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NOTE : AN ORIGINAL SYSTEM TO SEPARATELY CONTROL LITTER AND FEMALE FEED INTAKE WITHOUT MODIFICATION OF THE MOTHER - YOUNG RELATIONS

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ABSTRACT : This paper describes an original system allowing separate control of the feed intake of the mother and of her litter without rearing them in separate cages, and thus without modifying young / mother relations. This system involved several modifications on traditional wire cages. Firstly, the female's feeder was modified to prevent the ingestion of pellets by the suckling rabbits. Secondly, young had access to a specific feeder. Lastly, a wire mesh partition divided the

cage in two areas, to avoid the doe having access to the young's feeder. Females need to be adapted to their new feeder at least two weeks before the beginning of the control of feed intake. About 10% of the females did not adapt to this system while the others recovered their initial feed intake within one week. Neither the milk intake nor the growth of the suckling rabbits were modified by this system. Therefore, it allows independent feeding plans for females and litters.

RESUME : Un système original permettant de contrôler séparément la consommation de la lapine et de sa portée sans modification des relations mère / jeunes

Ce papier décrit un système original permettant de contrôler séparément la consommation des mères et de leurs portées, sans les élever dans deux cages séparées, et donc sans modifier les relations mères / jeunes. Ce système consiste à réaliser plusieurs modifications sur des cages d'élevage traditionnelles. Premièrement, la mangeoire de la mère est aménagée de façon à empêcher la consommation des petits. Deuxièmement, les jeunes ont accès à une mangeoire

spécifique, conçue pour éviter le grattage. Enfin, une cloison grillagée sépare la cage en deux afin d'empêcher la mère d'accéder à la mangeoire des lapereaux. Les femelles doivent être adaptées à leur nouvelle mangeoire au moins deux semaines avant le début de l'expérience. Environ 10% des femelles ne s'adaptent pas à ce système tandis que les autres retrouvent leur niveau d'ingestion initial dans la semaine suivant les modifications. Ni l'ingestion de lait, ni la croissance des jeunes ne sont modifiés par ce système. Il permet d'envisager une stratégie alimentaire des lapereaux avant le sevrage indépendante de celle des femelles.

INTRODUCTION

Digestive disorders are frequently observed in rabbit kits around weaning. These troubles are assumed to be due to incomplete maturation of the digestive processes at weaning (GIDENNE, 1997). Therefore, the nutrient requirements as well as the factors able to influence the maturation of digestive capacity in rabbits before weaning need to be better known. That requires the ability to precisely measure the ingestion of young. However, that is generally impossible because before weaning, suckling rabbits classically have access to the same feeder than the female.

It has long been assumed that doe's nurse only once a day (ZARROW *et al.*, 1965). Therefore, in previous works studying the nutrition of suckling rabbits, the females and their litters were reared in two separate cages and the females were allowed to suckle their young once a day for a few minutes (MAERTENS and DE GROOTE, 1990; PARIGI-BINI *et al.*, 1991). In this situation, the mother / young relations are greatly affected. The young have no contact with their mother except during the suckling time, and females do not nurse according to their own rhythm, but are under the

breeder's control. Additionally, two cages instead of one are needed to study one female and her litter. Therefore, we developed a new system allowing independent control of the feed intake of the mother and of the litter without separating the mother from her young and thus without modifying their relations.

This paper describes this new system. Firstly, the female's feeder was adapted to prevent the ingestion of the doe's feed by the suckling rabbits. Secondly, the young have access to a specific feeder with a wire mesh partition protecting it from access by the mother.

MATERIALS

Modifications on the female's feeder (figure 1)

Firstly, a wired mesh, top hinged gate was installed on one half of the feeder. This gate was provided with a 200 g weight that was light enough to make it possible for the females to push it with the muzzle to eat, yet heavy enough to prevent the young rabbits from raising it. After day 28 of lactation, some young rabbits are able to push the wire gate of the female's feeder. In that case, a second 200 g weight was added to the first one.

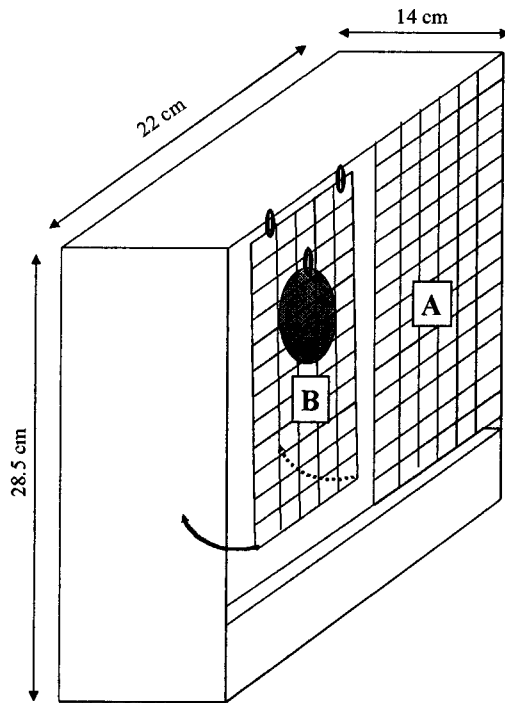


Figure 1 : Adaptations on the female's feeder.

A : Access to the diet is prohibited on one half of the feeder using wire netting. **B :** A movable gate of wire netting, on which is hung a 200 g weight prevents the access by the young.

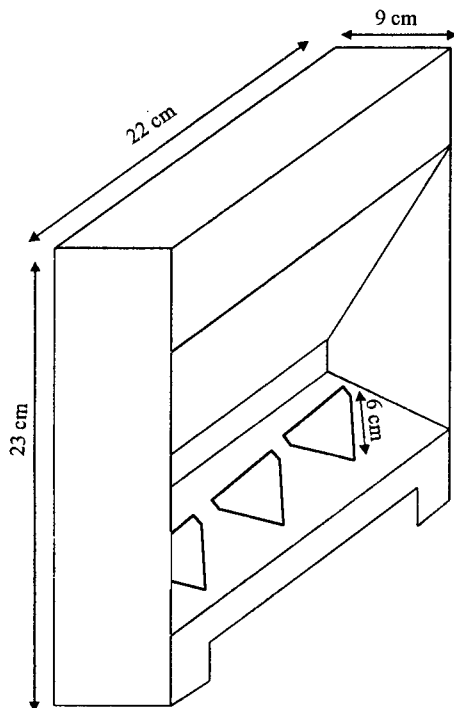


Figure 2 : Description of the young's feeder, with limited access to the food (triangle shape), to avoid the scrabbling .

Secondly, the access to the other half of the feeder was prohibited using a piece of wire mesh, to prevent the young rabbits eating at the same time as the mother. Both parts of the adaptation, the wire netting gate and the piece of wire netting which prohibits the access to one half of the feeder, could be fixed on the female's feeder or on the cage.

The young's feeder (figure 2)

The feeder for the young rabbits was narrower than that of the mother's to occupy a minimum area in the cage. Access to the food was limited by triangular openings (figure 2), to avoid waste by scrabbling. The young's feeder was positioned in the cage as shown in figures 3 and 4.

Protection of the young's feeder of the mother access

Access to the young's feeder by the doe was prevented by a wire mesh partition. Two types of partition were used giving or not giving the female access to the nest box. In both cases, it is preferable to have two drinking nipples, one in each part of the cage.

a. With a free access to the nest box for the female (figure 3)

A piece of wire mesh bent at a right angle was fixed in the cage creating a space around the young's feeder. Two doors (8 x 8 cm) were installed in the wire mesh, large enough to allow the young rabbits to go to their feeder but too small to permit the females to pass through. This separation could be installed at parturition since females have free access to the nest box.

b. Without access to the nest box for the female (figure 4)

A straight piece of wire mesh was fixed in the middle of the cage dividing it in two parts. One door (8 x 8 cm) was installed in the wire netting, large enough to allow the young rabbits to go with their mother and too small to permit the females to pass through.

In that case, females had no access to the nest box. Therefore, the separation should not be installed before the young are able to move towards their mother for suckling (15-18 days). Such a separation permitted, if the little door was closed, control of suckling in order to measure the milk production for example.

METHOD

The experiment consisted of measuring the effects of the size of the litter (4 or 10 young per litter, $n = 22$ and $n = 20$, respectively) on solid feed intake before weaning. Cages were equipped with the system which

was previously described. Modifications of the female's feeder were made one month before the first mating. The straight wired mesh partition and the young's feeder were installed on day 16 of lactation.

RESULTS AND DISCUSSION

Results of this work were detailed in a previous paper (SCAPINELLO *et al.*, 1999). We relate here only the results concerning the modifications of the cages and the feeders.

Females.

Among the 42 females, three females did not adapt to the system and were withdrawn from the experiment because of an abnormally low feed intake (<100 g / day). The others adapted to the modifications of their feeders within a week. Thus we recommend modifying the feeders at least two weeks before the beginning of the experiment. From parturition to weaning (day 32), the mean feed intake of the does was 329 g/day which was in accordance with previous results (MAERTENS and DE GROOTE, 1991; CERVERA *et al.*, 1993; PARIGIBINI *et al.*, 1996). No female get stuck nor succeeded in passing through the small door of the wired mesh partition in the area

reserved for the young rabbits.

At around 28 days of age, some young rabbits (eight litters of 42) were able to push the gate of the female's feeder. In this case, a second 200 g weight was added until weaning (32 days of age). However, the feed intake of one female was perturbed by this modification so it was removed from the experiment. Finally, 90% of females adapted to this system. Therefore, it could be recommended to provide the gate with a 300 g weight before the beginning of experiment to avoid the problem of new adaptation during measurements.

Young rabbits.

The beginning of the solid food intake starts about 18-20 days of age. The specific feeder for the young rabbits makes it possible to avoid wastage by scrabbling. However, we observed some half pellets wasted below the cage because when a young rabbit took a pellet in the mouth, it broke it into two when crunching it: half being intake and the second half falling by ground. To precisely measure the feed intake, we installed a plate, under the young's feeder inside the cage, to recover the wastage (see figures 3 and 4). However, the measurement of intake must be frequent (at least 2 times a week) to prevent the pellets thus wasted in the plate being soiled with faeces or urine.

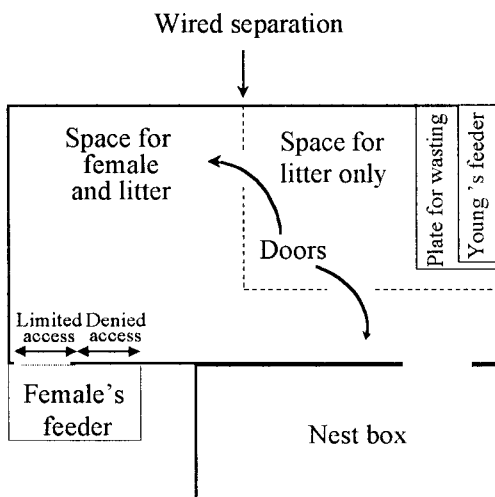


Figure 3 : Adaptation of the cage permitting separate control of the feed intake of the mother and that of her litter, leaving the female free access to the nest box .

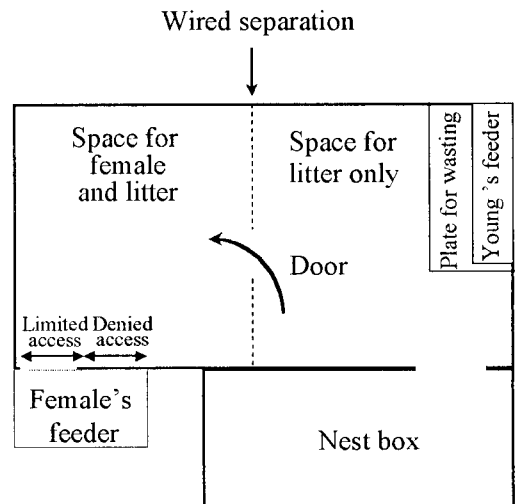


Figure 4 : Adaptation of the cage permitting separate control of the consumption of the mother and that of her litter, while preventing doe access to the nest box.

From day 16 to day 32, solid feed intake reached 202 g per kit and 128 g per kit in litters of 10 or 4 young, respectively, which was in accordance with previous results (MAERTENS and DE GROOTE, 1990; PARIGI-BINI *et al.*, 1991).

Suckling was not disturbed by this system, and the mean milk intake between day 16 to day 32 of lactation was 200 g / kit / day, which is in accordance with PARIGI-BINI *et al.* (1991). The young rabbits moved freely around the cage on each side of the separation throughout the day. Mean live weight of the young at weaning (day 32) was 602g.

CONCLUSION

This new system allows measurement of the feed intake of the litter independently of the mother while preserving the mother / young relations. It could be adapted to most cages and requires simply training the female to the new feeder at least two weeks before the beginning of the experiment. Regular measurement of the pellets that have fallen into the plate placed under the young's feeder was necessary to obtain a precise measure of the litter feed intake. This system could also be used to distribute a specific feed to the litter. It thus allows independent feeding plans for females and their litters before weaning.

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