

EVALUATION OF THE USE OF STRAW AS AN ENTERTAINMENT IN *GIGANTE DE ESPAÑA* RABBIT CAGES: THE EFFECT OF THE PLACING OF THE STRAW IN CAGE ON THE BEHAVIOUR

LÓPEZ M., CARRILHO M.C., GÓMEZ C.

Facultad de Veterinaria. Dpto. Producción Animal y Ciencia de los Alimentos.
Producción Animal. Miguel Servet, 177. 50013 Zaragoza. Spain.
marina@unizar.es

ABSTRACT

The instantaneous behaviour (direct, discontinuous recording every 5 minutes, 3 hours a day) of two groups of 13 adult females that received straw daily was evaluated. The straw was placed in between lateral walls of each two contiguous cages (group A) or in a metallic container fixed on the floor of the cage (group B). More than 70% of the does were occupied with the straw immediately after its distribution, but the frequency decreased up to 10% after the first hour of straw being made available to them. The dynamics of the resting behaviour was opposed to that of the occupation with the straw. The does spent more of their time resting to which followed the interaction with the straw and the self-grooming behaviour. There were no significant differences between groups in the interaction with the straw, but in other behavioural patterns (resting, self-grooming, feeding, movement, polishing, playing). The rabbits of group A have used more of their time on resting and less in the other activities than group B. The average intake of straw was 2 g per doe day (10 A.M.-6 P.M.).

Key words: rabbit does, straw, behaviour.

INTRODUCTION

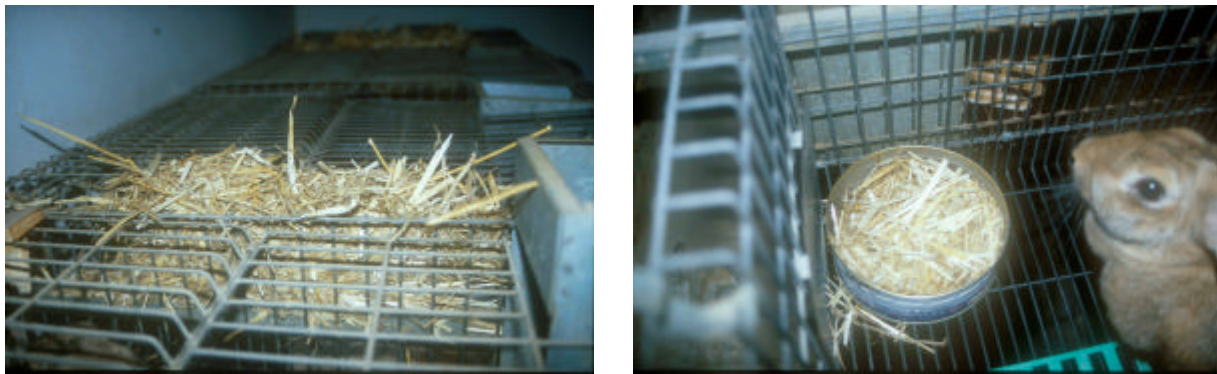
The impact of hay as a possibility of cage enrichment on the productive traits of fattening rabbits kept in standard cages of six animals (MIRABITO *et al.*, 2000) or on the behaviour of laboratory rabbits group-housed or individually kept has been analysed (LOVE and HAMMOND, 1991; LIDFORS, 1997). This last author found that rabbits subjected to pellets' restriction between the 3 and 4 months of age interacted with hay more frequently than with other objects such as a wooden stick or a box placed in the cage. In a preliminary study on lactating does, we observed that the barley straw is an attractive element for females and young rabbits immediately after the distribution of straw, but their interest decreased a little bit afterwards and the animal-straw interactions became sporadic (LÓPEZ and GÓMEZ, 2003).

The objective of the present work is to analyse whether the straw enriches permanently the behaviour of adult females during the non-reproductive phase.

MATERIAL AND METHODS

Twenty-six *Gigante de España* multiparous does were divided in two groups and placed into two laterally opposed rows in an experimental farm (groups A and B). They occupied standard individual cages without nest (13 cages/row), all of galvanized wire. The cages had a plastic slat covering part of the floor, to be used as a resting place or to be moved voluntarily by the doe. The does were fed commercial feed, as well as water, both administered *ad libitum*, and their light-dark rhythm was 16:8 hours. In group A long straw was placed in between the lateral walls of each 2 neighbouring cages. In group B slightly shorter straw was distributed in metallic individual containers fixed inside each cage (Figure 1).

Figure 1. Systems of straw distribution in group A and group B



During three weeks a discontinuous recording every 5 minutes was performed and the instantaneous behaviour was recorded, between 10 A.M. and 12 A.M. and between 5 P.M. and 6 P.M. (540 records/doe). The distribution of the straw was done daily (Monday to Friday) at 10 A.M. and direct observation of the does' behaviour started immediately after spreading the straw. The following behavioural patterns were registered: utilization of straw, resting, self-grooming, feeding pellets, drinking, movement, polishing (scraping, gnawing the bars), playing (with the slat or with the metallic container in group B). The observation was carried out 4 meters away of cages to avoid interference.

The straw was weighed before distribution. Previous to the distribution a perforated plastic sheet was placed at a distance of 30 cm under the cages' floor to collect the straw which had fallen from the cages. At 6 P.M. the straw which was not used by the females was weighed ("not used"), as well as the straw which was accumulated on the plastic sheet ("waste"). The "not used" straw was distributed back in view of being used by the does during the night and the plastic sheet was taken out to avoid the accumulation of faeces and urine during the night. The presence of faeces and caecotrophes over the sheet was observed at 12 A.M. and also at 6 P.M.

A frequency analysis was performed and the groups were compared by the Chi-square test. The Pearson Rcoefficient was used to compare the daily dynamics of behaviour

and T-test to compare the mean frequencies of both groups. The SPSS 11.5 statistical pack was used for the analysis.

RESULTS

1. Interactions with the straw and other behaviours

More than 70% of the does interacted with the straw immediately after its distribution. Progressively the occupation with the straw was decreased, in such a way that by the end of the first hour less than 10% of the behavioural patterns of the rabbits showed behaviour was related to straw. The activity increased slightly at the beginning of the second and the third control hours and decreased again then more markedly (Figure 2). In both groups A and B the behaviour was similar, and the correlation between groups was positive and highly significant ($R=0.944$, $P<0.001$).

The development of the resting behaviour was opposite to that of the straw (Figure 2) and the correlation coefficient between both activities was negative and highly significant in both groups ($R=-0.896$, $P<0.001$ group A; $R=-0.885$, $P<0.001$ group B).

Concerning the self-grooming behaviour, the does had an increase of this activity in the beginning of the observations. But the frequency showed a tendency to decrease and then to increase again at the beginning of the third hour of observation. There was a similar dynamics in both groups ($R=0.576$, $P<0.001$). The development of the feed consumption, that of the locomotion behaviour and of the polishing was also highly correlated between groups ($R=0.596$, 0.521 and 0.590 respectively, $P<0.001$) and in all cases the tendency was similar to that one indicated for self-grooming.

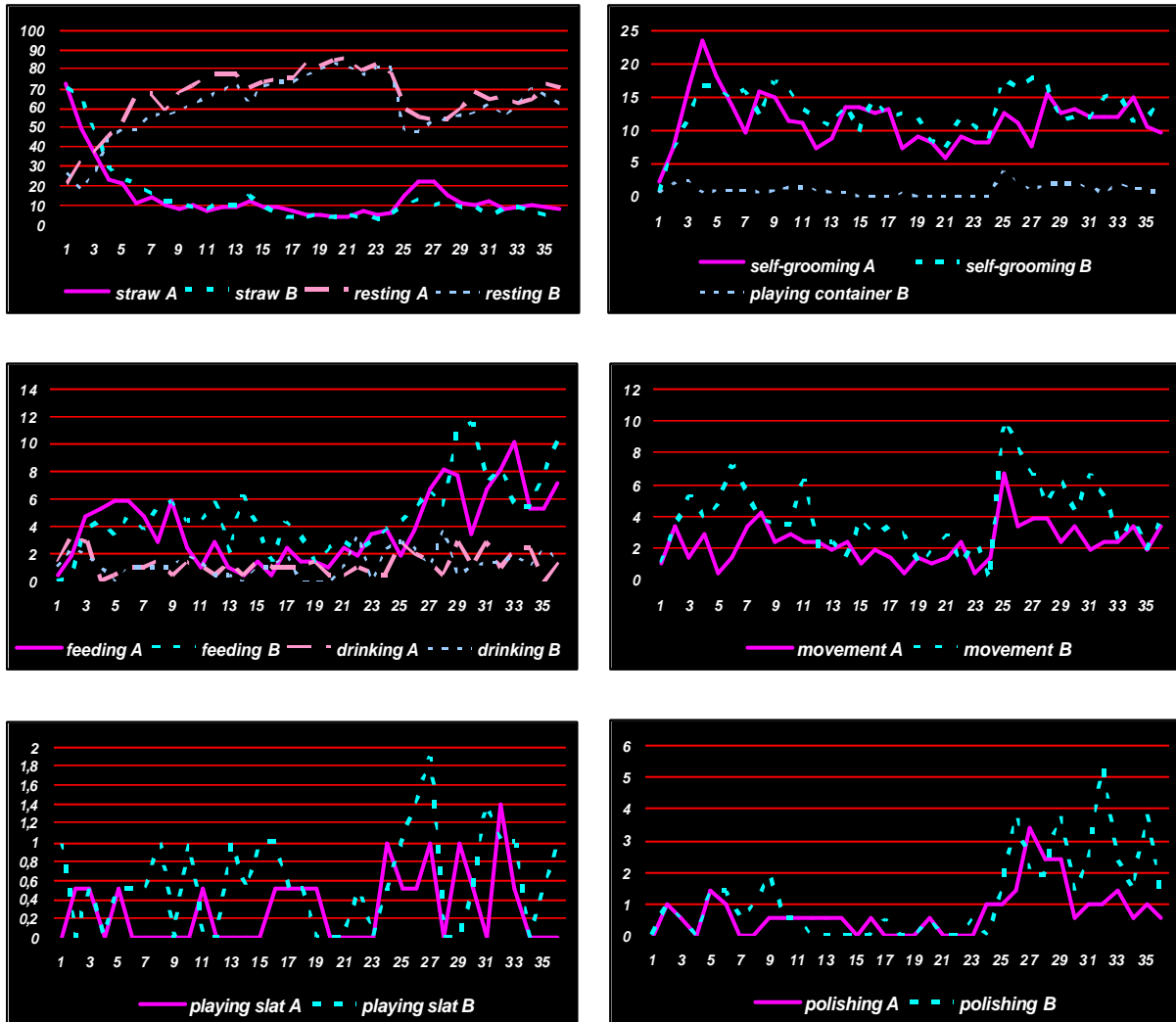
There were some significant differences in the recordings 2, 3 and 6 ($P<0.05$) where in group B higher frequencies of straw-animal interactions were present and the does spent less time with resting, presented more locomotion behaviour, and used the metallic container as an entertainment, a possibility that the group A does lacked. There were significant differences in the records 25, 26, 27, 29, 30 and 35 ($P<0.05$), and, in this phase, the group A does interacted more with the straw while those of group B showed more activities related to the self-grooming, feeding pellets, locomotion and playing with the metallic container, and had lower frequency of resting activities.

More than 50% of the does had caecotrophes on the plastic sheet under their cage at the end of the second control hour. Between 12 A.M. and 6 P.M. some more does deposited caecotrophes (66.8% group A, 69.71% group B). The defecation behaviour was also practised during the control period, affecting 80% of the does of each group by the end of it.

2. Distribution of activities

The resting was the most frequent behaviour in the controlled period (Table 1). It is followed by interactions with the straw, these comprising about 14% of the time. The

Figure 2. Dynamics of behavioural patterns (Axis X= Recording (n), Axis Y= Frequency (%))



self-grooming behaviour was also important. The total period of occupation with the straw was similar in both groups. Concerning the other behaviours, the does of group A practised resting more frequently and less frequently the other activities.

Table 1. Distribution of the different behaviours (%)

Group A	Straw	Resting	Self-grooming	Feeding	Drinking	Locomotion	Polishing	Playing slat	Playing container
Group B	14.05	65.84	11.45	3.88	1.29	2.35	1.44	0.29	-----
	13.65	60.92	12.71	4.75	1.29	3.89	2.36	0.56	0.95
	NS	***	*	*	NS	***	*	**	-----

3. Straw intake

The average intake of straw calculated on the basis of difference between the used and the wasted straw was 2 g per doe and day (10 A.M.-6 P.M.) in both groups.

DISCUSSION

According with observations by other authors the resting behaviour is the most frequent one under the common conditions of the farm (DRESCHER and REICHEL, 1996; MORISSE and MAURICE, 1996; VERGA and FERRANTE, 2002; LÓPEZ *et al.*, 2002). According to results of the present work, the resting frequency can be modified by some stimuli such as the distribution of straw or the entry of people into the farm, even if the person is well known to the rabbits. The distribution of straw also interrupts momentarily other behaviours of the does, but, after the first half an hour of availability of new straw, it seems that this element is integrated in the cage and that the interactions with it are getting stabilised. In such a way, being initially attracted by the novelty, the does react similarly to other species (GRANDIN and DEESING, 1998), as it has been found in piglets or chicken, which show a great interest for new objects in relation to already known ones and this interest declines progressively (WORD-GUSH and VESTERGAARD, 1991; NEWBERRY, 1999).

On the other hand, in this experiment, the feeding and drinking frequency was extraordinarily low compared with the results of HOY (2000) and LÓPEZ *et al.* (2002), because the does only ate pellets once each two hours. But we can also reasonably think that the does substitute the visits to the feeding-box by visits to the straw, in this way they use it not only as an entertainment but also as a source of nutrients. As a matter of fact, MIRABITO *et al.* (2000) have shown that fattening rabbits which had hay available showed a daily consumption of pellets 3.4% lower to those having access to a wooden stick. This possibility opens a new perspective in relation to the feeding balance if the decision of using straw as an enriching element of the cages is taken.

The differences between group A and B according to which the second had a lower resting behaviour and showed to be more active in the other behavioural patterns. This can be explained by the fact that previously all the does had straw at their disposal which was distributed according to the A system for therapeutic reasons, while the does of group B did not know this kind of distribution of straw. Consequently, it is estimated that differences in their behaviour are the reaction to the novelty available in the cages.

It is concluded that there is no effect of the distribution system on the interactions rabbit-straw but the offering of straw enriches the behaviour repertoire. The impact of straw distribution on the animal alimentary balance must be studied carefully.

ACKNOWLEDGEMENTS

This work could not have been carried out without the financial support by I.N.I.A. for the Conservation of the Gigante de España breed (Project RZ01-005-C2-1).

REFERENCES

- DRESCHER B., REICHEL A. 1996. Elevage de lapins en groupe. *Cuniculture*, 132, **23 (6)**, 258-262.
- GRANDIN T., DEESING M.J. 1998. Behavioural genetics and animal science. In: *Genetics and behaviour of domestic animals*. Academic Press. San Diego, California. Available at: <http://ansci.colostate.edu/documents/livestock/1998/genetics.htm>
- HOY S. 2000. The use of infrared video technique and computer supported analysis in investigations of rabbit behaviour. *7th World Rabbit Congress*, **B**, 531-536.
- LIDFORS L. 1997. Behavioural effects of environmental enrichment for individually caged rabbits. *Applied Animal Behaviour Science*, **52**, 157-169.
- LÓPEZ M., MARÍA G., PANIAGUA P. 2002. The effect of cage size on the behaviour of the reproductive doe. *COST Action 848*, Stuttgart.
- LÓPEZ M., GÓMEZ C. 2003. The use of entertainment objects in rabbit cages. Preliminary evaluation. *World Rabbit Sci.*, **11(3)**, 173.
- LOVE J.A., HAMMOND K. 1991. Group-housing rabbits. *Lab. Animal*, **20(8)**, 37-43
- MIRABITO L., GALLIOT P., SOUCHET C. 2000. Effect of different ways of cage enrichment on the productive traits and mortality of fattening rabbits. *7th World Rabbit Congress*, **B**, 447-452.
- MORISSE J.P., MAURICE R. 1996. Influence of the stocking density on the behaviour in fattening rabbits kept in intensive conditions. *6th World Rabbit Congress*, **2**, 425-430.
- NEWBERRY R.C. 1999. Exploratory behaviour of young domestic fowl. *Applied Animal Behaviour*, **63**, 311-321.
- VERGA M., FERRANTE V. 2002. La ricerca su benessere e adattamento nel coniglio. *Rivista di Conigliicoltura*, N. **2**, 31-39
- WOOD-GUSH D.G.M., VESTERGAARD K. 1991. The seeking of novelty and its relation to play. *Animal Behav.*, **42**, 599-606