

# Effects of Transport on Live Weight and Behavior of Lambs

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## Abstract

The study has monitored the effects of transport stress on some biochemical indicators of stress and behavior lambs at time of slaughter. The research was carried out in the cold season, on a number of 120 lambs, transported for 6h-16h, to be slaughtered. During our research, we followed the changes in bodyweight, behaviours expressed by sheep, and plasma cortisol levels. Bodyweight loss recorded in the slaughterhouse to 24 hours of departure transportation was of 4-5%. The behavioural manifestations of lambs were different from the destination, depending on journey duration. Lambs behaviour was different depending on the journey, the resting and watering were mostly present manifestations. Increased in cortisol levels measured at 3 h after leaving the vehicle was maintained at 9 h after the journey. Increased duration of rest before slaughter can reduce the stress of transport in case of lambs ensures obtaining good quality meat.

**Keywords:** behaviour, lambs, live weight, transport.

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## 1. Introduction

Transport is probably one of the most stressful events in the animals' lives, as they are removed from the safety of the environment they had been raised in and are subject to manhandling, new sounds and noises, temperature changes, group modifications, etc. Many a studies have investigated animal transport related aspects such as loading and unloading, water and fodder deprivation, new environment, journey time/duration, driver's behaviour and road conditions, all considered as important stress factors with impact on animals' health and productivity [1, 2, 3, 4].

Animals' welfare during transport may be assessed by means of several measurements, which include among others, animals' behavioural displays, disease prevalence as well as physiological changes. During long term transport

there are breaking intervals during which animals need to take sufficient time to eat, rest and drink before the journey continues [5]. If during breaks the sheep can only feed and do not have enough time to drink water, dehydration due to dry fodder consumption may appear. Short-term transport may lead to an increase in plasma cortisol levels in sheep compared to its levels during relaxed, quiet conditions. Long journey times and new environments may produce complex modifications in both directions of cortisol levels, which may last for months.

Sheep's behaviour changes slightly in poor welfare conditions, as these animals are tolerant to transport in comparison to other species. After a 24 hour journey, lambs destined to be slaughtered display again their normal drinking behaviour once they have had 14 hours of rest, and show normal feeding behaviour after 16 or 24 hours of rest [6].

The concern for animals' protection during transport was approached though a series of directives and regulations starting with The European Council's Directive 77/489/CEE,

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followed by the Directive 91/628/CEE and Directive 95/29/CE, which have brought about in turns improvement and proposals finalised with The Council's Regulation (CE) nr. 1 / 2005 related to animals' protection during transport [7]

## 2. Materials and methods

The research has been conducted throughout March and April, on lambs (n: 120), of Spancă and Merinos breed, transported to the slaughterhouse. The transport was carried out in specialised, three deck trucks and the animals were marked with spray and housed on the lower deck. Each of the transports was performed according to the legislation on animals' protection during transport, and mobile and fixed ramps were used for loading/unloading. The caretakers handled the lambs by methods in accordance with the applicable legislation. The transport was completed on similar days in terms of weather conditions.

The lambs were 13 to 16 weeks old, and weighed 22-27 kg. They were weighed and grouped depending on the journey duration as follows: A lot (n: 78) lambs that travelled for 6h, B lot (n: 42) lambs transported for 16h from a collection farm and which had one hour break to rest, feed and drink.

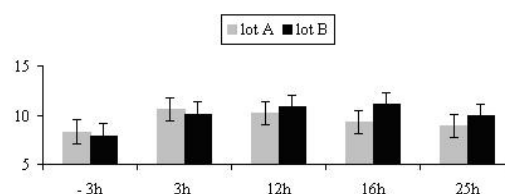
The blood samples were collected 3 hours prior to transport, 3 hours from departure, and at the slaughterhouse following unloading by 3 hours and 9 ours respectively. We used a catheter applied on the jugular vein for blood sampling, together with Lithium/Heparine 1,3 ml vacutainers (Vacutainer System) (LH/1,3). The blood samples were stored, transported and processed according to the laboratory protocols. The plasma cortisol levels were determined by means of an Elisa test, while the lambs' behaviour was monitored by direct observation of their displays in the slaughterhouse pens following unloading for an interval of 3 to 9 hours.

Data resulted from laboratory analyses were processed using the standard deviation ( $\pm$ SD), and behavioural manifestations were processed by the t test in order to be able to compare the three lots that were undergoing observation.

## 3. Results and discussion

Our study has monitored the effects of transport on lambs destined to be slaughtered by measuring their responses such as some physiological indicators, body weight and behavioural displays. During animal transport the metabolic stress sets in as a result of the stress factors and may last throughout the journey, which leads to a depreciation of their welfare.

Plasma cortisol levels (figure 1), increased 3 hours after departure in A and B lots, compared to the 7.9 - 8.3 ug/ml measured prior to loading. The increase maintained throughout the journey time most likely due to the lambs' effort to adapt to transport conditions.



**Figure 1.** Plasmatic cortisol level (ug/ml) in lambs during transport, in the slaughterhouse (A, B lot)

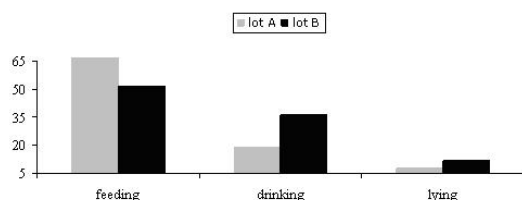
Body weight of lambs transported for 16 hours (table 1), decreased by 5.3% compared to departure weight and did not regain initial values even after the animals were fed, watered and had resting time in the slaughter house pens. This decrease appeared in response to the chronic stress installed due to fodder and water deprivation. Thus, the animals' weight dropped by 2.8% after 14 hours of deprivation, while 9 hours after fodder and water consumption was 2.8% lower than its value at departure time. When animals feed during transport at other times (planned break) than their shelter routines, their organism uses glucose as energy source while the volatile fatty acids are no longer produced.

**Table 1.** Body weight evolution (kg) in the monitored lambs

Time of assessment	Body weight /kg	
	A lot	B lot
3h before loading	25.5 $\pm$ 1.1	24.6 $\pm$ 1.1
12h after departure	24.1 $\pm$ 1.2	23.9 $\pm$ 1.2
16h after departure	24.4 $\pm$ 1.1	23.3 $\pm$ 1.1
25h after departure	24.7 $\pm$ 1.1	23.9 $\pm$ 1.1

Live weight loss is the most frequent consequence it depends on a series of factors such as: transportation means, transport duration, livestock density, feeding and drinking, weather conditions, etc. Live weight loss is important from the economic perspective and is correlated with species, transport distance and conditions.

Lambs in A and B lot went directly to the feeding gutter once they were unloaded, but they spent less time feeding compared to the interval allotted to feeding during transport break. Lambs' behavioural manifestations (figure 2) monitored by direct observation upon arrival at the slaughterhouse have indicated the fact that the animals wanted to consume the fodder immediately after they reached the slaughterhouse pen.



**Figure 2.** Lambs' behaviour (%) following unloading from vehicles in the slaughterhouse (A, B lot)

Feeding time increased following unloading with lambs transported for 6h compared to the animals that travelled for 16h, and had 1 hour break during transport. Immediately after unloading in the slaughter house pens 52% of the lambs that had been transported for 16h wanted to feed and only 36% drank while 12% of the animals rested.

When in the slaughterhouse, lambs ignored water consumption and went straight for the fodder. Average time between unloading and drinking time was  $23,9 \pm 1,4$  min for A lot and  $17,7 \pm 4,5$  min for B lot.

#### 4. Conclusions

Plasma cortisol levels increased 3 hours after departure and stayed high even 9 hours after unloading, as transport made for a moderate stress factor.

Body weight decreased by approximately 5,3% compared to the initial one, due to limited fat resources especially in lambs that travelled for 16h as a results of insufficient fodder and water consumption until unloading time.

of animal transport and ranges between 5 and 6%; Average time to display behavioural manifestations upon unloading differed with journey time.

Therefore we recommend a break of at least the same length as the journey time for rest, feeding and drinking in the case of the lambs destined to be slaughtered.

The welfare level of lambs destined to be slaughtered may increase with reduction of travelling time and lengthening of recovery period prior to slaughtering.

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