Effect of rearing technique in outdoor floor cage on slow growing rabbit population performance

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ABSTRACT - The aim of this research was to test the effect of floor cage in outdoor pen on productive performance and carcass characteristics of a rabbit local population characterized by slow growing rate. A sample of 48 rabbits female 57 days old was divided into two groups: Indoor group, housed in colony cages indoor at the density of 14 animals/m² and Outdoor group, in wire net floor colony cages in outdoor pen, at the density of 5 animals/m². The animals were fed a commercial feed and ad libitum alfa-alfa hay. Individual live weight and cage feed consumption were checked every week and feed conversion ratio was calculated; at 103 ± 2 days old a sample of 24 animals was slaughtered and carcass traits were recorded. The results showed that the Outdoor group had the highest live weight and the best daily weight gain, together with higher feed intake. Outdoor group showed the lower mortality, the higher slaughtering weight, the higher reference carcass incidence and hind leg percentage. These favourable results encouraged this kind of rearing system characterized also by lower investment costs.

Key words: Rabbit, Rearing system, Outdoor, Performance.

INTRODUCTION - The growing interest in obtaining meat from less intensive alternative rearing systems, has led to the implementation of “alternative housing systems” in rabbit: for these reasons, different “natural housing systems” have been studied (Paci et al. 1999; Finzi, 2000; Verga, 2000; Dal Bosco et al. 2003; Paci et al., 2004; Paci et al., 2005). The intensive rearing systems use commercial hybrids derived from selection programmes aimed at a rapid growth rate, high metabolism and, consequently, high energy requirements; thus these genotypes have a reduced capacity to cope with certain environments due to a decreased immune-competence and increased susceptibility to environmental stress; for these reasons they are usually reared in standard conditions. The alternative rearing system requires breeds/populations characterized by a slow growth rate, which can adapt to various environments, leading to favourable productive performance; in fact, the interaction between genotype, rearing system and group size and density may affect the animals’ welfare and production both favourably and unfavourably. In recent years studies carried out on a rabbit population with a slow growth rate, showed their good productive performance, rusticity and ability to cope with different rearing systems, both organic and intensive (Paci et al. 2004; Lambertini et al. 2006). The aim of the research was to test the effect of floor colony-cage in outdoor pen on the productive performance and the carcass characteristics of a rabbit local breed/population characterized by slow growing.

MATERIAL AND METHODS - 76 rabbits were weaned at 35 days of age, at an average live weight of 840g; all the animals received a pharmacologic prophylactic treatment for coccidiosis for 5 days. At 42 d of age the rabbits were immunized against MEV and Mixomatosis. In this period, till the start of experimental trial, at 57d of age, the rabbits were reared in cages, in a forced ventilated rabbitry, at the density of 14 animals/m². At the start of the trial, during the winter, a sample of 48 rabbits female was divided into two groups: Indoor group, housed in 7 colony cages indoors at the density of 14 animals/m² and Outdoor group, in 3 wire net floor colony cages (cm 100x150x76h) in outdoor pen in a wooded area, at the density of 5 animals/m². The floor colony cages were located on wheat straw litter, restored with fresh litter every week and were equipped with 4 feeders (20cm length) and with 4 nipple drinkers. The animals were fed a complete feed and ad libitum alfa-alfa hay. Individual live weight and cage feed consumption were checked every week and feed conversion ratio was calculated. At 103 ± 2 days old a sample of the animals (Indoor: 12 animals; Outdoors: 12 animals) was slaughtered according to WRSA Commission (Blasco and Ouhayoun, 1993) and
carcass traits were recorded. All data were analysed by ANOVA; slaughtering parameters were analysed as weight, but they are expressed in percentage (SAS, 1995).

RESULTS AND CONCLUSIONS - During the experiment, five rabbits died in the Indoor group while only one rabbit died in the Outdoor group. The productive performance of experimental period are reported in Table 1. The growth performance differed between groups; the Outdoor group showed the highest live weight and the best daily weight gain, together with an higher feed intake ($P \leq 0.01$). The great difference between groups is probably due to the fact that animals reared indoors received feed restriction for the onset of digestive disorders, that were the major cause of the morbility and mortality previously pointed out. A similar condition of digestive disorders happened even in the Outdoor group, but the rabbits overcame this syndrome without any negative influence on productive performance.

Table 1. Productive performance.

|                | Indoor | s.e.  | Outdoor | s.e.  |
|----------------|--------|-------|---------|-------|
| Rabbits n     | 12     | 26    | 12      | 22    |
| Live weight (57 d) g | 1235 | 37.86 | 1311 | 41.16 |
| Rabbits n     | 21     | 21    |         |       |
| Live weight (103 d) g | 1997B | 56.10 | 2506A | 56.10 |
| Daily weight gain g/d  | 16.5B  | 1.25  | 26.0A | 1.25  |
| Cages n       | 7      | 3     |         |       |
| Feed intake:  |        |       |         |       |
| Complete feed g/d | 72.8B | 5.30  | 117.3A | 8.66  |
| Alfa-alfa hay g/d | 17.2B | 2.27  | 33.3A  | 3.71  |
| Total g/d     | 90.0B  | 7.19  | 150.6A | 11.74 |
| Feed conversion efficiency | 5.5  | 0.15  | 5.8   | 0.24  |

On the row: A, B: $P \leq 0.01$.

Slaughtering data are reported in Table 2: as expected, slaughtering weight was higher in Outdoor group. The same group showed the higher skin percentage, probably due to the environmental rearing conditions, and conse-

Table 2. Slaughtering data.

|                | Indoor | s.e.  | Outdoor | s.e.  |
|----------------|--------|-------|---------|-------|
| Rabbits n     | 12     | 12    |         |       |
| Slaughtering weight g | 2194B | 52.91 | 2428A | 74.74 |
| Skin %        | 15.5B  | 0.22  | 17.4A  | 0.35  |
| Full gastrointesinal tract % | 19.9  | 0.34  | 19.9   | 0.35  |
| Chilled carcass % | 58.5a | 0.54  | 57.8b  | 0.51  |
| Drip loss %   | 4.7A   | 0.25  | 3.5B   | 0.21  |
| Head %        | 9.9a   | 0.24  | 9.0b   | 0.14  |
| Liver %       | 5.4A   | 0.22  | 3.9B   | 0.12  |
| Reference carcass % | 81.9B | 0.35  | 84.0A  | 0.31  |
| Loin %        | 24.2   | 0.35  | 24.7   | 0.28  |
| Hind leg %    | 35.1b  | 0.25  | 35.3a  | 0.40  |
| Meat to bone ratio | 4.3   | 0.12  | 4.3    | 0.15  |

On the row: A, B: $P \leq 0.01$; a, b: $P \leq 0.05$. 

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quently a lower chilled carcass percentage. The significantly lower drip loss observed in Outdoor rabbits showed the good state of fattening reached although the variable environmental conditions; moreover the lower head and liver percentages determined a higher reference carcass incidence.

The hind leg percentage of Outdoor rabbits was statistically higher, probably due to the locomotor activity that increased intensively the development of the carcass hind part, according to the findings of other authors (Xiccato et al., 1999; Dal Bosco et al., 2000; 2002).

In conclusion, compared to the Indoor group, the Outdoor rabbits achieve a higher live weight at the same age and showed better health condition probably in relation to the space available and thus the locomotor activity, that plays a positive role in the control of digestive function. The higher feed consumption related to an unfavourable feed conversion efficiency of the Outdoor group, may increase the rearing costs; nevertheless the lower mortality, the higher live weight, the higher reference carcass and hind leg percentage represented favourable results that encouraged this kind of rearing system characterized also by lower investment costs.

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