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ASSESSMENT OF DAIRY SHEEP WELFARE IN CONVENTIONAL AND ORGANIC FARMS

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Abstract

The aim of this study, carried out in the Tuscany Region (Italy), was to compare animal welfare in conventional and organic dairy sheep farms. Recordings were performed on 4 farms (2 conventional and 2 organic) selected for large flock size (average: 725±65 heads) and 4 farms (2 conventional and 2 organic) selected for small flock size (average: 145±53 heads). A single trained observer performed the evaluation, using a modified Animal Needs Index (ANI 35L) protocol, which relies on 6 assessment sheets. Only one visit was carried out in each farm. Modifications of ANI 35L protocol were referred to animal based indicators: skin lesions and integument alterations, cleanliness, hoof condition, lameness, evaluated on the basis of their prevalence (number of affected animals/number of observed animals). Longevity and mutilations, scored in terms presence/absence, were also included. The total derived ANI 35L score (average: 48.3±7.5; min 36.0; max 58.5) for the different farming method (organic vs. conventional) and flock size (large vs. small) was analysed by non-parametric Kruskal Wallis test. No significant differences were observed between organic/conventional farms and large/small herds. The obtained results might be explained by the negligible difference in dairy sheep production: despite of farming methods and flock size, all rearing systems were extensive. Further investigations are required to improve the modified ANI 35L protocol on dairy sheep farms; in particular, animal based indicators should be tested on farm to evaluate their validity in relation to specific variables (e.g. season, shearing) possibly affecting animal welfare.

Keywords: *dairy sheep, animal welfare, monitoring scheme, animal based indicators*

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Introduction

Organic agriculture has expanded in many countries all over the world in the last twenty years and the small ruminant organic sector has registered a sharp increase in numbers of animals and farms in the EU (FiBL-IFOAM, 2012). The traditional sheep and goat production systems, usually extensive, are often organic, despite of a formal certification. In the EU context, Italy plays an important role following United Kingdom for sheep and Greece for goats in number of certified animals (Martini and Lorenzini, 2007; EC, 2010).

Organic farming promotes high levels of animal welfare to increase animal health and longevity to fulfil consumer ethical needs (Lund and Röcklinsberg, 2001). However, the general belief that organic production always provides the best conditions for animals has been challenged (Athanasiadou *et al.*, 2002).

In order to meet the consumers' demand for welfare-friendly products, valid, reliable and feasible monitoring schemes to assess animal welfare at farm level should be developed. Nevertheless, a few numbers of assessment protocols have been produced for both conventional and organic sheep farms (El Balaa and Marie, 2006; Napolitano *et al.*, 2009).

In some European countries, label standards are used to control and certify organic farms; the Animal Needs Index (ANI 35L) proposed by Bartussek *et al.* (2000). It relies on a five categories score system (Locomotion, Social interactions, Flooring, Light and air, and Stockmanship) of the housing and management.

Due to the lack of scientifically validated monitoring schemes for sheep, an ANI 35 L derived protocol was developed in collaboration with academics and certification body representatives in the Italian E.Qu.I.Zoo.Bio project (Barbieri *et al.*, 2008; Napolitano *et al.*, 2009; Ferrante *et al.*, 2010).

The protocol relies on five sheets, mainly based on resource-based parameters, and a sixth sheet where animal-based parameters were included; an additional category was introduced to assess farmers' aptitude towards organic principles.

The aim of this study, carried out in the Tuscany Region (Italy), was to compare animal welfare conditions in organic and conventional dairy sheep farms using the derived version of ANI 35L.

Material and methods

Data were collected in 4 conventional (2 small and 2 large flock-size) and 4 organic (2 small and 2 large; flock-size) sheep farms located in Tuscany (centre Italy), in the provinces of Arezzo (2 farms), Firenze (4 farms) and Grosseto (2 farms) at an average altitude of 158m above sea level.

The mean number of heads was 145±53 in small size farms (from 100 to 200 heads) and 725±65 in large size ones (from 650 to 800 heads). Sarda italiana sheep was the most common breed in the observed farms; in one farm Friesian sheep and in another one Langhe sheep were present. Milking took place in a milking parlour twice a day and the daily milk production was about 1 litre/head. Observations were conducted on lactating animals during the spring.

One observer performed the evaluation and the assessor was trained for using the E.Qu.I.Zoo.Bio protocol before the farm visit. The assessment was realised visiting each farms once, using the modified version of ANI 35L, which relies on 6 assessment sheets.

Sheet 1 is about the opportunity for locomotion, Sheet 2 evaluates the possibility of the animals to interact with the conspecifics, the condition of floor of the indoor and outdoor area are recorded on Sheet 3, Sheet 4 evaluates the suitability of the internal and external environment in terms of microclimate and design of pasture.

Stockmanship and animal health are assessed in Sheet 5 using some resource-based parameters (e.g. cleanliness of feeding, drinking and lying areas). The following animal-based indicators were included in Sheet 5, according to Napolitano *et al.* (2009): integument alterations (skin damages due to ecto-parasites, wool-less patches, hyperkeratosis), animal dirtiness (major splashing or distinct plaques of dirt at hind quarters and udder), hoof overgrowth (at least one overgrown claw), lameness (any sign of abnormal gait) and lesions (swellings, wounds and scabs). Animal-based measures were recorded on at least 20% of lactating animals and scored on the basis of their prevalence (number of affected animals/numbers of observed animals). Sheet 6 based on closed questions assess farmers' attitude towards organic principles, using e.g. vaccination, unconventional veterinary treatments, and appropriate breed. Longevity and mutilations, scored in terms presence/absence, were also included.

The final derived ANI 35L score range from +75 to -1, the highest scores corresponded to better sheep welfare levels.

All the data were recorded on Excel files and statistically analysed with SPSS 16.0 (SPSS, 2007). Non-parametric analyses of variance, Kruskall Wallis tests, were used to compare the final derived ANI 35L mean scores for the production systems (organic and conventional) and the size of the flock (small and large).

Results

Application of the welfare assessment protocol required a mean time of 40 min per farm to be filled in. The total derived ANI 35L score (average: 48.4±7.5; min 36.0; max 58.5), recorded in the investigated farms, is outlined in *Figure 1*.
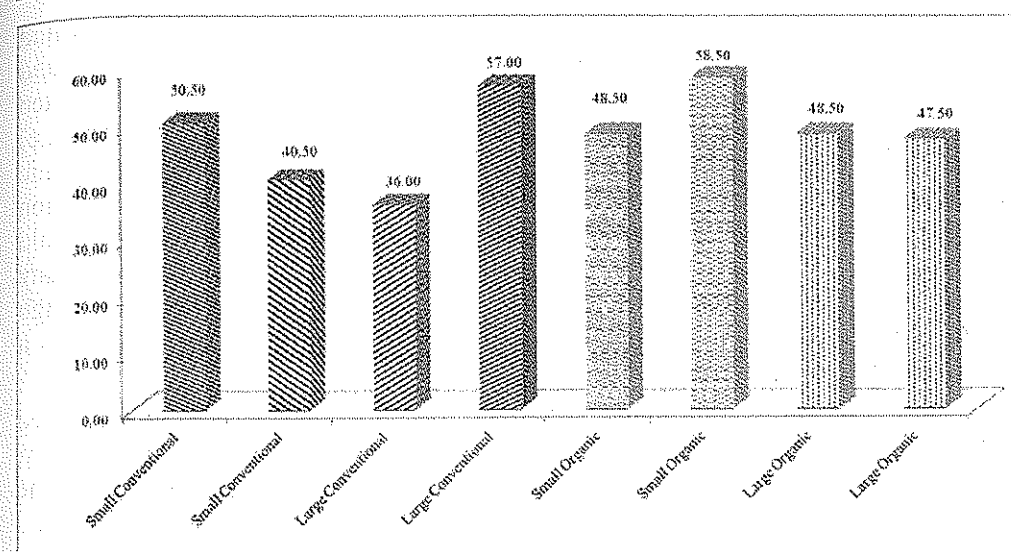
Figure 1. - *Total derived ANI 35L score. Figure shows the scores of each studied farm.*

No significant differences were observed between production systems (organic and conventional) and flock size (small and large). The final score was 50.8±5.2 (mean ± s.d) for the organic farms and 46.0±9.5 (mean ± s.d) for the conventional ones; 49.5±7.4 for small size flocks and 47.3±8.6 for large size flocks was recorded.

Two organic farms, one small and one large, did not comply with the indoor area requirements of the EU Regulation 889/2008 Annex III (1,5 m²/goat + kid vs 1,85 m²/goat + kid).

Discussion

On-farm feasibility of welfare monitoring schemes should consider the time to perform the assessment: the time needed in this study was lower than reported by other authors (40 vs. 85 min; Napolitano *et al.*, 2009). This scoring system is affected by the seasonal and the climate conditions during the farm visit; furthermore, scoring of extensive rearing systems, mainly based on pasture, is heavily influenced by the layout of paddocks.

Our results regarding the modified ANI 35L scores might be explained by the negligible difference in dairy sheep production: despite of farming methods and flock size, all rearing systems were extensive and based on pasture. Hörning (2000) reported higher welfare conditions in organic dairy cattle than conventional

one; otherwise, Braghieri *et al.* (2007) and Napolitano *et al.* (2009) did not find marked differences in terms of welfare between ewes raised in organic and conventional production systems. Dairy cattle in conventional systems are often raised in very intensive conditions (large herds, limited or no access to pasture) compared to extensively reared sheep; despite of the production system (organic and conventional), the level of intensification is not excessive. The composition of the diet, which is not considered by the ANI 35L and derived protocols, could be a critical point in terms of intensification of the production system. Many sheep farmers sell the fresh milk to dairy factories and use silages and/or high protein diets (allowed in organic farming) to increase the productivity with a possible detriment of animal health and welfare.

An issue, which is taken into consideration by the ANI 35L and derived protocols, is the space availability: no difference was underlined by our study, even if two farms did not respect the minimum requirement. Not to assure the compliance for the available indoor area with the EU Regulation seems to be a frequent problem in sheep farms, many times underestimated by control bodies (Martini, 2000).

This is one of the first studies evaluating animal welfare in dairy sheep applying a comprehensive protocol, which includes resource- and animal-based indicators. In fact, the most appropriate combination between resource- and animal-based indicators might assure the validity of the welfare assessment protocols.

The ANI system is currently used in Austria in small farms for on-farm welfare assessment and relays on environmental measures, not on the state of the animals. Nowadays, many researches agree that animal-based measures are the most appropriate indicators to assess the welfare of animals in a valid and reliable way (Smulders and Algers, 2009; Appleby *et al.*, 2011). The recent EU funded projects (Welfare Quality® and AWIN) are also focused primarily on simple and accessible animal-based indicators.

Conclusions

The modified ANI 35L scoring system might be useful for both organic and conventional dairy sheep farms, as it provides an effective tool for on-farm welfare assessment. However, this protocol is mostly based on resource-based criteria with a lack of animal-based parameters.

The lack of valid, reliable and feasible direct animal indicators, mainly relevant to sheep in Mediterranean areas where animals are traditionally housed indoor for shorts periods in winter season, may be the critical point.

Further investigations are required to improve the derived ANI 35L protocol on dairy sheep farm; in particular, animal based indicators should be tested to evaluate their validity in relation to specific variables (e.g. season, shearing) possibly affected the assessment.

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