this journey.

Holly sacrifice festival plays an important role for the animals' movement in whole country. Nearly 30% of the total animals in three years were transported for the reason of sacrifice festival. Increasing animal transportation just before this social activity was also detected by Yıldız and Hayırlı [9]. Records showed that rising number of transportation demands special rules for animals and vehicles in this certain time.

It is vital in transportation that, transporter has to guarantee that the lorry is not overcrowded and animals are placed to avoid any risk of damage or preventable distress. Loaded animals should be provided with adequate space to stand and lie down in their natural position. Transports were also evaluated in terms of the space allowance and allowed average space for each animal during the transportation was defined for large ruminants, small ruminants and lamb/kid as 0.84 m^2, 0.41 m^2, and 0.16 m^2 respectively. Although allowed space for the small ruminants matches the standards *(Table 1)*, space for the large ruminant was less than the defined standards. Large ruminants were also constantly roped during the journey. These two impropriate conditions can easily affect the welfare of the large ruminants during the transport as well documented by Knowles [12] and Randall [13]. Therefore instead of the roping, individual compartment with the standard space can be built on the vehicle. Application of bedding with rough saw dust was standard for the entire investigated lorries, which is effective to keep the both ceiling and animals clean.

Duration and distance of transport are the most important factors for animal welfare and these two factors dramatically affect the slaughter characteristics and meat quality Vecerek et al.[14], Adams et al.[15] Numbers and percentage of the parties according to duration and distances *(Table 4)* showed that 38% of transportations were made to the cities further than 1000 km. Also 52% of the total journeys were more than 8 h. Eight hours duration is a criterion for animal transportation in terms of welfare, Anonymous [16]. Because, the longer the duration of the journey, the higher the incidence of injuries sustained and transported animals were exposed to serious stress factors adversely affecting their health, productivity and market value Minka and Ayo [17]. Journeys over the 8 h need a specific vehicle to carry the animals; this specific vehicle has to have some equipment for water and food supply for the sake of welfare and product quality. Gallo [18] made an explanation on the subject that long journeys cause the tiredness and stress which have effect on the amount and quality of meat.

Applied survey showed that none of the vehicle has a proper weatherproof roof to protect the animals from environmental factors such as cold, wind and sun. Also a standard nonslip (un)loading ramp with the lope was not detected on the vehicles, which is essential for safe loading and unloading. According to EU rules slope of the ramp should not be more than 25° for cattle and horses, not be more than 30° for sheep and goats. Any step at the top or bottom of a ramp must not exceed 21 cm, and any gap between the ramp or lifting platform and the vehicle should not be so large that an animal's foot could pass into it, and must not exceed 6 cm between ramp and vehicle [19]. Minka and Ayo17 reported that number of injuries on transporting animals was higher in loading time because of unsuitable equipments and methods. These above mentioned conditions create the weakness in terms of welfare. Contrarily these negative conditions, 55% of the lorry drivers' education level were high school and university, who can easily be educated according to animal welfare rules. Even a transporter authorisation certificates can be provided to those drivers, after a standard education period.

Animal welfare implications

Corresponding study proved that, animal transporting over 8 hours from east to the other parts of the country is a reality for Turkey and this realty will continue in following years. But these transportations do not match the rules of animal welfare. It is also a reality that animal welfare rules will apply on the transportation very soon as an obligation. Therefore regulations on this sector are essential. Forming the professional companies dealing with the animal transportation may solve this problem. These companies can convert the lorries into a vehicle which can carry the animals according to welfare rules with providing water, feed, enough space, accurate

bedding and optimum shelter. Also a veterinary technician can be employed in each vehicle who can look after the animals all the way of the journey. In order to provide relaxation to the animals for longer transportations, brake stations can be built in the middle of the country. These brake stations can also be used as a control point to check the animal diseases. Large countries like Turkey have to produce similar solutions and apply them to solve transporting problems under the legislations of animal welfare.

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