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EFFECT OF HANDLING IN PRE-WEANING RABBITS

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ABSTRACT: The aim of this study was to investigate the effects of regular daily handling in the first week after birth on weight gain and the fear reaction towards a new environment and human beings in domestic kits (Tonic Immobility test: TI, Emergence test: ET). Two groups in the same environment and fed the same diet were analysed: handled group and control (17 litters, 9 kits/litter per group). No differences in weight gain were recorded. During ET at 33 d of age, handled kits took less time to enter the arena than control group kits. TI duration was shorter in handled kits, which required more inductions than the control group. It was found that minimal human contact imposed before nursing reduced the fear of humans in rabbit kits. Our handling method requires minimal contact and can be used to reduce fear and improve welfare in rabbits. Moreover, the short length of the handling procedure allows stockpersons to produce tamer rabbits, reducing stress levels.

Key Words: rabbit kits, handling, body weight, behavioural test, fear.

INTRODUCTION

A number of recent studies have indicated that the type of handling may influence behaviour and human-animal relationship in terms of approachability and fear of humans in different species of farm animals such as pigs (Tanida *et al.*, 1994), sheep (Mateo *et al.*, 1991), cattle (Boivin *et al.*, 1994) and rabbits (Anderson *et al.*, 1973; Kersten *et al.*, 1989; Jezierski and Konecka, 1996; Pongrácz and Altbäcker, 2003; Verga *et al.*, 2004). In kits, even minimal human contact is effective in reducing rejection of the caretaker, so handling could be a useful tool to reduce stress and improve welfare even under intensive farming conditions (Csatádi *et al.*, 2005).

Kersten *et al.* (1989) found that early handling seems most effective in reducing emotionality if applied after the 10th d of life, while Jezierski and Konecka (1996) recorded higher growth rates and higher activity levels in rabbits handled from day 10 to 10 wk of age.

Hudson *et al.* (1996) showed that minimal handling reduces shyness, particularly when performed in 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 and that the kits 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.

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.

Reinforcing properties of handling are effective only when performed around nursing time (Pongrácz and Altbäcker, 1999); the pre-nursing arousal state *per se*, rather than nursing, presence of the doe or milk ingestion, is essential for the handling-induced reduction of kits' fear response toward humans (Pongrácz and Altbäcker, 2003). Bilkó and Altbäcker (2000) found that kits handled around nursing become tame at weaning, but this procedure was efficient only if it was conducted within 30 min after nursing in the first week of the kit's life.

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

MATERIALS AND METHODS

Experimental farm and animals

The trial was carried out on a commercial rabbit farm, in North-West Italy (Lombardy Region), with a controlled environment (T: 20±2°C, Light: 16:8 h L:D).

Thirty-four commercial hybrid rabbit does and their litters (9 kits per litter) were used. Kits were weaned at 33 d of age. All does were housed in the same room in standard wire cages (length×width×height; 95×38×35 cm). Each cage was equipped with a feeder and a nipple drinker; feed (commercial diet: 2550 kcal of metabolizable energy and 175.0 g of crude protein per kilogram, automatic distribution) and water were administered *ad libitum*. The nest area was 760 cm².

Handling procedure

The kits from 17 litters were handled (experimental group) and the others were not (control group, 17 litters).

Handling was performed daily for 7 d starting on the day of birth, immediately before nursing (6:30 a.m.). Does had controlled access to the nest boxes once a day (7:00 a.m.). Throughout the experiment the same operator introduced one hand into the nest box, near the litter but without touching the kits, for 1 min.

Measured Variables

Litters were weighed at the age of 5 d while at 14 and 33 d of age the kits were weighed individually. Fear of a new environment and of humans was determined using 2 specific behavioural tests, on the same days that the kits were weighed (14 and 33 d of age): emergence test (ET) and tonic immobility test (TI) (Hansen *et al.*, 1993; Ferrante *et al.*, 2005).

Performances were recorded simultaneously for both does groups.

Emergence test (ET)

During the ET, each rabbit was placed in a start wooden box (50×52×60 cm), closed by a lid, with a sliding door leading to the arena (50×120×50 cm). The worker stood behind the start box, outside the rabbit's visual field, and after 1 min opened the sliding door to the arena. The parameters recorded were: Number of escape attempts (the number of times the rabbit put one or

more legs or head outside the box before it emerged) and emergence latency (time to enter with all the body into the arena, s, max of 180 s). Long lasting latencies in approaching and entering a new arena and a low number of attempts to enter with one or more legs are considered indicators of high fearfulness (Miller *et al.*, 2005).

Tonic immobility test (TI)

After ET the TI test was performed. In this 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 on their ears for 10 s. The pressure applied by the worker's hands was proportional to the resistance offered by the rabbit. Then, hand pressure was gradually released and 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 lying with one or both legs extended, the worker slowly withdrew the hands and a chronometer was activated to measure the duration (s, max 180 s) of the response, which ended when the rabbit resumed the upright position. If 3 inductions were unsuccessful TI duration was scored as 0 and the number of inductions was considered equal to 3. During TI tests, the worker always stood close to the rabbit to be seen by the animal.

Statistical analysis

Statistical analysis was carried out using SAS software (SAS, 2008). Means and standard deviations were calculated for the recorded parameters and differences were calculated using the Kruskal-Wallis non parametric ANOVA. Significance was set at one level: $P < 0.05$. Handling was considered the source of variation.

RESULTS

A summary of the results is reported in Table 1. No differences in litter weight at 5 d of age were observed between the 2 groups. Single kit weights showed almost a 10 g difference at 14 d with heavier control kits (257 vs. 247 g; $P < 0.05$). Control kits were also heavier at 33 d, with a 29 g difference (835 vs. 806 g; $P < 0.05$).

During the ET, carried out at the ages of 14 and 33 d, differences were found in the number of attempts and latency time. At 14 d of age, handled kits took more time to leave the start box than the control group ($P = 0.07$). On the contrary, at 33 d of age, the handled kits took less time to enter the arena than the control kits ($P < 0.05$). The number of escape attempts in control rabbits increased in the second repetition of the test, while in handled ones it dropped to 0 ($P < 0.05$). During the TI test carried out at the age of 14 and 33 d, differences were found in the numbers of inductions ($P < 0.05$) of TI as well in its duration ($P < 0.05$). Kits handled showed higher numbers of inductions and less TI duration than the control group (Table 1).

DISCUSSION

In contrast to authors (in rabbits; Jezierski and Konecka, 1996, and in pigs; Hemsworth and Barnett, 1991) who found that handled animals grew better than unhandled ones, the control kits were heavier than those handled ($P < 0.05$). A possible explanation for this discrepancy is that current observations were restricted to only the period before weaning, when animals are in the nest for a long time and hardly see any humans. The ET aims to evaluate the effect of different husbandry systems on the animals' reactivity towards new environment (Erhard and

Table 1: Effects of handling on litter weight (9 kits/litter), kit weight, Emergency test and Tonic Immobility test.

	Mean±standard deviation		Significance ¹
	Handled	Control	
Litter weight (g)			
at 5 d	1 060.2±158.2	1 112.2±175.7	NS
Kit weight (g)			
at 14 d	246.9±22.9	257.3±28.5	*
at 33 d	805.7±75.9	835.4±74.4	*
Emergency Test at 14 d			
Attempts (No.)	0.23±0.49	0.06±0.24	NS
Latency (s)	24.17±31.24	19.54±20.10	NS
Emergency Test at 33 d			
Attempts (No.)	0.09±0.28	0.49±1.01	*
Latency (s)	29.11±40.79	45.00±57.49	*
Tonic immobility Test at 14 d			
Inductions (No.)	2.34±0.87	2.03±0.92	NS
Duration (s)	15.06±33.23	17.66±38.09	NS
Tonic immobility Test at 33 d			
Inductions (No.)	2.29±0.71	1.83±0.86	*
Duration (s)	15.83±32.04	31.37±43.55	*

¹Significance: NS, no significant; *, significant at $P<0.05$.

Mendl, 1999). During the first repetition, handled kits did not explore as actively as control kits. The positive effect of handling, which may reduce fear towards the new environment, was only observed during the second repetition, which could indicate that the effect of handling to reduce fear in a new environment comes later. These results, according to some authors (Ratner, 1967; Hansen *et al.*, 1993; Ferrante *et al.*, 2005), may 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 induction attempts and higher duration time in TI test were correlated to higher fear level. Moreover, many studies (Jones and Faure, 1981; Kersten *et al.*, 1989; Grigor *et al.*, 1995; Pongrácz and Altbäcker, 2003; Csatádi *et al.*, 2005) emphasise that regular handling may reduce the level of fear towards human beings.

Bilko and Altbäcker (2000) suggest that early handling results in olfactory imprinting when kits may imprint the odour of humans. The learning occurs during the sensitive period around nursing (Pongrácz and Altbäcker, 2003). As the development of the olfactory system of kits is more sensitive during the maternal visits, handling is efficient if carried out in this period but inefficient if it is performed out of the nursing time or after the first week postpartum (Csatádi *et al.*, 2005). Pongrácz and Altbäcker (2003) observed that kits exhibit anticipatory behaviour prior to maternal visits and this state of excitement is characteristic only of standard nursing: kits show more activity levels and marked uncovering behaviour.

CONCLUSIONS

Although one of the main goals of the domestication process is to eliminate unnecessary high fear responses (Price, 1984), domesticated animals still show rejection towards human beings (Rushen *et al.*, 1999). Reported results show that 1 min of early daily handling of kits causes different reactions in both the behavioural tests applied; it was underlined how even minimal human contact applied before nursing reduced the fear reactions towards a new environment and humans. This “low time demand” and “low cost” handling method requires minimal contact and can be used to reduce fear responses. Furthermore, the brief duration of the handling procedure allows stockpersons to produce tamer rabbits with higher coping ability.

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