PROCEEDINGS

16TH IFOAM ORGANIC WORLD CONGRESS
MODENA, 16-20 JUNE 2008

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Proceedings of the Second Scientific Conference of the International Society of Organic Agriculture Research (ISOFAR), held - at the 16th IFOAM Organic World Congress - in Cooperation with the International Federation of Organic Agriculture Movements (IFOAM) and the Consorzio ModenaBio 2008.

18-20 June 2008 in Modena, Italy.

VOLUME 2
LIVESTOCK, SOCIO-ECONOMY AND CROSS DISCIPLINARY RESEARCH IN ORGANIC AGRICULTURE

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Monitoring the welfare of sheep in conventional and organic farms using an ANI 35 L derived method

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Key words: sheep, welfare monitoring, organic farming, reliability

Abstract

The present study was undertaken to evaluate the inter-observer reliability of a welfare monitoring scheme to be applied to sheep, and compare the welfare state of the animals between 10 organic and 10 conventional sheep farms. No significant differences were observed between organic and conventional farms in terms of housing characteristics and animal based parameters (P>0.10). This result may be due to the fact that most of the farms, both conventional and organic, based their farming systems on an extensive use of the land by grazing animals. The monitoring protocol proved to be feasible (the mean time needed to perform the assessment of welfare was 45 min per farm) and reliable: a significant correlation between observers was observed for total score and all sheets (P<0.001), while the correlation was significant for all animal based parameters (integument alterations, animal dirtiness, hoof overgrowth and lameness; P<0.001), apart from lesions (P>0.10).

Introduction

Organic farming promotes high standards of animal welfare as a means to increase health and longevity of the animals and fulfill consumer ethical needs. However, the general belief that organic systems always provide the best conditions to the animals has been recently challenged (Athanasiadou et al., 2002). Therefore, in organic systems the need of reliable tools for monitoring the welfare state of the animals at farm level is urgent (Knierim et al., 2004). Due to a lack of welfare monitoring schemes for small ruminants a protocol scientifically validate for cattle, the ANI 35L 2000, was fitted to sheep. The Animal Needs Index proposed by Bartussek *et al.*. (2000) relies on a graded point system that allows assessing five aspects of the housing relevant to animal welfare. These aspects are scored through 5 corresponding assessment sheets, namely: Locomotion, Social interaction, Flooring, Environment, and Stockmanship. Two main problems are associated with the ANI protocol: (a) it mostly relies on design criteria with a lack of animal based variables, therefore, it may not sufficiently indicate the actual welfare state of the animals; (b) it allows compensation between poor and good conditions. However, this index, at least in cattle, has proven to be valid (Ofner *et al.*, 2003), reliable (Amon *et al.*, 2001) and to have some common criteria with consumer perception of animal welfare (Napolitano *et al.*, 2007). The

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present study was undertaken to evaluate the inter-observer reliability of the scheme when applied to sheep and compare the welfare state of the animals in organic and conventional sheep farms.

Materials and methods

Recordings were performed in 10 organic and 10 conventional sheep farms located in Basilicata (southern Italy) at an average altitude of 844 m above sea level. The mean number of heads per farm was 350 and Merinizzata Italiana the most common breed. The average milk yield was 80 kg, including the amount ingested by the lambs. Observations were conducted on lactating animals from January to March 2007. Two trained observers performed assessments. Four preliminary sessions, conducted in different non-experimental farms, were used to standardize assessments: observers thoroughly discussed the score attributed to each parameter and, if different scores had been attributed, further discussion allowed to reach an agreement. No additional discussion was conducted between assessors before, during and after the experimental recordings. The protocol used in the present study relies on five sheets derived by the Animal Needs Index (ANI 35 L), mainly based on resource-based parameters (Bartussek et al., 2000), and a sixth sheet where animal-based parameters, deemed relevant to animal welfare, are taken into account. In particular, in Sheet 6 were included the following animal-based variables recorded on at least 20% of lactating animals: integument alterations, animal dirtiness, hoof overgrowth, lameness and lesions, which where scored on the basis of their prevalence (number of affected animals/numbers of observed animals), longevity (years) and mutilations (de-horning, caudotomy, etc.). The final score can range from 81 to -9.5, the higher the score the better the sheep welfare. Data on housing characteristics and animal based parameters were analysed using ANOVA with one factor. Data on the presence of the outdoor paddock and hospital pen were analysed using the χ^2 test. For each sheet and each qualitative parameter inter-observer reliability was computed using the Spearman coefficient of correlation (r_s).

Results and Discussion

The mean time needed to perform the assessment of welfare was 45 min per farm. No sophisticated equipment was necessary in both time consuming and economical terms. The main housing characteristics of the sheep farms are depicted in Table 1, whereas in Table 2 the animal related variables monitored in this study are shown. The mean total scores of the sheep farms (48.4±1.7 and 47.7±1.8 for organic and conventional farms, respectively) were well above the central point of the scale (81-9.5/2=35.75), which indicated an overall satisfactory level of welfare. The application of the scheme showed that the most critical aspects of sheep farms were the low indoor and outdoor space allowance and the lack of an outdoor paddock in several farms (67 and 55% in conventional and organic farms, respectively). However, these aspects were compensated by the frequent access to the pasture, which was not allowed only in very bad weather conditions. In addition, pasture was steep in most of the cases, thus allowing a good physical exercise to the animals. As to animal based parameters, the prominent aspect to be improved was dirtiness, as it affected the highest percentage of animals. This aspect is obviously dependent on the low space allowance offered to the ewes in the barn and also related to the fact that the animals were observed in the early morning, before access to pasture. No significant differences were observed between organic and conventional farms in terms of housing characteristics and animal based parameters ($P>0.10$). Accordingly, no

marked differences in terms of welfare were observed between organic and conventional sheep by Braghieri et al. (2007), whereas in Germany organic dairy cattle farms showed higher welfare conditions than conventional farms (Hörning, 2000). The results obtained in this study may be attributed to the fact that farms, both conventional and organic, based their farming systems on an extensive use of the land by grazing animals Therefore, the decision to certify their products as organic was dependent on market constraints (lack of distribution channels for organic products, which are often sold in local markets as undifferentiated) rather than on obstacles to the conversion dependent on the farming system (most of the conventional farms could become organic with little or no changes).

Tab. 1: Mean (± SE) of the main housing characteristics of the sheep farms

	Indoor space allowance (m^2/head)	Outdoor space allowance (m^2/head)	Space at manger (m/head)	Presence of outdoor paddock (% of farms)	Presence of hospital pen (% of farms)
Organic	1.2±0.15	1.7±0.4	0.28±0.03	45	27.3
Conventional	1.0±0.17	1.2±0.5	0.26±0.03	33	44.4

Tab. 2: Mean (± SE) of some animal related variables

	Longevity (years)	Integument alterations (%)*	Hoof overgrowth (%)*	Lameness (%)*	Lesions (%)*	Dirtiness (%)*
Organic	8.0±0.56	19.2±7.0	1.0±0.55	6.6±2.4	1.35±0.93	28.3±8.9
Conventional	8.5±0.61	17.0±6.9	0.40±0.52	3.5±2.0	1.79±0.93	35.3±8.9

*(Number of affected animals / number of observed animals) x 100

Spearman correlation coefficients were significant for total score and all sheets ($P<0.001$). Inter-observer reliability of animal based parameters is displayed in Table 3. A significant correlation between observers was observed for all parameters ($P<0.001$), apart from lesions ($P>0.10$). However, the level of statistical significance of the correlation says little about the degree of reliability, as significance also depends on the sample size, whereas the value of the correlation coefficients is much more informative on the strength of the association. Martin and Bateson (2007) suggest that, although acceptability of coefficients depends on several factors, a satisfactory threshold can be considered 0.7. In this study the r_s of total score and all sheets exceeded this value, whereas only 4 (integument alterations, hoof overgrowth, lameness and dirtiness) out of 5 animal based parameters showed coefficients higher than 0.7. This latter result may be due to the fact that lesions were often small and hidden by the fleece. The problem could be approached by monitoring only wide and evident lesions, while observers should also perform more training.

Tab. 3: Inter-observer reliability (r_s) for each qualitative animal-based parameter

	Integument alterations	Hoof overgrowth	Lameness	Dirtiness	Lesions
r_s	0.85	0.82	0.81	0.84	0.22
P<	0.001	0.001	0.001	0.001	NS

Conclusions

No marked differences were detected between organic and conventional sheep farms, using the ANI 35 L derived protocol possibly because most of the farms, both conventional and organic, based their farming systems on an extensive use of the land by grazing animals. The present monitoring protocol proved to be feasible and reliable, although more studies are needed to test the scheme on a larger sample size and assess its validity.

Acknowledgments

This study has been conducted within the project E.QU.I.ZOO.BIO. (Efficienza, Qualità e Innovazione in Zootecnia Biologica – SP10).

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