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INFLUENCE OF TRANSPORT ON SOME PRODUCTION PARAMETERS IN RABBITS

Luzi F., Heinzl E., Crimella C., Verga M.
Istituto di Zootecnica Veterinaria
Universita' di Milano
via Celoria, 10
20133 Milano, ITALIA.

Summary

The transport of animals to the slaughter is the cause of considerable stress which can influence both welfare and zootechnical performance in a negative way. This research aims to contribute to the knowledge of production variables concerning fattening rabbits reared in an intensive way and transported to the slaughter by truck. The study concerns 25,200 rabbits from 30 stock farms in the North of Italy; the period analysed was 12 months. Seasonal factors, distance, transport time, temperature (T - Celsius degrees) and relative humidity (RH) measured in the van were taken into account with regard to their effect on weight loss and carcass yield. The data were analysed by Analysis of Variance according to a linear model (GLM). The results pointed out that some variables, such as climate and transport time may influence animal performance.

Introduction

The rabbit species has been domesticated relatively recently when compared to other species of zootechnical interest (C.E.C., 1984; Craig, 1981; E.C.O.P.E.A., 1982). This is the reason why breeding and management have changed in so little time to arrive at an intensive breeding system; the animals have actually had to adapt themselves rapidly in this direction.
This fact can cause stress circumstances which can in turn affect performance, due to the high sensitivity of the rabbit species to the habitat it lives in.
In some cases rabbits show some symptoms of maladjustment caused by stress, induced by breeding conditions and, by surrounding and management circumstances (Finzi et Al., 1980; Galassi, 1985; Verga et Al., 1987) which can also affect meat quality as well (Jolley, 1990; Maspero, 1987).
Rabbit stress reactions to noise and high temperatures have already been studied by evaluating hematic levels of *corticosterone* and ascorbic acid (Verde et Al., 1986).
Even transport is a remarkable stress factor for animals: these circumstances have been studied in many different domestic species (Adams et Al., 1980; Ashby et Al., 1980); some results concerning weight loss, general physiological changes and death rate in transport by road and by air were

reported (Coppings et Al.,1989; Hails, 1978; Moss, 1982; Purdue, 1984).
The purpose of this research was to evaluate the influence of transport on some production parameters of the meat-rabbit which is reared in an intensive way; the influence of some factors such as temperature (T), relative humidity (RH), distance and transport time on the production performance of the animals (weight loss, carcass yield) were most carefully analysed.

Materials and Methods

The research analysed data on 25,200 rabbits from 30 intensive stock farms situated in the North of Italy.
These can be considered as sufficiently homogeneous with relation to structure, management and genetic stock.
Transport was always done at night in an open van, in which two rows of plastic avicultural cages (size cm 100*55*25) were set side by side longitudinally with 70 on each side (for a total of 140 cages). Each cage contained 15 animals for a total of 2,100 rabbits in a full load. 3 hygrothermometers and one maximum-minimum thermometer were put on the van in several positions (fore, central and rear) to survey T (C) and RH (%) during transport.
Climatic data were surveyed at each stop while animals were being loaded.
The test was carried out once a month for a year at stock farms situated at three different distances from the slaughter (50-100-150 km). The van, the driver and the roads were always the same.
Transport time varied from 1 to 9 hours; the animals were weighed before and after transport, divided by breeder and slaughtered 1-2 hours after their arrival in corresponding order to that in which they were loaded.
Two production variables were analysed: weight loss and carcass yield as compared to T, RH, season, distance and transport time. Analysis of Variance according to a linear model GLM (S.A.S./STAT, 1987) was used for the data analysis.
Note - Only 2 classes of distance in km (50-100 km) and 7 classes of transport time were considered in the statistical analysis because of a lack of information relating to the upper distance classes.

Results and Discussion

Previous surveys on the subject carried out at this Institute had furnished some indications concerning the trend of those zootechnical variables which simplify the relationship between weight loss and carcass yield in the presence of stress agents (Luzi et Al., 1990).
The result of the examined sampling is that transport length demonstrates a remarkable influence on weight loss ($p <= 0,01$). T and RH exhibit a less significant influence ($p <= 0,05$) and that km and season exhibit no influence at all on the weight loss.
The carcass yield does not seem to be affected by the considered parameters (Table 1).
The reported figures (n. 1, 2, 3, 4, 5) allow some general remarks to be made. Moreover, it is to be remembered that the test was made in a continental climate with no extreme values of resulting T during the analysed period.
The weight loss points out a negative trend with an increase of T, transport time, distance and low RH values.
If we go into detail, night temperature above 18 - 20 C, RH of about 70 - 75 %, transport time above 4 hours and distances above 100 km are the critical points.
As we have already remarked, the carcass yield shows a non-statistically-significant floating trend when compared with all considered variables.
According to the theory of several authors (Verita', 1980, 1982; Zaragoza et Al., 1985, 1986) we can therefore assert, that in its various components, transport represents a factor of negative determinism for productive efficiency; in fact, weight loss at slaughter can even be above 4%.
Carcass yield is not substantially influenced by the analysed stress parameters.
The results of this research focus on the significance of careful planning for rabbit transport, with travel characteristics (km and length time) and more favourable hours concerning transport in different seasons taken into account.
Finally, these results suggest the following two lines of research for the future:

a) identification and biological quantification of the stress agent;
b) a qualitative evaluation of the carcass.

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Table 1 - Least Square Means of Weight Loss and Carcass Yield.

		Weight Loss (%)	P	Carcass Yield (%)	P
Transport time (hours)	1	1,4 a	**	56,1	n.s.
	2	1,9 ab		55,9	
	3	2,6 bc		56,2	
	4	3,5 bcd		56,1	
	5	3,6 cd		56,1	
	6	4,0 cd		55,5	
	7	4,6 d		55,9	
Distance (Km)	50	3,5	n.s.	55,6	n.s.
	100	3,0		56,3	
Temperature (C)	0-6	1,5 a	*	56,5	n.s.
	9-12	3,8 b		55,0	
	15-22	3,9 b		56,4	
Relative humidity (%)	70-75	3,8 a	*	56,0	n.s.
	80-85	2,5 b		56,0	
	90-95	3,0 b		55,9	
Season	Autu.	3,6	n.s.	55,8	n.s.
	Wint.	4,1		55,2	
	Spri.	4,0		56,6	
	Summ.	4,2		56,2	

P = Probability
n.s. = Not significant
* = $p<=0.05$
** = $p<=0.01$

FIG. 1

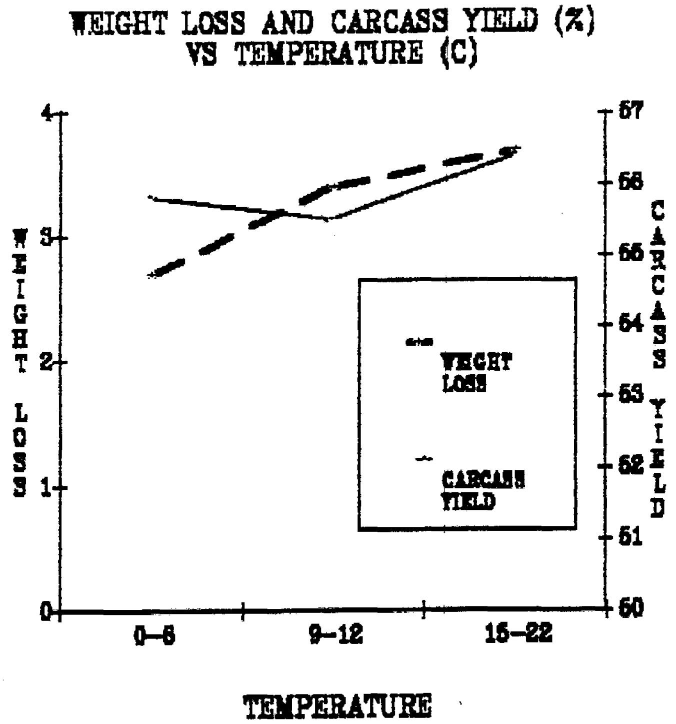
WEIGHT LOSS AND CARCASS YIELD (%)
VS TEMPERATURE (C)
WEIGHT LOSS
CARCASS YIELD
0
1
2
3
4
57
56
55
54
53
52
51
50
WEGHT LOSS
CARCASS YIELD
0-6
9-12
15-22
TEMPERATURE

FIG. 2

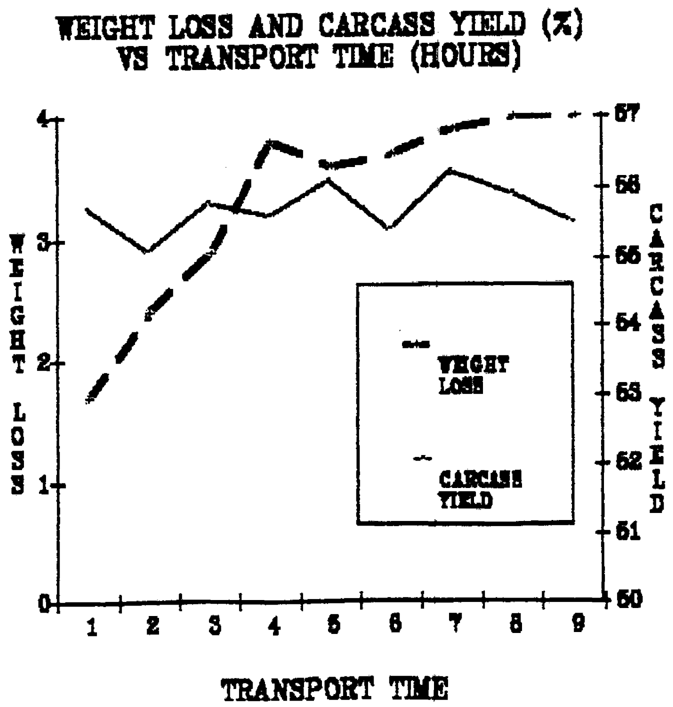
WEIGHT LOSS AND CARCASS YIELD (%)
VS TRANSPORT TIME (HOURS)
WEIGHT LOSS
CARCASS YIELD
0
1
2
3
4
57
56
55
54
53
52
51
50
WEGHT LOSS
CARCASS YIELD
1
2
3
4
5
6
7
8
9
TRANSPORT TIME

FIG. 3

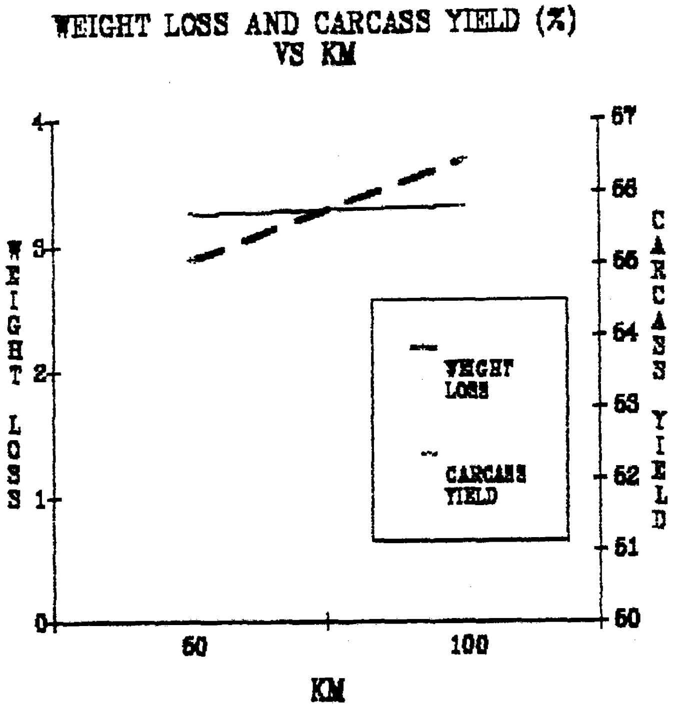
WEIGHT LOSS AND CARCASS YIELD (%)
VS KM
WEIGHT LOSS
CARCASS YIELD
0
1
2
3
4
50
51
52
53
54
55
56
57
60
100
KM
WEGHT LOSS
CARCASS YIELD

FIG. 4

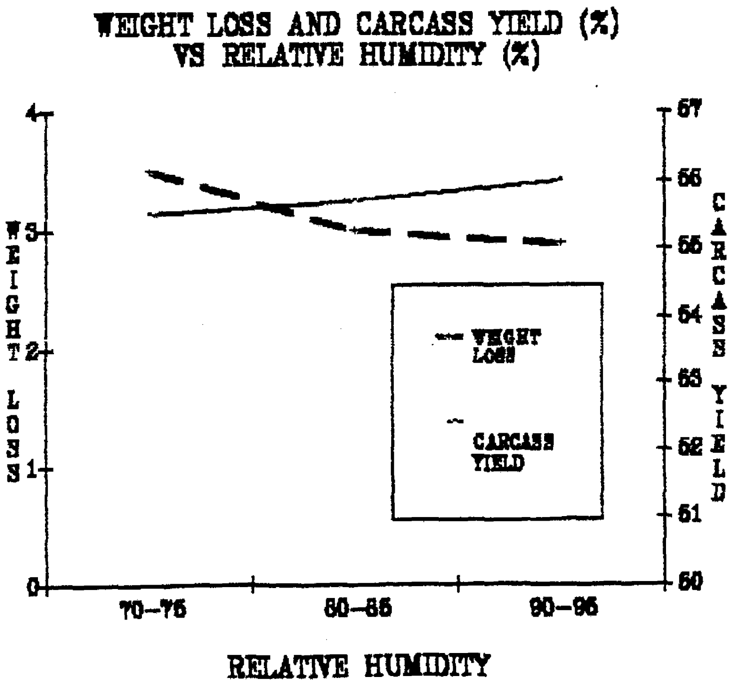
WEIGHT LOSS AND CARCASS YIELD (%)
VS RELATIVE HUMIDITY (%)
WEIGHT LOSS
CARCASS YIELD
0
1
2
3
4
50
51
52
53
54
55
56
57
70-75
80-85
90-95
RELATIVE HUMIDITY
WEGHT LOSS
CARCASS YIELD

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FIG. 5