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in

Baselga M. (ed.), Marai I.F.M. (ed.).
Rabbit production in hot climates

Zaragoza : CIHEAM
Cahiers Options Méditerranéennes; n. 8

1994
pages 425-429

Article available on line / Article disponible en ligne à l'adresse :

<http://om.ciheam.org/article.php?IDPDF=95605320>

To cite this article / Pour citer cet article

Emeash H.H., Karousa M.M. **The influence of some managemental programmes on maternal anomalies and pup's performance in White New Zealand rabbits.** In : Baselga M. (ed.), Marai I.F.M. (ed.). *Rabbit production in hot climates*. Zaragoza : CIHEAM, 1994. p. 425-429 (Cahiers Options Méditerranéennes; n. 8)



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THE INFLUENCE OF SOME MANAGERMENTAL PROGRAMMES ON MATERNAL ANOMALIES AND PUP'S PERFORMANCE IN WHITE NEW ZEALAND RABBITS

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SUMMARY - Twelve New Zealand White adult female rabbits and three fertile bucks were used. The normal and abnormal maternal behaviour and pup's performance were observed and recorded. The influences of some managerial programmes on maternal anomalies and pup's performance were also studied.

The results revealed that the abnormal maternal behaviour was recorded in six females which were housed in the lower row of rabbit cages. After application of some managerial changes, the abnormal maternal behaviours show a significant decline. The percent of abnormal does which cannibalized their young reduced from 66.0 to 30.0% and the scattering young from 50.0 to 16.0% in comparison with those does that correct the some managerial environment. The survival percent of pups through weaning for the normal does (78.0%) was significantly higher ($P < 0.05$) than that of the abnormal ones (12.8%), the last percent would be corrected to 56.8% after application of some managerial programmes on the abnormal does. In addition, the percent of building either material or maternal nest in abnormal does was improved after change of some managerial programmes. The average body weight of pups from birth to weaning in the normal does was significantly higher ($P < 0.05$) than that of the abnormal does. On the other hand there was no significant difference in the average litter size between the normal and abnormal does before and after managerial changes.

Key words : Rabbit, maternal anomalies, pup's performance.

INTRODUCTION

Mammalian reproduction, in its broadest essence, starts with mating behaviour and terminates when the young are weaned. Between these two events is a complex chain of genetic, biochemical, physiological, environmental and behavioural phenomena, all of which are critical for the survival of the young. Maternal anomalies of the does characterized by a set of undesirable specific patterns exploited immediately prior and post-partum stage, are of great significants. Cannibalism is defined as the

eating of part or all of one or more pups, where it divided into three classes according to the number of pups of the litter damage (*Denenberg et al., 1959*), in addition cannibalism in rabbits may be associated with dead or deformed young, a hyperexcitable, primiparous doe, placentophagy, environmental disturbance or a low energy diet (*Harkness and Wagner, 1989*). Does who failed to suckle the whole or more than 50% of the young considered as abnormal mother, moreover, tendency of the doe to scatter the pups after delivery on the floor of the cage or

elsewhere rather than to group them in the nest boxes, is considered abnormal behaviour (*Hafez, 1975*). There are several causes for abnormal behaviour in the doe. There is little doubt that some of the cases are due to deficiencies in rations, disturbance of some dams, hormonal unbalance and environmental stress (*Sandford and Woodgate, 1980*). Manipulation of dimensions of the external environment, significantly affected reproductive physiology and maternal behaviour in rabbits (*Denenberg et al., 1963*). In addition *Parkes and Bruce (1961)* suggested that the external environment, rather than merely having a supportive role, has a dynamic effect in guiding the course of mammalian reproduction. Rabbit can be successfully raised on diet consisting entirely of forage and cereal by-products. *Mcnitt (1984)* mentioned that insufficient fiber in the ration lead to cannibalism in fowl, while *Schlolaut (1984)* reported that the importance of the crude fiber content in a ration would appear to be mainly due to its dietetic value, as an increase in the incidence of dysentery in rabbits was observed with reduced levels.

From above, this work was designed as a trial to correct the maternal anomalies in the rabbit dams by changing of some environmental management programmes.

MATERIALS AND METHODS

Twelve New Zealand White adult female rabbits were used with three fertile bucks used for mating.

This study was carried out at rabbitry, Faculty of Veterinary Medicine, Beni-Suef, Cairo University. The animal house (540 x 330 cm floor) was sufficiently ventilated, where the does were accommodated in wire cage, each was of 54 x 45 x 30 cm. Each doe was individually housed in one cage. The doe cages were arranged in three rows, the lower one was near rabbitry floor by about 25 cm, the middle 80 cm, while the upper one was 140 cm. Each doe cage was provided with a metal nest box of 38 x 28 x 25 cm, having an entrance of circular aperture, 16 cm in

diameter and 5 cm high from the cage floor. Each cage was identified by a card denoting the animal number and other informations. All animals were kept under standard conditions of commercial pelleted feed (crude protein, 18%, crude fiber, 13.6% and ether extract, 1.8%), water and food were supplied *ad libitum*, and light cycle of 13 hours per 24 hours as mentioned by (*Denenberg et al., 1963*).

In the first experiment, the normal and abnormal maternal behaviour among female rabbits were observed and recorded. The gestation period and litter size for each doe were recorded. Pup's body weight and the viability percent up to weaning (at 28 days of age) for each doe were recorded. The percentage of nest building either material or maternal was also observed and recorded.

The abnormal maternal behaviour among rabbits was recorded according to *Denenberg et al. (1963)* as follow:

- 1- Incidence of scattering : mean that birth of one or more young outside the nest-box, in other word, scattering of the pups after delivery on the floor of the cage.
- 2- Incidence of cannibalism (eating part or all of one or more young).
- 3- Does that failed to suckle the whole or more than 50% of the youngsters.

In the second experiment, the does that showing the abnormal maternal behaviour were accommodated and managed as follow:

- 1- Change the doe's place from the lower cages to the middle and upper row's cages.
- 2- Human handling, was performed daily by the observer and assistant for 10 minutes, where the handling was carried with gently light and palm fingers on the head, back and thighs from the day of mating till prior of parturition as described by *Anderson et al. (1972)*.
- 3- Addition amount of hay straw (about 10 gm) daily at a 20th day of pregnancy till time of birth, where it is considered as the material nest and a source of crude fiber.

Statistical analysis of the data was carried by analysis of variance according to *Snedecor and Cochran (1976)*.

RESULTS AND DISCUSSION

The abnormal maternal behaviour was recorded in six females which were housed in the lower row cages, while the other six females showed a normal maternity throughout the first experiment.

Table (1) shows the mean value of the maternal behaviour (normal and abnormal) and pup's performance of White New Zealand rabbit during the 1st and 2nd experiments. It can be noticed that there was a significant difference ($P < 0.05$) in length of gestation period (31.0 days in normal) and (28.8 days in abnormal) does. Moreover the correction of environmental conditions of the abnormal does, returned the gestation period to normal length (31.3 days). In addition, there was no significant difference in the average of litter size among does in 1st and 2nd experiments.

Regarding to the percent of does which built either material (hay) or maternal (fur) nests, it is clearly that the correction of environmental conditions by addition amount of hay straw (10 gm daily) at 20th day of pregnancy, improved the material nest quality, where the percent of material nest built in abnormal does (33.0%) increased to (80.0%) after correction, this led to improvement of maternity and consequent increase the percent of maternal nest (fur) from (17.0) to (66.0%) after treatment, in addition the percent of does which cannibalized their youngs was reduced from (66.0) to (30.0%) and the scattering percent of youngs was also reduced from 50.0 in abnormal does to 16.0% after improvement of the environmental conditions. These results will reflect on the percentage of survival of pups through weaning time, where in abnormal does reach to 12.8% and increased to 56.8% after correction of managemental conditions.

Regarding to the body weight of pups, it was found that the average body weight of pup at birth till weaning time in the normal does significantly increased than

that of the abnormal does. However, the abnormal does not give attention for their pups and consequently affected body weight of their pups, while treatment of abnormal does produced an increase in body weight increase in body weight of their pups.

The observed marked differences in the maternal behaviour and pup's performance of normal and abnormal does may be due to stressful conditions, such as high concentrations of ammonia and inadequate light in the lower row of cages, those conditions are long term stressors. Those stressors cause prolonged stress because the production of the corticosterone hormone is retriggered and high levels continue to exist (*Mack, 1984*). Those stressors evoke negative emotions and may result in undesirable behaviours. Aggressive behaviour has been reported to be correlated with testosterone and corticosterone (*Sapolsky, 1982 and Kaplan, 1985*). In the abnormal does, routine management of both gently handling of the does and supplementation source of crude fiber as well as hay straw will reflect and improve the abnormal does. *Kersten (1986)* mentioned that the handling of rabbits gently reduces their general emotionality or fearfulness, in addition *McNitt (1984)* mentioned that insufficient fiber in the ration lead to cannibalism in fowl, while *Schlolaut (1984)* recorded the importance of crude fiber in a rabbit ration, would appear to be mainly due to its dietetic value, as an increase in the incidence of dysentery with reduce level of crude fiber in ration.

These findings indicate that some behavioural anomalies resulted from difficult environment or stressors. So good managemental programmes as well as change of rabbit place, gently handling of the stressed dams and addition adequate amount of hay straw that considered as a good source of crude fiber and used as a material nest, may be needed to bring about an ideal situation, reduce stress, eliminate stress-induced behavioural disorders, and correct certain types of maternal anomalies which appear to be not under the control of hormonal or genetic factors.

Table (1): Normal, abnormal maternal behaviour and pup's performance as influenced by management programmes in White New Zealand female rabbits.

Parameters	A Normal (Control) does	B Abnormal does	C Correction of abnormal
- Length of gestation period/day	31.0 ± 0.3 b	28.8 ± 0.6 a	31.3 ± 0.5 b
- Litter size	5.2 ± 0.8 a	5.2 ± 0.9 a	4.9 ± 0.8 a
- Percent built of material nest (Straw)	77.0	33.0	80.0
- Percent built of maternal nest (Fur)	83.0	17.0	66.0
- Percent Scattered young	0.0	50.0	16.0
- Percent cannibalized young	0.0	66.0	30.0
- Survival % of pups till weaning	78.0	12.8	56.8
- Average of weight pup / gm.			
At birth	52.3 ± 2.6 c	34.1 ± 1.2 a	44.2 ± 1.8 b
At 2nd week	180.0 ± 7.1 c	121.0 ± 3.8 a	149.7 ± 5.6 b
At 3rd week	262.0 ± 8.9 c	218.3 ± 9.5 a	232.0 ± 8.5 b
At 4th week	381.5 ± 13.5 c	305.7 ± 13.3 a	320.7 ± 5.6 b

Means in the same row not sharing a common superscripts letter differ significantly (P < 0.05).

A.B → 1st Experiment

B.C → 2nd Experiment

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