MORPHOLOGY RELATED WELFARE INDEXES IN PURE BREED FANCY RABBITS

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ABSTRACT

The aim of this research was to evaluate fancy rabbits welfare conditions through the analysis of morphology related indexes: Body Condition Score (BCS), Pet Size O meter (PSOM), Footpad Injuries (FI). 172 (93 males; 79 females) adult (age ≥ 6 months) pure breed (14 breeds) pedigree rabbits were sampled, animal were kept in standard environmental condition (2 rabbitries) and fed the same diet (ME 2400 kcal/kg; CP 15%). Rabbits were singularly cage housed with a slatted plastic floor (80*50*40 cm: W*D*H) and a solid floor with straw litter for giant breeds (120*80*60 cm: W*D*H) in both rabbitries. Animal were singularly analyzed: identification, sexing, weighing, scoring for BCS according to the method of Cardinali et al., 2008 (0-4: very skinny-fat), scoring for PSOM according to Pet Food Manufactures Association (PFMA) method (1-5: very thin-obese), scoring for FI according to Rommers and Meijrhof, 1996 method (0-3: coated foot sole-horny skin +deep crackers > 2.5 cm). SAS® statistic package 9.2 version was applied to data analysis: measurements and scoring were analysed using the procedures means and npar1way procedure (ANOVA, Kruskal-Wallis), breed, breed*sex, size (4 sizes according to Italian Standard of Purebred Rabbits: Heavy (H), Medium (M), Light (L), Dwarf (D)) were considered as sources of variance. Recorded animal weight is in accordance to the standard one, the effect of Breed is significant, giant breeds are the closest to breed standard weight, even if the standard does not divide animal weight by sex: in many breeds females were heavier than male in D and H breeds in particular. Very good BCS (3 were recorded for all the analysed rabbits), Breed significantly influence BCS this is due to the particular morphological traits of one of the analysed breeds the Hare an extreme dolichomorphic rabbit, no differences in breed*sex on BCS were recorded. All the rabbits' BCS ranged between 3 and 4, size significantly influence BCS: H and M breeds showed the highest BCS values M breeds values are influenced by the presence of the Hare breed, D breeds are the lowest group due to weight control and restricted feeding for show purpose. PSOM varied significantly according to Breed*sex variance in one breed in particular (Lynx) female are clearly fatter than males this could be due to feed characteristics that should be less energetic for light breeds, two meat-type breeds (Wien-Blue and Fauve de Bourgogne) showed high PSOM scores underlining their feed conversion ability. Statistically significant differences were recorded in FI, rabbit size influence the presence of injuries, with H breeds being the more affected even if reared on litter solid floor.

Key words: fancy breeds welfare, BCS, PSOM, Footpad Injuries, rabbit breeds

INTRODUCTION

Not all rabbit races are useful for intensive farming and consequently pure breeds have been relegated to amateur breeding or even as "hobbyist". The amateur breeding is a small farming where the farmer is dedicated "part time" to a limited number of races (Gamberini, 2009). The genetic amateur tends to fix the genotypes essentially morphological inside official limits established with arbitrary criteria referred to the official standard (Cerolini *et al.,* 2008).

The European Commission has required the development of measurable indicators of animal welfare, to support the scientific basis for Community legislation in this field. Therefore, EFSA is currently engaged in the innovative task of developing a series of scientifically measurable animal welfare indicators to include in its future recommendations and conclusions (www.efsa.europa.eu/en/topic/ animalwelfare.htm). The main welfare indicators used for livestock may also be used for the rabbit and have been defined by many authors (Hoy and Verga, 2006)

The method of welfare assessment increasingly common in the breeding of most farm animals (cows, horses and hens), and recently even rabbit does (Edmonson et al., 1989, Henneke, 1985; Gregory and Robins, 1998; Bonanno *et al.,* 2008; www.pmfa.org.uk) is the Body Condition Score. This method is used to ascertain, as well as to the adequacy of the food ration, the state of health of individual animals and especially to determine the physical condition of the same during the operations of management. The rating assigned to quantify in numerical terms the biological variation that has been identified (Gregory and Robins, 1998).

The aim of this research was to evaluate fancy rabbits welfare conditions through the analysis of morphology related indexes: Body Condition Score (BCS), Pet Size O meter (PSOM), Footpad Injuries (FI)

MATERIALS AND METHODS

Animals and experimental design

172 (93 males; 79 females) adult (age ≥ 6 months) pure breed (14 breeds) pedigree rabbits were sampled. Animals were reared in two different fancy rabbitry located in Northern Italy.

Animal were kept in standard environmental condition (2 rabbitries) and fed the same diet (ME 2400 Kcal/kg; CP 15%). Rabbits were singularly cage housed with a slatted plastic floor (80*50*40 cm: W*D*H) and a solid floor with straw litter for giant breeds (120*80*60 cm: W*D*H) in both rabbitries.

Morphological measurements and scoring

Animals were singularly analyzed: identification, sexing, weighing, scoring for BCS according to the method of Cardinali *et al.,* 2008 (0-4: very skinny-fat), scoring for PSOM according to Pet Food Manufactures Association (PFMA) method (1-5: very thin to obese), scoring for FI according to Rommers and Meijrhof, 1996 method (0-3: coated footsole-horny skin +deep crackers > 2.5 cm).

BCS was evaluated by manual palpation of the loin region, of the rump region and of the hind leg muscle fullness always including both the bone process and the muscle fullness as reported in Table 1.

Table 1: Body condition score classification

Characteristics	score
Pointed loin and rump regions bone protrusions, scarce muscle fullness	0
Pronounced loin and rump regions bone protrusions, poor muscle fullness	1
Pronounced but rounded loin and rump regions bone protrusions, poor muscle fullness	2
Hand pressure to feel hip bones spine and ribs, fat presence	3
Very difficult to feel hip bones and spine, belly and fat.	4

(Cardinali *et al*., 2008, modified).

PSOM was evaluated by touch according to the scoring system reported in Table 2

Table 2: PSOM classification

Characteristics	score
Hip bones, ribs and spine are very sharp to the touch, no fat cover and loss of muscle, rump area curves in	1
Hip bones, ribs and spine easily felt at touch, very little fat cover loss of muscle, flat rump area	2
Hip bones, ribs and spine easily felt at touch but they are rounded no abdominal bulge	3
Hip bones, ribs and spine can be felt at touch with a pressure, fat layers, rounded croup	4
Hip bones and spine hardly felt at touch, ribs era no felt, obvious fat padding at abdominal level, rump bulges out	5

(PFMA, modified).

The last welfare parameter to be analyzed were the footpad injuries, the applied method was described in 1996 by Rommers & Meijrhof and follows the scoring system reported in table 3

Table 3: Footpad Injuries classification

Characteristics	score
No horny skin is visible, the foot sole is coated	0
Visible horny skin, width ≤ 1cm	1
Horny skin often cracked, width 1-2.5 cm	2
Horny skin with deep crackers, width ≥ 2.5cm with or without open wound	\\

(Rommers & Meijrhof, 1996, modified)

Statistical Analysis

SAS® statistic package 9.2 version was applied to data analysis: measurements and scoring were analysed using the procedures means and npar1way procedure (ANOVA, Kruskal-Wallis), breed, breed*sex, size. Four sizes according to Italian Standard of Purebred Rabbits: Heavy (H), Medium (M), Light (L), Dwarf (D)) were considered as sources of variance.

RESULTS AND DISCUSSION

Recorded animal weight is in accordance to the standard one, the effect of Breed is significant, giant breeds are the closest to breed standard weight, even if the standard does not divide animal weight by sex: in many breeds females were heavier than male in D and H breeds in particular.

Very good BCS (3 were recorded for all the analysed rabbits, Breed significantly influence BCS this is due to the particular morphological traits of one of the analysed breeds the Hare an extreme dolichomorphic rabbit, no differences in breed*sex on BCS were recorded. All the rabbits' BCS ranged between 3 and 4, size significantly influence BCS: H and M breeds showed the highest BCS values M breeds values are influenced by the presence of the Hare breed, D breeds are the lowest group due to weight control and restricted feeding for show purpose. (Figure 1).

PSOM varied significantly according to Breed*sex variance in one breed in particular (Lynx) female are clearly fatter than males this could be due to feed characteristics that should be less energetic for light breeds, two meat-type breeds (Wien-Blue and Fauve de Bourgogne) showed high PSOM scores underlining their feed conversion ability. (Figure 2)

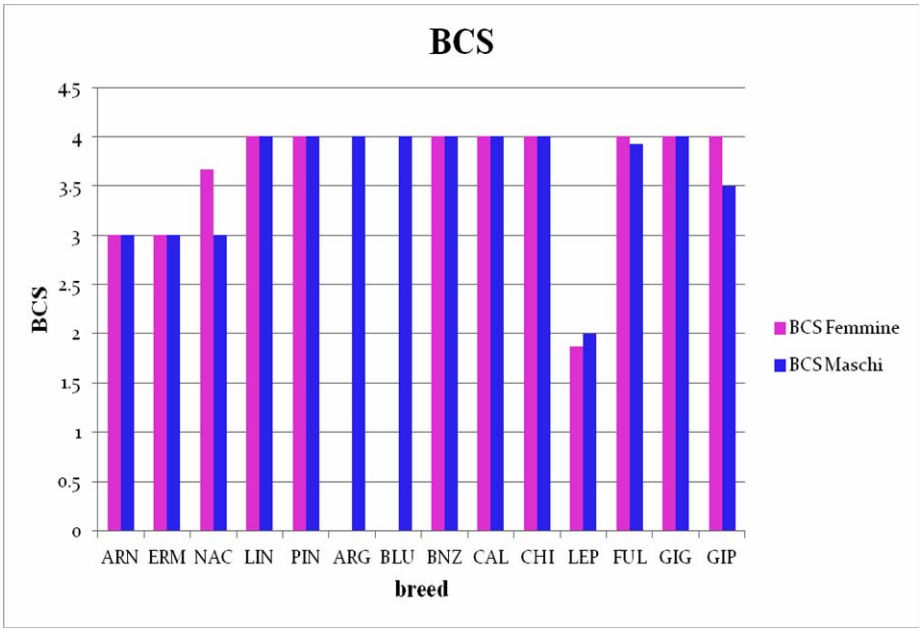

Figure 1: Effect of rabbit breed on BCS

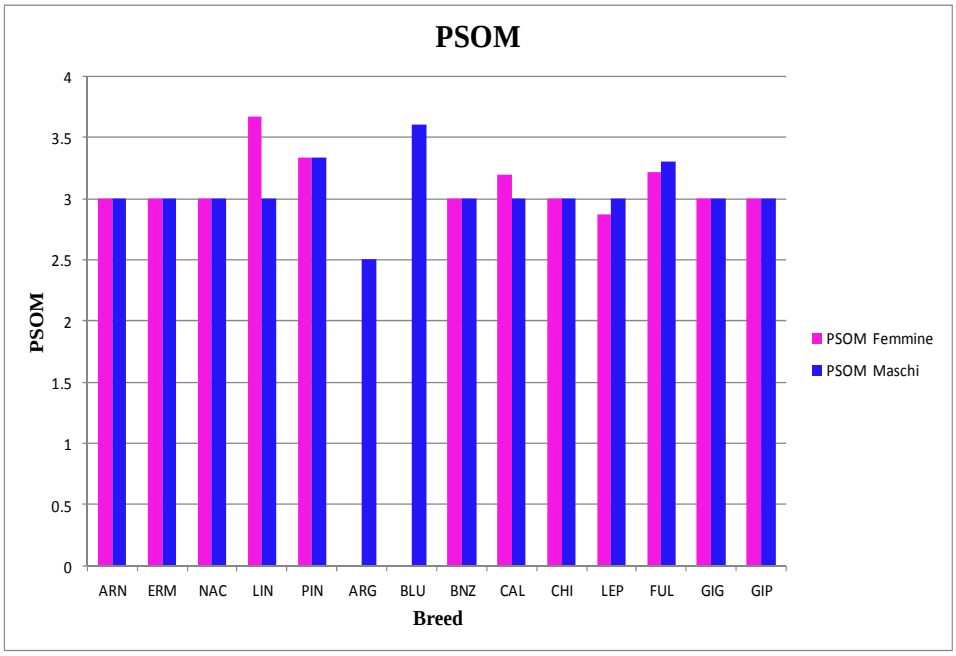

Figure 2: Effect of rabbit breed on PSOM

Statistically significant differences were recorded in FI, rabbit size influence the presence of injuries, with H breeds being the more affected even if reared on litter solid floor (Rommers and Meijerhof, 1996; De Jong et al., 2008); no one of the analysed animal anyway showed wound at footpad level.

CONCLUSIONS

A confirmation of the standard weight was given. High BCS results underline the high welfare standard of the two studied rabbitries, PSOM and FI scoring results corroborate the effectiveness of the diet fed to the animal and the management procedure both for growing and reproduction period. (Verga et al., 2006)

A good food conversion ability was recorded in Wien Blue and Fauve de Bourgogne rabbit breeds. Used facilities and housing system are very good in maintaining rabbits in healthy condition even if a lot of work is required in solid floor with litter cage management. (Verga et al., 2007). FI results show that even if Giant heavy breeds are particularly subject to footpad lesions a good housing system and precise care can avoid footpad injuries even in 2-4 years old rabbits. BCS, PSOM and FI can be considered effective methods to asses rabbit welfare both in meat production and in fancy breeds per production systems.

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REFERENCES

Bonanno A., Mazza F., Di Grigoli A., Alicata M.L. 2008. Body condition score and related productive responses in rabbit does. *In: 9th World Rabbit Congress, June 10-13, Verona, Italia.*

Cardinali R., Dal Bosco A., Bonanno A., Di Grigoli A., Rebollar P.G., Lorenzo P.L., Castellini C. 2008. Connection between body condition score, chemical characteristics of body and reproductive traits of rabbit does. *Livestock Science 116 (2008): 209–215.*

Cerolini S., Marzoni Fecia di Cossato M., Romboli I., Schiavone A., Zaniboni L. 2008. Avicoltura e coniglicoltura. *Le Point Veterinaire Italie.*

Dalle Zotte A., Princz Z ., Matics Z., Gerencse´r Z., Metzger S., Szendro Z. 2009. Rabbit preference for cages and pens with or without mirrors. *Applied Animal Behaviour Science 116 (2009): 273-278.*

De Jong I.C., Reimert H., Rommers J.M. 2008. Effect of floor type on footpad injuries in does: a pilot study. *In: 9th World Rabbit Congress, June 10-13, Verona, Italia.*

Edmonson A. J., Lean I. J., Weaver L. D., Farver T., Webster G. 1989. A body condition scoring chart for Holstein Dairy Cows. *Journal of dairy science 72: 68-78.*

EFSA (2005). The Impact of the current housing and husbandry systems on the health and welfare of farmed domestic rabbits. *The EFSA Journal 2005 267: 1-31.*

Gamberini A., 2009. Coniglicoltura. L'alleviamento professionale del coniglio da carne e da affeczione. Edagricole, Bologna.

Gregory N.G., Robins J.K. 1998. Body condition scoring system for layer hens. *New Zealand Journal of Agricultural Research, Vol. 41: 555-559*

Henneke D. R. 1985. A condition score system for horses. *Equine practice 7: 13-15*

Hoy St., Verga M. 2006. Welfare indicators. *In: Maertens L., Coudert P. Recent advances in rabbit sciences. ILVO Melle, Belgium, pp 71-74.*

Rommers J.M., Meijerhof R. 1996. The effect of different floor types on footpad injuries of rabbit does. *In: 6th World Rabbit Congress, July, Toulouse, France, Vol. 2, 431-436.*

SAS 2011. User's Guide Statistics. Version 9.2.Inst. *Inc., Cary NC, USA.*

Verga M., Luzi F., Szendro Zs. 2006. Behavior of growing rabbits. *In: Maertens L., Coudert P. (Eds.), Recent Advances in Rabbit Sciences. ILVO, pp. 91-97.*

Verga M., Luzi F., Carenzi C., 2007. Effects of husbandry and management systems on physiology and behaviour of farmed and laboratory rabbits. *Hormones and Behavior 52,) 122–129.*

PFMA The Pet Food Manufacturers Association. http://www.pfma.org.uk..