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ESTIMATION OF BEEF AND DAIRY CATTLE WELFARE ON ORGANIC FARMS OF LITHUANIA

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Abstract

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Organic farming is a very important sector of agriculture in Lithuania. The adoption of organic farming is important because this method of farming creates potential possibilities to solve the issues of competitiveness of husbandry production, employment and additional income in the rural areas. Besides it helps to reduce the negative effects on the environment of Lithuania and supplies the consumer with healthier food products.

The welfare of animals concerns not simply stress, experienced by an animal, but its ability to manage stress, whether it is physical or mental stress. Welfare can be ranked; there is not simply good or bad welfare, but many gradations of wellbeing of animals.

The aim of the study was to analyze and evaluate the environment and welfare of beef and dairy cattle on organic farms. The studies were conducted on four organic farms located in different regions of the country and at the Institute of Animal Sciences of Lithuanian University of Health Sciences. Deep litter and cubicle housing technologies were applied for beef and dairy cattle, respectively.

Cattle welfare and health studies were carried out on the basis of ANI 35 L/2000 system. Deep litter housing was evaluated more favourably in comparison with cubicle housing on the organic farms. The estimation of barns with deep litter housing was average 35.25 points or "very suitable" versus 24.33 points or "suitable" for cubicle housing. Correspondingly, animal welfare was evaluated as "excellent" and "very good".

The microenvironment of barns, cleanliness of equipment, and animal health of all four organic farms were similar in evaluation.

Key words: organic farming, animal welfare, beef and dairy cattle

Introduction

There are many ways by wich animal welfare could be improved, such us means of legislative enactment, scientific research or better stockbreeding. Awareness about animal welfare sems to have increased since the early 1990s. An important awaking factor has been the various scandals involving the meat sector and debates in the mass media, followed up by an increasing amount of legislation to improve the welfare of farm animals within the European Union (Skudenienė, Ribikauskas, 2006; Kuscinsky et al., 2003).

Broom (1986) says, that the welfare of an animal is its state as regards to its attempts to cope with this environment. Animals have to cope with a complex environment, such as high temperature, hunger, fear of predation. Animals have a range of menas of coping with this stressors, principally throught the adrenal stress response. Strees is therefore an entirely normal response to challenges from the environ-

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ment, and animals are able to cope with smals amounts of stress, and with stressors from which they can escape. Stress is therefore not necessarily acause of poor welfare, but distress does have a negatyve effect on welfare (Arney, 2012).

An encreased interest in assesment of welfare was initiated by the aim of consumers to improve animal welfare it was necessary to develop a system of welfare assesment that can supply information and guarantees about both product quality and animal friendly way of animal housing and care of stockman (Blokhuis et al., 2003). Following this aim it appeared necessary to dešine a system that can be used on various farms of Europe Union, respond to differencies in welfare on the farms, reflect animal welfare of the herds and appear transparent to producers, consumers, tradesmaen and correlate with the present state of knowladge in the field of welfare (Botreau et al., 2007).

The welfare of animals concerns not simply stress, but ability to manage strese, ahether it be physical or mental stress (Alrøe and Kristensen, 2003). Welfare can be ranked; there is not simply good or bad welfare, but many gradations of wellbeing.

An Animal Needs Index – ANI – has been in development since 1985 in Austria by Bartussek (1999). A similar system with similar name was developed in Germany (Sundrum et al., 19940). The main aim of ANI was to assess welfare of cattle, pigs and lying hens focusing particularry on organic farmas and concentrates on housing conditions and on their influence on animal welfare. Animal welvare is assessed by one visit to the farm and evaluation of obtained date. There is very practical and easily repeatable.

Organic farming has always been a frontrunner in sustainable farm practices. This role has been recognized by EU policy makers since 1991 with the creation of the first EU regulation for organic food and farming. Organic farming, with EU an EU wide standard and certification system in place can play an important role within the CAP to both increases the proportion of farms using organic practices, but also as a laboratory to demonstrate the scope for improving the sustainability of non-organic farms.

Organic farming in Lithuania is becoming increasingly popular. There (2012) are 2511 organic farms and cultivate 162 655 hectares of organic farmland. Average size of the farm grows.

In most dairy systems cows are housed at some pint during the year in many mases in zero-grazing systems throughout the year. The reasons for housing an animal that is Adaptec to environmental condition covering a range of climates is principally ease of management, but also to prevent poaching of grassland and protection from poor weather conditions.housing has traditionally been designed to easy management and husbandry, in tandem with demands for increased production, with little regard to the neeis of individual animals, or indeed the herd as whole (Arney and Aland, 2012).The aim of this study was to analize and evaluate the environment and welfare of beef and dairy cattle on organic farms of Lithuania and using for assesment Animal Needs Index (ANI) 35 L/2000 system.

Materials and Methods

Animal welfare was evaluated in four (4) organic farms of different regions (North and Middle) of Lithuania., two (2) beef cattle farms and two (2) dairy cows farms with different animal keeping conditions (deep litter and cubicle housing technologies).

The concentrations of ammonia and carbon dioxide were determined by the devices GASTEC. Other microclimate parameters were identified by the equipment ALMEMO. The total amount of germs, the quantity of moulds and *E.coli* in the indoor air was determined in cultivating the samples on MPA (meat peptone agar), on the medium of Levin and Sabourad Dextrose (Lugauskas et al., 2002).

The speed of air movement was determined in three points of the poultry house diagonally in the 150 cm above floor surface by ball catathermometre and wing anemometer. The investigations of air temperature, humidity and pressure were done by ALMEMO devices in nine points at the height of 50 and 150 cm.

The concentration of dust in the indoor air was be identified by gravimetric way by using aspirator diagonally at the height of 50 and 150 cm above floor surface.

To evaluate the welfare of beef cattle and dairy cows we used Animal Needs Index system – ANI 35/2000 (Bartussek et al., 2000).Evaluation by this system fucuses on the five fields of influence (movement, social contact, quality of flooring, climatization (Table 1).

The final ANI 35/2000 evaluation consisted of assigning points for relevant criteria which allowed us to classify the farms using 6-category suystem of welfare (Table 2).

Results and Discussion

Our research was done in typicals Lithuanian beef catttle and dairy cows organic farms. In analyzing microoganism concentration the data, it was evident that during the study the total number of bacteria in air of beff cattle with deep litter floor was on average 22.0±2.8 thous. CFU m^{-3}. Its 2 time lower compare with the data registered in dairy cows tarme, where animals were kept in cubicles 9.5±0.6 thous. CFU m^{-3} .

The lowest concentration of dust (0.0±0.0 mg m^{-3}) and the lowest concentration of microorganisms(9.5±0.6 ksv/m^3) in the air were registered at the dairy cows farms. There were the biggest concentration of dust (47.5±3.2 mg m^{-3}) at the beef cattle farms with deep litter keeping technology (see Table 3).

In summarizing the our research findings suggest that the investigated farms indoor air was clear in all farms, and the dynamic of micro climate indicators is due to the keeping technologies diversity. Compared with cattle keeping technologies in the organic farms (deep litter and cubicles), deep litter technology was the best.

Assessment of storage conditions, this type of sheds received of 35.25 points (Table 4), exerting verbas sdescription of the terms „very appropriate" and well-being „excellent". Meanwhile, in the cubicles sheds were assessed an average of 24.33 points (Table 5). Verbal description of storage conditions are „right" and the well-being assessed as „very good".

The analysis of the different storage conditions between investigated groups of animal shows that in boxes sheds received less all signs pint groups. However, you can pic out the most diverse groups of symptoms – the possibility of movement and social contacts, here scoring points was significantly lower. Deep litter sheds of this atribute groups received respectively 8.75 and 8.0 points and in the boxes – 4.67 and 4.17, respectively. The Reason for the differences is the fact that Almost half of the cattle kept on deep litter during the stale period were free to go out in the field. The all cubicles were equipped. Meanwhile, in boxes and stalls were all open air areas during the indoor period, the animal spent the premises in Europe. Another Reason is the area per animal, deep litter pens were significantly greater. It is also influenced by the fact that cows kept in stakles in boxes, their offspring were housed in separate Romos and did not evenhave visual contact with the rest of the other herd part. Meanwhile, deep litter processing in offspring was considered to be in the same room with adult animals, but in the different boxes.

Assessing symptoms groups „Floor properties", „Microclimate" and „Maintenance" boh of the group of animals received a similar assessment – deep litter group by 6.5, 5.0 and 7.0 points, and in boxes – 4.5, 4.83 and 6.17 points. This means that in the two treatment groups were similar micro climate, equipment cleanliness and technical condition, as well as livestock health.

Table 1
ANI 35L/2000 for calves. beef and dairy cattle

Group	Characteristics	Points: Min–Max
I. Locomotions	Floor area	0–3.0
	Lying dow, rising in loose/group housing	0–3.0
	Tether systems	0–2.0
	Outdoor exercise	0–3.0
	Pasture	0–1.5
II. Social interaction	Floor area. m^2/500 kg	0–3.0
	Herd structure	–0.5–2.0
	Integration of new animals	0–2.5
	Outdoor exercise	0–1.0
	Pasture	0–1.0
III. Flooring	Softness of lying area	–0.5–2.5
	Cleanliness of lying area	–0.5–1.0
	Slipperiness of lying area	–0.5–1.0
	Activity areas	–0.5–1.0
	Outdoor yard	–0.5–1.5
	Pasture	0–1.0
IV. Light & air	Light	–0.5–2.0
	Air quality	–0.5–1.5
	Draught	–0.5–1.0
	Noise	–0.5–1.0
	Outdoor exercise days/year	0–2.0
	Outdoor hours/ days	0–2.0
V. Stockmanship	Cleanness of stalls	–0.5–1.0
	Condition of equipment	–0.5–1.0
	Condition of integument	–0.5–1.0
	Cleanliness of animal	–0.5–0.5
	Condition of hooves	–0.5–1.5
	Technopathies	–0.5–1.5
	Animal health	–0.5–1.5
Total		–9.0–45.5

Table 2
ANI point system

ANI Sum total	Housing conditions	Available percentage of ANI points	Estimation
< 11	Not suitable with respect to welfare	0–15	Not sufficient
11 ≤ 16	Scarcely suitable with respect to welfare	16–30	Sufficient
16 ≤ 21	Little (medicore) suitable with respect to welfare	31–50	Satisfactory
21–24	Fairly suitable with respect to welfare	51–60	Good
> 24–28	Suitable with respect to welfare	61–75	Very good
> 28	Very suitable with respect to welfare	>75	Excellent

Table 3

Air pollution in animal stables

Stables	Ammonia concentration, ppm	CO_2 concentration, ppm	Dust concentration, mg/m^3	Total bacteria count. thous. CFU/m^3	E.coli bacteria count. thous. CFU/ m^3	Mold quantity, thous. CFU/m^3
Beef cattle on the deep litter	2.0±0.3	2100±92	47.5±3.2	22.0±2.8	798±15	1.5±0.2
Dairy cows in the cubicles	3.7±0.5	1287±85	0.0±0.0	9.5±0.6	35±3	4.4±0.9

Table 4

Total sum of poits for beef cattle housed on deep litter

Item	Columns						Sum total
	a	b	c	d	e	f	
I Locomotion	Area	Getting up, laying	-	-	Enclosure days/ year	Pasture days/ year	
	2.75	3	-	-	1.5	1.5	8.75
II Social interaction	Area	Herd structure	Integration of new animals	Enclosure days/ year	Pasture days/ year	-	
	2.75	1.5	1	1.25	1.5	-	8
III Flooring	Softness of lying area	Cleanlines of lying area	Slipperiness of lyin area	Activity area	Floor quality in enclosure	Pasture	
	2.5	1	1	1	0.5	0.5	6.5
IV Light & air	Natural light	Air quality	Draught	Technological noise	Outdoor exercise days/year	Outdoor hours/ day	
	0.5	1	0.5	1	1	1	5
V Stockmanship	Cleanness of the pen, feeding troughand waterer	Condition of equipment	Condition of integument	Condition of hooves	Technopathies	Animal health	
	1	1	0.5	1.5	1.5	1.5	7
ANI Total							35.25

Table 5

Total sum of poits for cattle housed in cubicles

Item	Columns						Total sum
	a	b	c	d	e	f	
I Locomotion	Area	Getting up, lying	-	-	Enclosure days/ year	Pasture days/ year	
	1.17	2	-	-	0	1.5	4.67
II Social interaction	Area	Herd structure	Integration of new animals	Enclosure days/ year	Pasture days/ year	-	
	1.17	1	0.5	0	1.5	-	4.17
III Flooring	Softness of lying area	Cleanlines of lying area	Slipperiness of lying area	Activity area	Floor quality in enclosure	Pasture	
	1.17	0.67	1	1	0	0.67	4.5
IV Light & air	Natural light	Air quality	Draught	Tehnological nise	Outdoor exercise days/year	Outdoor hours/ day	
	1.5	1.33	1	1	0	0	4.83
V Stockmanship	Cleanness of the pen, feeding troughand waterer	Condition of equipment	Condition of integument	Condition of hooves	Technopathies	Animal health	
	0.5	1	0.17	1.5	1.5	1.5	6.17
ANI Total							24.33

Table 6
Cattle housing characteristics on organic farm

Housing area		Minimal motion (pastule excluded) area per animal, m^2	
Lowest live weight, kg	Area per animal, m^2		
Up to 100	1.5	1.3	1.5
Up to 200	2.5	1.9	2.5
Up to 350	4	3.0	4.0
More than 350	5	3.7	5.0
	At least 1 m^2/100 kg		
	6	6	
	5.0 Per cow	5.0 Per cow	
	2.5 Per calf	2.5 Per calf	
	10	30	

* – Motion area should be lower than pen area
The bold – standards recommended by the Institute of Animal Science

Table 6 shows cattle housing characteristics on organic farms. The bold – standards recommended by the Institute of Animal Science of Lithuanian university of health sciences.

All four tested beef and dairy cattle organic farms got support from the 2004-2006 Rural Development Measure Standards Programme (Nitrate Directive and Milk Directive). This suggests that organic farmers in Lithuania focus on their long – tems business prospects.

Many researchers in Europe or worldwide were involved in variuos studies on evaluation of animal welfare (Johnsen et al., 2001; Capdeville and Veiser; 2001; Whay et al., 2002; Purcell et al., 1988). The main aim was to develop for all farmers easy analysis of welfare of their cattle herds and to indicate the ways of potential fast improvement.

Conclusions

Cattle welfare and health studies were carried out on the basis of ANI 35 L/2000 system.

Deep litter housing was evaluated more favourably in comparison with cubicle housing on the organic beef and dairy cattle farms.

The micro environment of barns, cleanliness of equipment, and animal health of all four organic farms of Lithuania were similar in evaluation.

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