

PERCEPTIONS AMONG UNIVERSITY STUDENTS IN SEVILLE (SPAIN) OF THE RABBIT AS LIVESTOCK AND AS A COMPANION ANIMAL

González-Redondo P. and Contreras-Chacón G.M.

Departamento de Ciencias Agroforestales, Escuela Técnica Superior de Ingeniería Agronómica,
Universidad de Sevilla, 41013 SEVILLA, Spain.

ABSTRACT: The rabbit has various utilities and roles, mainly as a meat-producing animal, game species, companion animal, laboratory animal or pest. Among these roles, rabbit breeding for meat has traditionally prevailed in the Mediterranean countries. However, in recent decades the practice of keeping this species as a companion animal has been on the rise; a factor that could be changing public perception of the rabbit. A survey of 492 university students from Seville, Andalusia, Spain, was conducted to determine young people's perceptions of the rabbit as livestock and as a companion species. The rabbit received the lowest score when regarded as livestock compared to the pig, cow, goat, sheep and hen. Regarding companion animals, young Spanish people preferred the dog and cat. The rabbit and the hamster were rated at the same level as a pet, while the budgerigar was rated lower than these 2 mammals by women and higher by men. The goldfish occupied the last position among the pet species in the women's perceptions. With regard to the perception of various rabbit breeds and varieties when evaluated as pets, it was found that the pet Lop Dwarf, Netherland Dwarf, Angora and Lionhead breeds were rated higher than a typical meat breed (New Zealand White) and than the wild rabbit. The gender of the young people surveyed influenced their perception of the rabbit. Women rated the rabbit lower as livestock while they rated it higher as a pet, also rating the pet rabbit breeds higher than men did. It is proposed that, in keeping with the rabbit's attributes related to its cuteness, conceptually linked with pets, young Andalusian people's perception of the rabbit is ambivalent and this perception might partly be shifting from perceiving it as livestock to regarding it as a pet.

Key Words: rabbit, wild rabbit, *Oryctolagus cuniculus*, livestock, pet, attitudes.

INTRODUCTION

In the Mediterranean area rabbit has traditionally been regarded a livestock species (Lebas *et al.*, 1996), and its meat is characteristic of the Mediterranean diet (Barroso and Grande, 2003) because this area includes the main rabbit meat-breeding countries (Lebas *et al.*, 1996). In recent decades, however, the role of the rabbit as a companion animal has been on the rise (AVMA, 2002, 2007; FACCO/SOFRES, 2008), as demonstrated by the significant number of farms specialising in raising pet rabbits (e.g. in Spain: MARM, 2010b) and by the related feed and equipment producing industries catering for their needs (Ricci *et al.*, 2010). Concurrently, in some Mediterranean countries a decrease in the per-capita consumption of rabbit meat in recent years has been noticed, particularly among younger segments of the population (Lebas *et al.*, 1996; Dalle Zotte, 2002; MAPA, 2007). The diffusion of the rabbit as a pet contributes to the ambivalence of this species among different utilities (Wilkinson and Fitzgerald, 1997; Hoffman *et al.*, 2005) and may be helping to change public perception of this animal, especially among young people whose familiarity with the rural world and animal production is on the

Correspondence: P. González-Redondo, pedro@us.es. Received April 2011 - Accepted June 2012
<http://dx.doi.org/10.4995/wrs.2012.1147>

wane (Marshall *et al.*, 1998). The valuation of the rabbit as a species useful to man has been only partially addressed, mainly concerning the consumption of its meat (e.g., Dalle Zotte, 2002; Hoffman *et al.*, 2005; González-Redondo *et al.*, 2010b) and its role as a game species (Hoffman *et al.*, 2005), a pest species (Wilkinson and Fitzgerald, 1997), a biomedical research species (Hagelin *et al.*, 2002) and as a species used in teaching livestock husbandry (González-Redondo *et al.*, 2010a). However, several issues still remain to be investigated. For these reasons, the present work focused on evaluating young people's perception of the rabbit as livestock and as a companion species in comparison with other species commonly used as livestock or kept as pets. It also aimed to compare the degree of attractiveness of various breeds and varieties of rabbits when considered as pets.

MATERIALS AND METHODS

Participants

The participants in the study were 492 undergraduate students (244 men and 248 women) aged 23.55 ± 0.12 years old (mean \pm SE; range: 18 to 30 yr old). The students were randomly and voluntarily recruited in the spring of 2008 from the University of Seville and the University of Pablo de Olavide, Seville, Spain. The sample consisted of students from all faculties of these universities, including sciences and humanities degrees. About 93% of the students of these universities came from the Autonomous Community of Andalusia (Universidad de Sevilla, 2008; Universidad Pablo de Olavide, 2008). The socioeconomic status of the population in the region is characterised by a per-capita income of €17 250, playing agriculture, livestock and fisheries a relative important role in the Andalusian economy (Junta de Andalucía, 2009). Informed consent was obtained from all participants.

Stimuli

Three sets of colour photographs were prepared: the first set comprised 6 livestock species: pig (*Sus scrofa*, Large White breed), cow (*Bos taurus*, Holstein-Friesian breed), sheep (*Ovis aries*, Merino breed), goat (*Capra hircus*, Saanen breed), hen (*Gallus gallus*, Brown line) and rabbit (*Oryctolagus cuniculus*, New Zealand White breed). This set aimed to evaluate the participants' perceptions of these species when regarded as livestock, through the instruction: "Rate the degree to which you consider each of the 6 species as livestock". Eumetric breeds were chosen to avoid strong differentiation among species. The New Zealand White was chosen as the breed of rabbit to be included in this set because it is the most widespread among the meat rabbit breeds.

The second set included six companion species: dog (*Canis familiaris*, English Setter breed), cat (*Felis catus*, Japanese Bobtail breed), golden hamster (*Cricetus auratus*), budgerigar (*Melopsittacus undulatus*), goldfish (*Carassius auratus*) and rabbit (*O. cuniculus*, Netherland Dwarf breed). This set aimed to evaluate the subjects' perceptions of these species when regarded as companion animals, through the instruction: "Rate the degree to which you consider each of the 6 species as a pet." To avoid strong differentiation among species, all the breeds included were eumetric, amply distributed and with typical pigmentations. The Netherland Dwarf was chosen as the breed of rabbit to be included in this set because it is one the most typical pet rabbit breeds.

The third set comprised 6 breed and varieties of rabbits: Lop Dwarf, Netherland Dwarf, Angora, Lionhead (all of these being pet types), New Zealand White (meat rabbit) and wild rabbit. The

domestic breeds included in this set conformed to the standards described by the British Rabbit Council (2008). This set aimed to evaluate the participants' perceptions of these rabbit breeds and varieties when regarded as companion animals, through the instruction: "Rate the degree to which you consider each of the 6 breeds and varieties as a pet".

Each photograph was printed at 7.5×8.0 cm in size. The relative size of the animals in the photographs was controlled to the highest possible degree.

Procedure

The participants were interviewed individually and anonymously by the same interviewer. Each of the 3 sets of stimuli was independently handed out to the participants, who rated straightaway each photograph. The oral answers were registered by the interviewer. The order of the photographs in each set was randomly counterbalanced across participants by shuffling them.

Scoring

For each set, the participants were instructed to rate the photographs according to a Likert-type scale (1: strongly disagree; 2: disagree; 3: nor agree nor disagree; 4: agree; 5: strongly agree) with regard to the aim of the set.

Statistical analysis

For each set of photographs, data were analysed as a factorial experiment of completely randomised design by using an univariate General Linear Model (GLM) including 2 fixed effects: the breed or species (6 levels) and participant gender (male or female), as well as their interaction. Tukey's test was used to compare scores among the photographs within each set. Mean comparisons between scores of each photograph according to the gender of the participant were done using a Student's *t*-test. The statistical analyses were performed using SPSS v.15.0 (SPSS Inc., 2006) software.

RESULTS AND DISCUSSION

Rabbit as livestock species

Table 1 shows the average scores that respondents attributed to the 6 species when regarded as livestock. The rabbit received the lowest score when compared with the pig, cow, goat, sheep and hen. This result highlights the fact that the rabbit is perceived as livestock to a lesser extent by young Andalusian people than other common livestock species. Moreover, the order of preference assigned to these species when evaluated as livestock fit well with the order of their importance according to the animal production statistics in Spain. Indeed, in Spain rabbit meat is the fifth most produced (MARM, 2010a) and consumed (MAPA, 2007), following pork, chicken, beef and ovine/caprine meats. The results of this study, in terms of preference for the studied species when regarded as livestock, also agree with the results of another research work carried out among university students from the same region as the present study, which indicated a lower preference for rabbit meat compared to meats of the abovementioned species (González-Redondo *et al.*, 2010b).

The fact that, unlike the rabbit, the other livestock species tested in this research are rarely kept as pets (AVMA, 2007), could also contribute to this perception. The only relevant exception might be the potbellied pig which, since the 1980s, has become a desirable pet in some countries

Table 1: Average scores of the species when considered as livestock (the number of interviewed subjects appears in brackets).

| | Men (244) | Women (248) | <i>P</i> -value between genders |
|------------------|-------------------|-------------------|---------------------------------|
| Species | | | |
| Cow | 4.94 ^a | 4.92 ^a | 0.239 |
| Pig | 4.93 ^a | 4.87 ^a | 0.090 |
| Sheep | 4.69 ^b | 4.65 ^b | 0.489 |
| Hen | 4.64 ^b | 4.40 ^c | <0.001 |
| Goat | 4.51 ^b | 4.44 ^c | 0.340 |
| Rabbit | 3.89 ^c | 3.54 ^d | 0.002 |
| RSD ¹ | | 0.74 | |
| <i>P</i> -values | | | |
| Species | | <0.001 | |
| Gender | | <0.001 | |
| Species×Gender | | 0.002 | |

Means within a column with a different superscript differ at $P < 0.05$.

¹RSD=Residual standard deviation.

such as the United States of America (Braun and Casteel, 1993). This pet pig, however, is not widespread in Spain. Indeed, the pig received the highest rating as a livestock species in the present study.

Compared to other livestock species, the rabbit is perceived by the public in a clearly more ambivalent way in their opposing roles as livestock or pet. Thus, in a study of prospective Mexican rabbit farmers, and although in general the participants assumed that the rabbit is a livestock meat species, 43% of them described the live rabbit as a “cute” animal, 43% of them perceived it as “nice” and 34% of them like the idea of observing it alive (Sanvicente *et al.*, 2009). In the same vein, in South Africa a study conducted to investigate potential consumers’ associations with rabbit meat (Hoffman *et al.*, 2005), among the general concepts immediately associated with rabbit meat, associating rabbits with pets (“cute little bunnies”) rather than as a meat-producing animals were the most common (19%). Regarding the agricultural products that South African people associated with rabbit, the first association was with “meat” (37%). However, after “meat” the association with “pets” came a close second (32%). In fact, Hoffman *et al.* (2005) noted that, since the rabbits are usually farmed for the pet industry (e.g. in Spain: MARM, 2010b), this association of rabbits as an agricultural product is not out of place. This fits well with the results of the present study in which, although the rabbit was rated relatively high as livestock (overall mean of 3.71 out of a maximum of 5; Table 1), it was ranked lower than the other livestock species.

Rabbits as pets

Table 2 shows the scores attributed by the students to the 6 species when regarded as companion animals. As expected, the dog and the cat, in this order, were more strongly perceived as pets in keeping with the fact that both are the most widespread pet species in many countries including Spain (AVMA, 2007; FACCO/SOFRES, 2008; PROPET, 2008; PFMA, 2010). A second group of animals valued as pets was consisted of the budgerigar, rabbit and hamster, all 3 being rated at a similar level by women, while men rated higher the budgerigar than the rabbit and hamster. Although the fish was scored by men at a similar level as the rabbit and the hamster, as expected the fish occupied the last position for women, because fish ownership originates a weak human-

Table 2: Average scores of the species when considered as a pet (the number of interviewed subjects appears in brackets).

| | Men (244) | Women (248) | P-value between genders |
|------------------|-------------------|--------------------|-------------------------|
| Species | | | |
| Dog | 4.92 ^a | 4.83 ^a | 0.069 |
| Cat | 4.61 ^b | 4.67 ^a | 0.414 |
| Budgerigar | 4.31 ^c | 4.03 ^c | 0.005 |
| Rabbit | 3.84 ^d | 4.30 ^b | <0.001 |
| Hamster | 3.82 ^d | 4.28 ^{bc} | <0.001 |
| Goldfish | 3.89 ^d | 3.76 ^d | 0.239 |
| RSD ¹ | 1.02 | | |
| P-values | | | |
| Species | <0.001 | | |
| Gender | 0.029 | | |
| Species×Gender | <0.001 | | |

Means within a column with a different superscript differ at $P < 0.05$.

¹RSD=Residual standard deviation.

animal bond and brings relatively more limited benefits to the owner than does the ownership of other types of pets (Bryant, 1990). The results obtained are consistent with the presence of the respective species in the households in many countries (AVMA, 2007; FACCO/SOFRES, 2008; PFMA, 2010). For example, the third most popular pet mammal species in the United Kingdom (UK) is the rabbit (McBride *et al.*, 2004; PFMA, 2010); in the USA it holds the ranks fourth among pet mammals, after the dog, cat and horse (AVMA, 2007). The same was also true among Norwegian children and adolescents (Bjerke *et al.*, 1998).

The rabbit was scored at a similar level as the hamster, probably because both are furry animals with which youths seem more involved. In fact, in a study about the role of pets for children, Salomon (1981) found that rabbits and hamsters, as furry animals, are important, with most children either owning one or expressing a desire to have one. The budgerigar was perceived as a pet by men in higher degree than the rabbit and hamster because it is an attractive bird species that easily promotes the establishment of human-animal interactions and positive changes in people's attitudes (Brodie and Biley, 1999).

The relatively high perception of the rabbit as a pet in comparison with other pet species, particularly among women, could be explained on the basis of its personality traits. Gosling and Bonnenburg (1998) studied personality traits of several pet species and found that the rabbit is regarded by their owners as a more complex, organised, practical, prompt, quiet, relaxed, shy, systematic, untalkative and warm, and a less anxious, careless, cold, deep, envious, extroverted, fretful, harsh, imaginative, jealous, rude, sympathetic, temperamental, touchy, uncreative, unintelligent, unkind and verbal animal than the dog and the cat. These personality traits make the rabbit a common, popular pet that is often seen as easy to maintain (McBride *et al.*, 2004).

Rabbit breeds and varieties preferred as pets

Table 3 shows the scores that respondents gave to the 6 rabbit breeds and varieties when regarded as pets. The 4 pet breeds (Lop Dwarf, Netherland Dwarf, Angora and Lionhead) were clearly rated higher than the meat breed (New Zealand White) and the wild variety. This could agree with the fact that these pet breeds have a cute and furry appearance (Verhoef-Verhallen, 2002; British Rabbit Council, 2008).

Table 3: Average scores of the rabbit breed and varieties when considered as a pet (the number of interviewed subjects appears in brackets).

| | Men (244) | Women (248) | <i>P</i> -value between genders |
|----------------------------|--------------------|--------------------|---------------------------------|
| Rabbit breed and varieties | | | |
| Lop Dwarf | 4.11 ^a | 4.34 ^a | 0.006 |
| Netherland Dwarf | 3.90 ^{ab} | 4.15 ^{ab} | 0.006 |
| Angora | 3.77 ^{bc} | 4.23 ^{ab} | <0.001 |
| Lionhead | 3.63 ^{bc} | 4.23 ^{bc} | 0.001 |
| New Zealand White | 3.54 ^c | 3.71 ^c | 0.108 |
| Wild Rabbit | 2.26 ^d | 2.37 ^d | 0.274 |
| RSD ¹ | 1.07 | | |
| <i>P</i> -values | | | |
| Breed | <0.001 | | |
| Gender | <0.001 | | |
| Breed×Gender | 0.120 | | |

Means within a column with a different superscript differ at $P < 0.05$.

¹RSD=Residual standard deviation.

The order of preference for the 4 pet breeds, from highest to lowest scores, was as follows: Lop Dwarf, Netherland Dwarf, Angora and Lionhead, the latter 2 showing no difference between them. These results are essentially consistent with those of a survey among pet rabbit owners conducted in Spain inquiring about the breeds they kept. This survey showed that the most widespread are, in decreasing order, lop rabbits, various types of dwarf rabbits (e.g., Dwarf Hotot, Polish), Angora and Lyonhead (ANAC, 2011). Lop Dwarf is the favourite rabbit breed because their long, floppy ears make them look like puppies and thus cute (Walker, 2009). Dwarf type rabbits are very popular because their small size makes them easy to handle and to maintain in today's small apartments (Verhoef-Verhallen, 2002). Angora and Lionhead breeds have a similar appearance, in the sense that both are long-haired (British Rabbit Council, 2008), and this might have contributed to both breeds receiving similar scores from the students in the present study.

Despite the higher degree of ambivalence showed in other countries by younger people in their views of the wild rabbit variety, intended as the coexistence of opposing attitudes toward its alternative roles or utilities (pest, useful resource, etc.) (Wilkinson and Fitzgerald, 1997), in the present research it was scored lower as a pet when compared with all the domestic breeds. Thus, in some countries it is regarded as a pest (Wilkinson and Fitzgerald, 1997) while in Spain it is a common game species (Virgós *et al.*, 2007) whose meat is also marketed and widely appreciated, particularly in the region where this research was carried out (González-Redondo *et al.*, 2010b).

Gender influences on how rabbit is perceived

The gender of the young people surveyed influenced their perception of the rabbit as a species useful to man (Tables 1, 2 and 3). Compared to other livestock species, males regarded the rabbit as a livestock species (Table 1) more strongly than women ($P < 0.01$). Consistent with these findings, women perceived the rabbit more as a companion animal than men ($P < 0.001$) when compared with other species commonly kept as pets (Table 2). It was also found that women scored all the pet rabbit breeds (Lop Dwarf, Netherland Dwarf, Angora and Lionhead) higher than men ($P < 0.01$). In contrast, no gender effect was found for the New Zealand White breed and wild rabbit perceptions when regarded as pets (Table 3), probably because neither is a pet variety. These results agree with the well-known fact that women are more prone to express affection

for animals; to be more ethically motivated in their treatment of animals (Kendall *et al.*, 2006); to show weaker utility orientations to them (Serpell, 2004) and to display greater attachment to pets (Kellert, 1996) than men. In fact, in a study carried out among Norwegian children and adolescents, girls were more pet-orientated than boys (Bjerke *et al.*, 1998), as were the young women in the present study. Also women in New Zealand show more ambivalence than men in their views of the wild rabbits damaging the environment and crops because although recognised as a pest, they are also thought of as “furry” and “cute” (Wilkinson and Fitzgerald, 1997).

Conclusions: ambivalence of young people toward the rabbit

Public perception of the rabbit is affected by human attributes such as ethnicity (Hoffman *et al.*, 2005), age, gender, urban or rural habitat (Wilkinson and Fitzgerald, 1997) and others. This perception also differs among countries (Lebas *et al.*, 1996) due to the uneven distribution of the species and the public’s familiarity with the different utilities and roles of the rabbit as a meat-producing animal, game species, companion animal, laboratory animal or pest. In several countries, such as the UK and USA, the rabbit is regarded as a common but relatively unknown exotic pet species (McBride *et al.*, 2004; AVMA, 2007) and attitudes to this animal have changed markedly in the last two or three decades as a consequence of the increase in the household rabbit population (McBride *et al.*, 2004). In Spain, however, the rabbit has traditionally been regarded as mainly a meat-producing animal (Lebas *et al.*, 1996) or a game species (Virgós *et al.*, 2007) while its pet-oriented farming and presence in the pet shops is very recent, although rapidly increasing (MARM, 2010b). Therefore, the rabbit is perceived to a relatively high degree as a livestock species by young people, although in this category it was rated much lower than other farmed species (Table 1). Simultaneously, the rabbit was rated relatively highly by young people as a companion animal in comparison with other common pet species (Table 2), the pet breeds being considered in comparison to a typical meat breed and the wild variety (Table 3). These results are in keeping with the animal attributes reviewed by Serpell (2004) that are known to influence people’s affective responses towards them, in the sense that those perceived as “cute” (a close conceptual link with “pet”), as rabbits are commonly tagged (Hoffman *et al.*, 2005), tend to be preferred. Young Spanish people’s perception of the rabbit might seem to be ambivalent, with the 2 primary motivational determinants of attitudes labelled by Serpell (2004) as “affect” and “utility” coexisting. It would be interesting to undertake further research to study whether public perception of the rabbit is shifting from regarding it a livestock animal to a companion animal, and whether this potential change of attitude could be linked to a lower preference for rabbit meat compared to meats from other species among young Spanish people (González-Redondo *et al.*, 2010b).

Acknowledgements: The authors thank the students for their kindly participation in this research.

REFERENCES

- ANAC. 2011. ¿De qué raza, más o menos, es vuestro conejo? *Asociación Nacional de Amigos del Conejo, Barcelona, Spain.* www.anacweb.com/modules.php?name=Surveys&op=results&pollID=15&mode=&order=&thold= Accessed March 2011
- AVMA. 2002. US pet ownership and demographics sourcebook. *American Veterinary Medical Association, Schaumburg, USA.*
- AVMA. 2007. U.S. Pet ownership and demographics sourcebook. *American Veterinary Medical Association, Schaumburg, USA.*
- Barroso M., Grande I. 2003. Estructura de consumo en alimentación en las dietas atlántica y mediterránea. *Elect. J. Environ. Agric. Food Chem.*, 2: 416-421.
- Bjerke T., Ødegårdstuen T.S., Kaltenborn B.P. 1998. Attitudes toward animals among Norwegian children and adolescents: species preferences. *Anthrozoös*, 11: 227-235. doi:10.2752/089279398787000544

- Braun W.F. Jr., Casteel S.W. 1993. Potbellied pigs. Miniature porcine pets. *Vet. Clin. N. Am-Small*, 23: 1149-1177.
- British Rabbit Council. 2008. Breed standards. www.thebrc.org/standards.htm
- Brodie S.J., Biley F.C. 1999. An exploration of the potential benefits of pet-facilitated therapy. *J. Clin. Nurs.*, 8: 329-337. doi:10.1046/j.1365-2702.1999.00255.x
- Bryant B.K. 1990. The richness of the child-pet relationship: a consideration of both benefits and costs of pets to children. *Anthrozoös*, 3: 253-261. doi:10.2752/089279390787057469
- Dalle Zotte A. 2002. Perception of rabbit meat quality and major factors influencing the rabbit carcass and meat quality. *Livest. Prod. Sci.*, 75: 11-32. doi:10.1016/S0301-6226(01)00308-6
- FACCO/SOFRES. 2008. Enquête FACCO/TNS SOFRES 2008 sur le parc des animaux familiaux français. *Chambre Syndicale des Fabricants d'Aliments pour Chiens, Chats, Oiseaux et autres animaux familiaux*. Paris, France. www.facco.fr/-Population-animale- Accessed March 2011.
- González-Redondo P., Caravaca F.P., Castel J.M., Mena Y., Delgado-Pertíñez M., Fernández-Cabanás V.M. 2010a. Using live animals for teaching in animal sciences: students' attitudes to their learning process and animal welfare concern. *J. Anim. Vet. Adv.*, 9: 173-179. doi:10.3923/javaa.2010.173.179
- González-Redondo P., Mena Y., Fernández-Cabanás V.M. 2010b. Factors affecting rabbit meat consumption among Spanish university students. *Ecol. Food Nutr.*, 49: 298-315. doi:10.1080/03670244.2010.491053
- Gosling S.D., Bonnenburg A.V. 1998. An integrative approach to personality research in anthrozoology: ratings of six species of pets and their owners. *Anthrozoös*, 11: 148-156. doi:10.2752/089279398787000661
- Hagelin J., Johansson B., Hau J., Carlsson H.E. 2002. Influence of pet ownership on opinions towards the use of animals in biomedical research. *Anthrozoös*, 15: 251-257. <http://dx.doi.org/10.2752/089279302786992540>
- Hoffman L.C., Vosloo M.C., Nkhabulane P., Schutte D.W. 2005. Associations with rabbits and rabbit meat of three different ethnic groups in Stellenbosch, South Africa. *J. Fam. Ecol. Consum. Sci.*, 33: 63-72.
- Junta de Andalucía. 2009. Conoce Andalucía. *Economía*. www.juntadeandalucia.es/andalucia/economia.html Accessed March 2011.
- Kellert S.R. 1996. The value of life: biological diversity and human society. *Island Press, Washington DC, USA*.
- Kendall H.A., Lobao L.M., Sharp J.S. 2006. Public concern with animal well-being: place, social structural location, and individual experience. *Rural Sociol.*, 71: 399-428. doi:10.1526/003601106778070617
- Lebas F., Coudert P., De Rochambeau H., Thébault R.G. 1996. *El conejo. Cría y patología*. FAO, Rome, Italy.
- MAPA. 2007. La alimentación en España, 2006. *Ministerio de Agricultura, Pesca y Alimentación*. Madrid, Spain.
- MARM. 2010a. Anuario de Estadística 2009. *Ministerio de Medio Ambiente y Medio Rural y Marino*. Madrid, Spain. www.magrama.gob.es/es/estadistica/temas/estad-publicaciones/anuario-de-estadistica/2009/default.aspx?parte=3&capitulo=14 Accessed March 2011.
- MARM. 2010b. Número de explotaciones de conejos según clasificación zootécnica en España. *Ministerio de Medio Ambiente y Medio Rural y Marino*. Madrid, Spain. www.magrama.gob.es/app/IndicadoresEconomicos/indicadores/indicadorescunicultura.aspx?lng=es#inicio Accessed March 2011.
- Marshall T.T., Hoover T.S., Reiling B.A., Downs K.M. 1998. Experiential learning in the animal sciences: effect of 13 years of a beef cattle management practicum. *J. Anim. Sci.*, 76: 2947-2952.
- McBride E.A., Magnus E., Hearne G. 2004. Behaviour problems in the domestic rabbit. In: *Appleby D. (ed). The APBC Book of Companion Animal Behaviour*. Souvenir Press Ltd., London, UK, 164-182.
- PFMA. 2010. Statistics. *Pet Food Manufacturers' Association*. London, UK. www.pfma.org.uk/statistics Accessed March 2011.
- PROPET. 2008. Animales domésticos en España. www.animalesdomesticos.wordpress.com/tag/estadisticas Accessed March 2011
- Ricci R., Sartori A., Palagiano C., Dalle Zotte A. 2010. Study on the nutrient adequacy of feeds for pet rabbits available in the Italian market. *World Rabbit Sci.*, 18: 131-137. doi:10.4995/WRS.2010.7532
- Salomon A. 1981. Animals and children: The role of the pet. *Canada's Mental Health*, 29: 9-13.
- Sanvicente R., Ruiz M., Contreras J., Rivera J., Ambríz D., Losada H. 2009. Percepción del sacrificio de conejos domésticos en productores que se inician en la actividad cunícola. In *Proc.: VII Encuentro Nacional de Cunicultura, 8-10 October, 2009, Veracruz, México, 8 pp.*
- Serpell J.A. 2004. Factors influencing human attitudes to animals and their welfare. *Anim. Welfare*, 13 Suppl.: 145-151.
- SPSS Inc. 2006. *Manual del Usuario de SPSS Base 15.0*. SPSS Inc., Chicago, USA.
- Universidad de Sevilla. 2008. Anuario Estadístico 2007-2008. *Secretariado de Publicaciones de la Universidad de Sevilla, Sevilla, Spain*.
- Universidad Pablo de Olavide. 2008. Memoria del Curso Académico 2007-2008. *Universidad Pablo de Olavide, de Sevilla. Secretaría General. Oficina de gestión de Convenios, Órganos Colegiados y Asuntos Generales*. Sevilla, Spain. www.upo.es/memoria0708/index_html Accessed March 2011.
- Verhoef-Verhallen E.J.J. 2002. La enciclopedia de los conejos y roedores. *LIBSA, Madrid, Spain*.
- Virgós J., Cabezas-Díaz S., Lozano J. 2007. Is the wild rabbit (*Oryctolagus cuniculus*) a threatened species in Spain? Sociological constraints in the conservation of the species. *Biodivers. Conserv.*, 16: 3489-3504. doi:10.1007/s10531-006-9054-5
- Walker K. 2009. See how rabbits grow. *Rosen Publishing Group, New York, USA*.
- Wilkinson R., Fitzgerald G. 1997. Public perceptions of biological control of rabbits in New Zealand: some ethical and practical issues. *Agr. Hum. Values*, 14: 273-282. doi:10.1023/A:1007473215360