SCORING SYSTEM AND IDENTIFICATION OF MASTITIS RISKS IN CATTLE FARMS

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Summary

Farm management failure is considered to be the cause of much sub-clinical prevalent pathologies in dairy cattle rearing. The aim of this study was: the quantitative evaluation of data assessment in farm management through the use of institutional instruments such as questionnaire and system of points (Scoring system) and their comparison with the laboratory analyses of milk, in a "X" farm situated in Ndroq, Tirana. The intention was to rank critical points during cattle breeding and their redress. For these purposes were conducted two surveys, by 8 months time frame, according to literature consulted, associated with quantitative evaluation of farm husbandry practices and milk samples. The breeding-quantitative quotation (milking, lactation, calving, etc...) was performed by point evaluation of specific practices. The smallest score point was 1 and the biggest was considered from 4 to10.

For each file were calculated the total points and then the average score. According to LS (Linear Score), maximal average number of points for each file should not exceed 4.5 to 4.9 points. At this point level Somatic Cells are 300-400 for SG 000/milk ml (Zecconi 2010).

Total aerobic and somatic cells were analyzed as raw milk indicators.

In the first survey the results for somatic cell were: 580 ± 50 for 10^3/ml and for total aerobic cells were: 1430 ± 157 for CFU (Colony Forming Units) / milk ml. At the second survey the somatic cells were 290 ± 40 while total aerobics 138 ± 58, versus 400 and <1000 that are mark respective rates, due this to rearing management corrections, which reflect directly to average scores.

During this study it was concluded that the most critical point during milking was the teat disinfection (before and after milking), practices which were not carried out correctly or were performed by inefficient pharmaceutical substances. Our suggestions that are in concordance with the farmers association, leaded to the correction of many farming practices, where the most indicative was the decreasing by 10 points to the score 1 point in milking file schedule during the second survey, which was also reflected in hygienic status of milk.

Key words: Udder health, Somatic cells, Total Aerobic indicators, Milking.

Introduction

The milk quality and quantity production is related to a correct functioning of the udder and optimized health status of the organism. Mastitis is not just a serious problem for animal health, but presents also a serious threat to human public health and is considered one of the main causes of economic losses. Farm management deficiencies are currently considered as the origin of this disease with less obvious symptoms, such as subclinical mastitis, which has become dominant in cattle breeding (Zecconi A. et al 2006; Sol, J et al 2000).

An accurate identification of the "critical points" in the farm by the implementation of HACCP procedure is essential and represents the basis of a healthy farm. The veterinarian interventions are imperative and require the availability of study objectives and practical tools for assessing to the proper farm management. The use of severe instruments such as questionnaires and pointing systems (Scoring system) for the evaluation of farm management, promise an objective assessment of herd health status and facilitate the veterinarian addressing toward critical points during livestock breeding (Zecconi.A, 2010).

Purpose of the study

The purpose of this study is: to estimate the relationship among the farming practices point scoring and the infection presence (sub-clinical mastitis YES/NO), in a study conducted in the farm "X", at Ndroq – Tirana.
Aim of this study is: the identification of critical points in cattle farming, through the use of institutional instruments such as questionnaire and pointing systems (Scoring system).

Materials and methods

The study was conducted on the dairy cattle farm "X", in Ndroq – Tirana.
Analyses were performed in the laboratories of Albanian Milk and Meat Association "ADAM"; Veterinarian Public Health Department of Faculty of Veterinary Medicine, Tirana - Albania and Infectious Diseases Department, Faculty of Veterinary Medicine, Milan – Italy.

1. Questionare and data collection
Goodger et al. (1993) and Zecconi (2010) have developed a list of indicators (that makes the questionnaire) easily monitored for assessing to the farm management practices.
Initially, the questionnaire based on breeding conditions of the farm was adapted. The data were collected at the farm by completing the questionnaire and farm visiting. The questionnaire covers all aspects of farm management, with greater emphasis on the activities related to general health management and in particular to udder health status (this case study).

2. Cytological and bacteriological analyzes of milk in the farm

Type of sample to analyze
In this study was analyzed the raw tank milk, in order to identify the presence of sub-clinical mastitis. The samples are usually taken for the milk quality assessment and the health status of the herd. Also, the milk of all quarters was analyzed in order to determine prevalence of mastitis etiological agents (Fox L. et al 2003; Zecconi. A, 2010).
To obtain accurate results sampling was much cautioned: the milk for sampling was previously mixed in the tanks and sterile test tubes were used. Samples were preserved at 4^0C and so transported to the laboratory within 24 hours (Zecconi. A, 2004).

The analyzed indicators (somatic cells in milk, total aerobics in milk, pH, Proteins, Fat):
To define the most prevalent mastitis pathogens, were analyzed 96 milk samples prevailed from 24 cows (in small capacity farms with fewer than 40 dairy cows normally are sampled 15 heads, in farms with more than 40 dairy cows are sampled 24 heads).
Assignment of sampled cows was performed on the basis of days of lactation as follows: 50%> 200 days; 30% <30 days; and 20% in the interval between 30 and 200 days of lactation (Zecconi.A, 2010).

3. Point evaluation system (Scoring System)

To each farm management practice, during this study was attributed a point system: the more correct a practice was performed and managed the lower was the score number of points attributed to it.

The smallest score number is 1 and the largest number is considered a score number from 4 to 1, depending on practice scheduled. The accuracy is determined by reference practices and consulting expert opinion.

The score point value for each data was calculated by the sum of every schedule voice. For each file was computed the total and the average of resulted points.

The obtained data are normally correlated to the content of somatic cells in milk (Zecconi 2010).

Results & discussions

The udder health and quality of milk are primarily assessed by the presence of somatic cells in it, as it is the surveyed indicator of this study.

For raw tank milk, the limit of 200.000 to 400.000 somatic cells/ml is an awareness value and not a critical threshold as in animal milk (dairy cow).

A normal and healthy situation of the farm management is numbered from 200,000 to 300,000 somatic cells/ ml raw tank milk (Zecconi 2010).

Table no. 1. Cytological and bacteriological milk indicators

Indicators / Timeline	Somatic cells/000/ milk ml		Total Aerobics /000 cfu/ milk ml	
	Results	**Norm (Regulation)**	**Result**	**Norm (Regulation)**
FIRST SURVEY	580 ± 50	400	1430 ± 157	*<1000*
Two Months after the First Survey	560 ± 43	400		
Four Months after the First Survey	450 ± 40	400		
Six Months after the First Survey	310 ± 25	400		
SECOND SURVEY	290 ± 40	400	138 ± 58	*<1000*

As it is shown in on Table no. 1 the differences in the content of somatic cells and total aerobics in milk, are very sensitive to the parallel monitoring during the first interview comparing to the second monitoring. In the first survey these indicators are at upper norm so they attest for mastitis presence. In the second survey, after our intervention to the management practices (which is expressed in point scoring too) the values are within the norm, even quite reduced (Fox L. et al 2003; Zecconi 2010).

Our somatic cell monitoring was performed every 2 months, which brought up to their gradual decrease up to 290,000 somatic cells / milk /ml.

Table no. 2. Milk chemical indicators

Indicators / Timeline	pH		PROTEINS %		FAT%	
	Result	Standart	Result	Standart	Result	Standart
FIRST INTERVIEW	**7.0** *increased*	**6.6-6.7**	**3.8** *increased*	**3.2**	**3.3** *decreased*	**3.8-4.2**
SECOND INTERVIEW	**6.66**	**6.6-6.7**	**3.3**	**3.2**	**4.1**	**3.8-4.2**

Table no. 2 reports that even the milk chemical indicators were not at normal levels during the first parallel monitoring and interview. The levels of proteins and pH resulted increased in value, meanwhile fat levels were decreased, and such results are in concordance with previous studies data (Zecconi A. et al, 2006).

The daily milk production at the first interview per dairy cow with mastitis was 17 liters, whereas at the second interview, after the milk chemical indicators were rated to normal rates, was 20 liters. Even this data is consistent to the consulted references, which indicate for a 15% daily milk decrease production per head.

Bacteriological test results reported the presence of mastitis pathogens as: *Staphylococcus aureus*, *Escherichia coli* and *Streptococcus agalactie* (Table no. 3)

Subclinical mastitis prevalence in total sampled animals resulted 37.5% respectively: 20.8% for *Staphylococcus aureus, Streptococcus agalactie* for 5.2% and 7.3% for *Eschericia coli*.

Table no. 3. Bacteriological results of milk samples

Isolated microorganisms	Number of Positive Samples	%	Number of Negative Samples	%
Staphylococcus aureus	21	20.8	75	79.2
Streptococcus agalactie	5	5.2	91	94.8
Eschericia coli	7	7.3	89	92.7

Referring to the score evaluation our results it could be concluded that the most important issue is dairy cattle milking with an average sum of 5.4 points and then followed by lactation, cattle drying and heifers (situated within a unique farm) with 5 points score (Zecconi A. et al 2006; Sol, J et al 2000).

Referring to **Linear Score**, recommended by Zecconi 2010, a milking schedule with 5.5 points score corresponds to a number of 560.000 somatic cells/milk ml, which complies with milk analysis results in parallel of the first survey (number of somatic cells per raw tank milk ml resulted 580.000 cells).

Also the result of 5 points score of lactation, cattle drying and heifers (situated within a unique farm), are a critical control point in terms of this score correlation with the content of somatic cells / raw tank milk ml.

Table no. 5. Point scoring of farm management practices

Schedules/Files	SCORE POINTS			
	FIRST SURVEY		SECOND SURVEY	
	TOTAL	AVERAGE	TOTAL	AVERAGE
AVERAGE SUM RESULT	20	2.5	9	1.1
LACTATION	75	5 !!	67	4.4!!
CATTLE LACTATION DRYING	75	5	67	4.4
HEFERS	75	5	67	4.4
MILKING	141	5.5 !!	64	2.4!!
PARTURITION	80	4.7	68	4
THERAPY	43	2.7	43	2.7
SUM	509	30.4	385	23.4

Farm management interventions, specifically improvements in milking practices management (which is considered a critical point for the mastitis presence), and also somewhat lactation, lactation drying and heifer, significantly reduce the number of points assessed in scheduled questionnaires during the second survey, which is consistent with milk analyzes results (the number of **somatic cells / raw tank milk ml**) proceeded parallel with the second survey.

Conclusions

• Quantitative assessment of breeding practices enables the farm auto control.
• The study confirmed a positive correlation between score pointing of husbandry practices and hygienic status of milk.
• Maintaining a constant point score and comparing it to the Linear Score, in key practices as milking, lactation, heifer, etc. ensures hygienic quality of milk.
• Milking is the most important critical point in dairy cattle where specifically is remarked the nipples before milking preparation and their before and after milking disinfection.

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