

## **EFFECT OF HANDLING IN PRE-WEANING RABBITS**

**Zucca D.<sup>1\*</sup>, Bonazza V.<sup>2</sup>, Heinzl E.<sup>1</sup>, Luzi F.<sup>1</sup>, Verga M.<sup>1</sup>**

<sup>1</sup>Dipartimento di Scienze Animali, Sezione di Zootecnica Veterinaria, via Celoria 10, 20133 Milano, Italy

<sup>2</sup>Osservatorio Epidemiologico Veterinario della Regione Lombardia - Istituto Zooprofilattico Sperimentale della Lombardia e dell'Emilia Romagna, via Bianchi 9, 25124 Brescia, Italy

\*Corresponding author: daniela.zucca@unimi.it

### **ABSTRACT**

Fear is an emotion that may negatively affect rabbits' welfare, as a consequence of bad handling during the rearing period. A number of recent researches suggests that a certain level of gentle handling in the pups, scheduled very accurately, can reduce the fear stress of the animals towards new environments and humans. The fear response may be reduced by handling around nursing time during the first week after birth. The aim of this study was to investigate the effects of regular daily handling on weight gain and on the fear reaction towards a new environment and towards human beings in domestic rabbit pups. We obtained different results between handled pups and control pups in the emergence test and in the immobility test. In fact we found that a minimal human contact applied before nursing reduced the fear of humans in rabbit pups. Our handling method, requiring minimal contact, can be used to reduce fear and improve welfare in rabbits. Furthermore, the short length of the handling procedure allows stockpersons to produce tamer rabbits, which could have a better reproductive and productive capacity due to reduced stress levels.

**Key words:** Young rabbits, Handling, Body weight, Behavioural test.

### **INTRODUCTION**

A number of recent studies have indicated that the type of handling may influence behaviour and human-animal relations in terms of approachability and fear of humans in different species of farm animals like pigs (Tanida *et al.*, 1994), sheep (Mateo *et al.*, 1991), cattle (Boivin *et al.*, 1994) and rabbits (Anderson *et al.*, 1972; Kersten *et al.*, 1989; Jezierski and Konecka, 1996; Pongrácz and Altbäcker, 2003; Verga *et al.*, 2004). Although one of the main goals of the domestication process is to eliminate unnecessary high fear responses (Price, 1984), domesticated animals still show avoidance towards human beings (Rushen *et al.*, 1999). In rabbit pups, even minimal human contact is effective at reducing avoidance of the caretaker and handling might, thus, be a useful tool to reduce stress and improve welfare even under intensive farming conditions (Csatádi *et al.*, 2005).

Hudson *et al.* (1996) showed that minimal handling reduces timidity, particularly when performed during the first week of post-natal life. Pongrácz and Altbäcker (1999) found that the behaviour and welfare of caged rabbits can be positively affected by repeated handling performed by familiar people and that the pups become fearless of humans only if they have been handled close to the time of the maternal visits. Bilkó and Altbäcker (2000) showed that the first week postpartum is a sensitive period for successful handling.

During early life of rabbits there are certain short periods, linked to nursing, when they can learn extremely fast: thus the rabbits' fear of humans decreased if they were handled (touched by the hand) during the first week of their life (Bilkó *et al.*, 1994). Similarly, Verga *et al.*, (2004) found that handling in early life significantly affected rabbits' reactivity in behavioural tests. Csatádi *et al.* (2005) studied the effects of minimal human contact on New Zealand White kits: handling could reduce rabbits' fear responses towards humans if it was performed during the sensitive period of the pups.

The aim of this study was to investigate the effects of regular daily handling in domestic New Zealand White rabbit pups, during the first week after birth, on their fear reaction towards human beings.

## MATERIALS AND METHODS

The trial was carried out in a commercial rabbit farm, in the North-West of Italy (Lombardia Region), equipped with an air control temperature system. Thirty-four commercial hybrid rabbit does were used. The weaning of the pups was at the age of thirty-three days. Each cage was equipped with a feeder and a nipple drinker; feeding (commercial diet) and water were administered *ad libitum*. We used 34 litters (9 pups each aged 5 days): half were handled and the others were not (control group).

The handling procedure was the following: handling was performed daily for seven days starting on the day of birth, immediately before nursing; always the same experimenter (worker of the animal house) introduced one hand into the nest box, near the litter but without touching the pups, for one minute. The following productive traits were recorded:

- the weight gain during the pre-weaning period;
- the fear of a new environment and of humans, using two specific behavioural tests: emergence test (ET) and immobility test (TI) (Hansen *et al.*, 1993; Ferrante *et al.*, 2005).

The litters were weighed at the age of 5 days while at 14 and 33 days of age the pups were weighed individually.

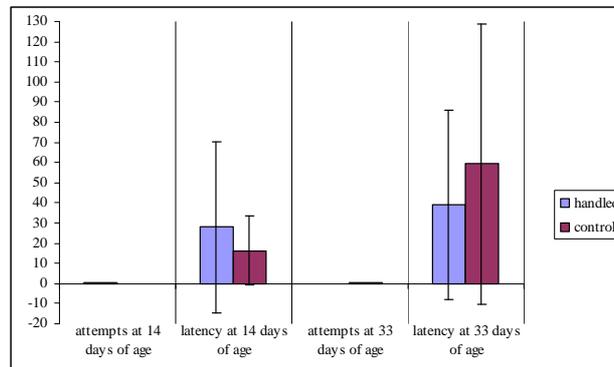
During the emergence test, the rabbit was placed in a start wooden box (50x52x60), closed by a lid, with a sliding door leading into the arena. The experimenter stood behind the start box, outside the visual field of the rabbit and after one minute opened the sliding door to the arena. The parameters recorded were: the number of attempts of escaping (the number of times the rabbit put one or more legs or head outside the box before it emerged); emergence latency, in sec (i.e., time to enter with all the body into the arena). After the finished of ET the experimenter picked the rabbit up and performed a TI test. If a rabbit didn't leave the box within three min, the test was stopped. Long latencies to approach and to enter a novel arena and few attempts to enter with one or more legs are considered indicators of high fearfulness (Miller *et al.*, 2005). In the TI test, the rabbit was laid on its back in a V-shaped wooden cradle and kept in this position by placing one hand on the animal's hind-feet and the other one on its ears for 10 s. The pressure applied by the hands of the experimenter was proportional to the resistance offered by the rabbit to restraint. Then, hand pressure was gradually lifted so that, if the rabbit still moved, the induction was considered unsuccessful and another induction period of 10 s started, until movement ceased. While the rabbit was laying still with one or both legs extended, the experimenter slowly withdrew the hands and a chronometer was activated to measure the duration (in seconds) of the response, which ended when the rabbit resumed the upright position. If three inductions were unsuccessful TI was scored as 0 and the number of inductions was considered equal to 3. If TI lasted for more than 180 s the single test session was terminated and the duration of TI was considered 180 s. The number of inductions necessary to obtain a TI reaction was always recorded. Means and standard deviations were calculated for the recorded parameters.

## RESULTS AND DISCUSSION

We found no difference among the two groups regarding their weight gain, in contrast to authors that have found (Jeziarski and Konecka, 1996 in rabbits, Hemsworth and Barnett, 1991 in pigs) that handled animals grow better than unhandled ones. A possible explanation for this discrepancy is that our observation was restricted to only the period before the weaning, when animals are for a long time in the nest and they hardly see humans. That is, a lower food consumption due to fear may affect development only at a later age.

During the emergence test, carried out at the ages of 14 and 33 days (Figure 1), differences have been found in number of attempts and in latency time. During the first repetition, at the age of 14 days, the

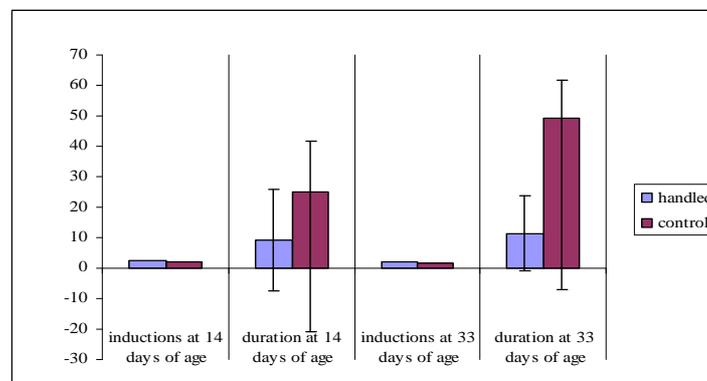
control pups showed a stronger attitude in exiting the start box compared to the handled ones. On the contrary in the second repetition of the test, carried out at the age of 33 days, the handled pups took less time to leave the box. Thus the number of attempts of escaping in control rabbits increased in the second repetition of the test, while in handled ones decreased to zero.



**Figure 1:** Emergence test: number of attempts of escaping (means) and latency (means $\pm$ s.d.)

The emergence test aims at evaluating the effect of different husbandry systems on the animals' reactivity towards new environment (Erhard and Mendl, 1999). Handled pups did not explore as actively as control pups, during the first repetition; the positive effect of handling, which may reduce the fear towards the new environment, can be observed only during the second repetition. In fact, at 33 days of age, the handled pups showed lower time to enter the arena compared to the control ones. It may be that the effect of handling, to reduce the fear also in a new environment, comes later.

During the tonic immobility test carried out at the age of 14 and 33 days (Figure 2), differences were found in the numbers of inductions of tonic immobility as well in the duration of it. Pups handled showed more numbers of inductions and less tonic immobility duration than the control ones.



**Figure 2:** Immobility test: number of inductions (means) and duration (means $\pm$ s.d.)

These results, according to some authors (Ratner, 1967; Hansen *et al.*, 1993; Ferrante *et al.*, 2005), can be interpreted as a greater fear reaction towards human beings in the non-handled rabbits. In fact, Gallup (1977) and Jones (1986a,b) found that fewer numbers of attempts of induction and higher duration time in tonic immobility test were correlated to higher fear level.

Moreover, many studies (Jones and Faure, 1981; Kersten *et al.*, 1989; Grigor *et al.*, 1995; Bilkó and Altbäcker, 2000; Pongrácz and Altbäcker, 2003; Verga, 2004) emphasize that regular handling may reduce the level of fear towards human beings.

The methodology used in this research agreed to various authors. For example, Bilkó and Altbäcker (2000) suggest that early handling results in an olfactory imprinting when pups may imprint the odour of humans. The learning occurs during in the sensitive period around nursing (Pongrácz and Altbäcker, 2003). As the developing olfactory system of rabbit pups is more sensible during the

maternal visits, handling should be more efficient if it is performed in this period but inefficient if it is performed out of the nursing time or after the first week postpartum (Csatádi *et al.*, 2005).

## CONCLUSIONS

Our results show that one minute of daily handling of rabbit pups produced different reactions in two behavioural tests: even a minimal human contact applied before nursing reduced the fear towards a new environment and towards of humans. This handling method, requiring minimal contact, can be used to reduce fear and improve welfare in rabbits. Furthermore, the short length of the handling procedure could allow stockpersons to produce tamer rabbits which could have a better reproductive and productive capacity.

## ACKNOWLEDGEMENTS

This research was founded by PRIN 2005 (MUR - Roma). We would like to thank the farm "Erminia Vezzoli" placed in Covo (Bg).

## REFERENCES

- Altbäcker V., Hudson R., Bilkó Á. 1995. Rabbit mothers' diet influences the pups' food choice. *Ethology*, 99, 107–116.
- Anderson C.O., Denenberg V.H., Zarrow M.X. 1972. Effects of handling and social isolation upon the rabbit's behavior. *Behavior*, 43, 165-175.
- Bateson P., Horn G. 1994. Imprinting and recognition memory: A neural net model. *Anim. Behav.*, 48, 695-715.
- Bilkó Á., Altbäcker V. 2000. Regular handling early in nursing period eliminates fear response toward human beings in wild and domestic rabbits. *Dev. Psychobiol.*, 36, 78-87.
- Bilkó Á., Altbäcker V., Hudson R. 1994. Transmission of food preference in the rabbit: the means of information transfer. *Physiol. Behav.*, 56, 907–912.
- Boivin X., Le Neindre P., Garel J.P., Chupin J.M. 1994. Influence of breed and rearing management on cattle reactions during human handling. *Appl. Anim. Behav. Sci.*, 39, 115-122.
- Csatádi K., Kustos K., Eiben Cs., Bilkó Á., Altbäcker V. 2005. Even minimal human contact linked to nursing reduces fear responses toward humans in rabbits. *Appl. Anim. Behav. Sci.*, 95, 123-128.
- EFSA 2005. The impact of the current housing and husbandry systems on the health and welfare of farmed domestic rabbits. *EFSA Journal*, 267, 1-31.
- Erhard H.W., Mendl M. 1999. Tonic immobility and emergence time in pigs – more ece for behavioural strategies. *Appl. Anim. Behav. Sci.*, 61, 227-237.
- Ferrante V., Marelli S., Pignattelli P., Baroli B., Cavalchino L.G. 2005. Performance and reactivity in three Italian chicken breeds for organic production. *Animal Science Papers and Reports*, 23, 1, 223-229.
- Gallup G.G.Jr., 1997. Tonic immobility: the role of fear and predation. *The Psychological Record*, 27, 41-61.
- Grigor P.N., Hughes B.O., Appleby M.C., 1995. Effect of regular handling and exposure to an outside area on subsequent fearfulness and dispersal in domestic hens. *Anim. Behav.*, 44, 47-55.
- Hansen I., Braastad B.O., Storbraten J., Tofastrud M. 1993. Differences in fearfulness indicated by tonic immobility between lying hens in aviaries and in cages. *Anim. Welfare*, 2, 105-112.
- Hemsworth P.H. 2003. Human–animal interactions in livestock production. *Appl. Anim. Behav. Sci.*, 81, 185–198.
- Hemsworth P.H., Barnett J.L. 1991. The effects of aversively handling pigs, either individually or in groups, on their behaviour, growth and corticosteroids. *Appl. Anim. Behav. Sci.*, 30, 61–72.
- Hudson R., Schaal B., Bilkó Á., Altbäcker V. 1996. Just three minutes a day: The behaviour of young rabbits viewed in the context of limited maternal care. In: *Proc. 6<sup>th</sup> World Rabbit Congress, 1996 July, Toulouse, France, Vol. 2, 395-403.*
- Kersten A.M.P., Meijsser F.M., Metz J.H.M. 1989. Effect of early handling on later open-field behaviour of rabbits. *Appl. Anim. Behav. Sci.*, 24, 157-167.
- Jeziński T.A., Konecka A.M. 1996. Handling and rearing results in young rabbits. *Appl. Anim. Behav. Sci.*, 46, 243–250.
- Jones R.B. 1986a. Conspicuous, vocalization, tonic immobility and fearfulness in the domestic fowl. *Behavioural Processes*, 13, 217-225.
- Jones R.B. 1986b. The tonic immobility reaction of the domestic fowl: a review. *World Poultry Sci. J.*, 42, 82-96.
- Jones R.B., Faure J.M., 1981. The effect of regular handling on growth in male and female chicks of broiler and layer strains. *Brit. Poultry Sci.*, 22, 461-465.
- Mateo J.M., Estep D.Q., McCann J.S. 1991. Effects of differential handling on the behaviour of domestic ewes. *Appl. Anim. Behav. Sci.*, 32, 45-54.
- Meisser F.M., Kersten A.M.P., Wiepkema P.R., Metz J.H.M. 1989. An analysis of the open-field performance of subadult rabbits. *Appl. Anim. Behav. Sci.*, 24, 147–155.

- Miller K.A., Garner J.P., Mench J.A. 2005. The test-retest reliability of four behavioural tests of fearfulness for quail: a critical evaluation. *Appl. Anim. Behav. Sci.*, 92, 113–127.
- Podberscek A.L., Blackshaw J.K., Beattie A.W. 1991. The behaviour of group penned and individually caged laboratory rabbits. *Appl. Anim. Behav. Sci.*, 28, 353–373.
- Pongrácz P., Altbäcker V. 1999. The effect of early handling is dependent upon the state of the rabbit (*Oryctolagus cuniculus*) pups around nursing. *Dev. Psychobiol.*, 35, 241–251.
- Pongrácz P., Altbäcker V. 2003. Arousal but not nursing is necessary to elicit a decreased fear reaction toward humans in rabbit (*Oryctolagus cuniculus*) pups. *Dev. Psychobiol.*, 143, 192–199.
- Price E.O. 1984. Behavioral aspects of animal domestication. *Quart. Rev. Biol.*, 59, 1–32.
- Ratner S.C. 1967. Comparative aspects of hypnosis. In: Gordon J.E. (Ed.). *Handbook of Clinical and Experimental Hypnosis*, Macmillan, New York, USA, 550–587.
- Rushen J., Taylor A.A., de Passilé A.M. 1999. Domestic animals' fear of humans and its effect on their welfare. *Appl. Anim. Behav. Sci.*, 65, 285–303.
- Tanida H., Miura A., Tanaka T., Yoshimoto T. 1994. The role of handling in communication between humans and weanling pigs. *Appl. Anim. Behav. Sci.*, 40, 219–228.
- Verga M., Castrovilli C., Ferrante V., Grilli G., Luzi F., Toschi E. 2004. Effetti della manipolazione e dell'arricchimento ambientale su indicatori integrati di "benessere" nel coniglio. *Riv. Coniglicoltura*, 2, 26–35.

