



Combined on-Farm Analysis of Management Procedures and Vaccination Protocols: The Way to Maximize the Health of the Herd

Ramon Armengol^{1*} and Marta Bassols¹

¹Department of Animal Science, University of Lleida, Spain

*Corresponding author: Ramon Armengol, Department of Animal Science, University of Lleida, Spain

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Abstract

During a farm animal's life, there are a lot of situations that carry stress and induce immunosuppression, increasing the risk of infections and diseases. At the same time, veterinarians and farmers make a big effort (technical and economical) to increase immunity, setting complete vaccination programs. Frequently, this prevention through vaccination fails because administration is carried out during immunosuppression periods. We propose an easy, accurate and understandable strategy based on a complete visit of the farm and interview with the farmer. It is purposed to analyze altogether management procedures on farm, other phenomena and vaccination protocols that occur during the ruminant's life. After a deep analysis, we suggest changes in the farm's routine in order to maximize health status of the ruminants, reducing stress and immunosuppression periods, increasing efficacy of vaccines and efficiency of the production system. This strategy includes the analysis of the ruminants' life, day by day, through a spreadsheet.

Keywords: Advice; cattle; management; ruminants; stress

Introduction

Increase or maximize the health of the ruminants in a herd should be a priority for both farmers and veterinarians. Since long, the use of vaccines in order to directly increase immunity but also reduce amount of pathogens in the herd and reduction of clinical signs in infected animals has been carried out [1-3]. It is also well known that stress factors have a negative impact on the immune system and ruminants submitted to it might suffer from stress-induced immunosuppression during several days [4]. Farm animals are submitted to management, physiological status and environment that can induce stress [4,5]. Even when this management is carried out properly and welfare is excellent in the farm, ruminants can be under 30 immunosuppression for a period of time that ranges from hours to weeks [4,6,7].

This stress may, directly or indirectly, induce a decrease of vaccination efficacy, above all when administration of the vaccine is done during this period of immunosuppression. Ideally, ruminants should not be vaccinated during these immunosuppression periods. On the day by day of a farm, this golden rule is often forgotten, and vaccinations are done under stress or immunosuppression periods. Veterinarians tend to assume that vaccination protocols

and management strategies they advise for are correctly done. The reality is that on farm routine brings to a bias in between what is set and what is done. The main objective of this manuscript is to provide a strategy for veterinarians, farmers and advisors in order to identify stress periods and vaccine administrations, evaluate if an increase of health and efficiency can be achieved.

Material and Methods

For this strategy a spreadsheet with several columns and multiple lines (Figure 1) is needed and an interview with the farmer/herd manager that will last 1 to 2 hours will be agreed. It is recommended to have agreed an appointment time before, it is crucial not to be in a hurry and start and finish the interview at once. It is also recommended to have this appointment visiting the farm and the animals, as if it was the first time you are in that farm.

Data collected will be all the stressing management, practices or statuses that occur in a farm from day 0 of life until completing first lactation, including dry off and the second parturition. Most common stress factors must be detailed, and the immunosuppression period attributed. It is also essential to detail all the different feeding and

allocation that ruminants will have during the period under study. Finally, all the vaccination protocols will be detailed (product and day of administration -age or day after parturition-). All this data

will be in columns and placed in the spreadsheet cell corresponding to the day that is done (Figure 2).

1	A	B	C	D	E	F	G
1	DAYS OF LIFE	FEEDING	MANAGEMENT	HOUSING TYPE	IMMUNOSUPPRESSION	VACCINATION	COMMENTS
30	56						
31	57						
32	58						
33	59						
34	60						
35	61						
36	62						
37	63						
38	64						
39	65						
40	66						
41	67						
42	68						
43	69						
44	70						
45	71						
46	72						
47	73						
48	74						
49	75						
50	76						
51	77						
52	78						
53	79						
54	80						
55	81						
56	82						

Figure 1: Template scheme used during the audit.

1	A	B	C	D	E	F	G
1	DAYS OF LIFE	FEEDING	MANAGEMENT	HOUSING TYPE	IMMUNOSUPPRESSION	VACCINATION	COMMENTS
30	56	Milk+Water+Concentrate IN PELLETT		Individual, straw+sawdust			
31	57	Milk+Water+Concentrate IN PELLETT		Individual, straw+sawdust		BRSV+PI-3+BVD+IBR	
32	58	Milk+Water+Concentrate IN PELLETT		Individual, straw+sawdust			
33	59	Milk+Water+Concentrate IN PELLETT		Individual, straw+sawdust			
34	60	Milk+Water+Concentrate IN PELLETT		Individual, straw+sawdust			
35	61	Milk+Water+Concentrate IN PELLETT		Individual, straw+sawdust			
36	62	Milk+Water+Concentrate IN PELLETT		Individual, straw+sawdust			
37	63	Milk+Water+Concentrate IN PELLETT		Individual, straw+sawdust			
38	64	Milk+Water+Concentrate IN PELLETT		Individual, straw+sawdust			
39	65	Milk+Water+Concentrate IN PELLETT		Individual, straw+sawdust			
40	66	Milk+Water+Concentrate IN PELLETT	DEHORNING	Individual, straw+sawdust			
41	67	Milk+Water+Concentrate IN PELLETT		Individual, straw+sawdust			
42	68	Milk+Water+Concentrate IN PELLETT		Individual, straw+sawdust			
43	69	Milk+Water+Concentrate IN PELLETT		Individual, straw+sawdust			
44	70	Milk+Water+Concentrate IN PELLETT		Individual, straw+sawdust			
45	71	Milk+Water+Concentrate IN PELLETT		Individual, straw+sawdust			
46	72	Milk+Water+Concentrate IN PELLETT		Individual, straw+sawdust			
47	73	Concentrate NOT PELLETT+ Water+Hay	SUDDEN WEANING	Individual, straw+sawdust			
48	74	Concentrate NOT PELLETT+ Water+Hay		Individual, straw+sawdust			
49	75	Concentrate NOT PELLETT+ Water+Hay		Individual, straw+sawdust			
50	76	Concentrate NOT PELLETT+ Water+Hay		Individual, straw+sawdust		BOOSTER BRSV+PI-3+BVD+IBR	
51	77	Concentrate NOT PELLETT+ Water+Hay		Individual, straw+sawdust			
52	78	Concentrate NOT PELLETT+ Water+Hay		Individual, straw+sawdust			
53	79	Concentrate NOT PELLETT+ Water+Hay	GROUPING	GROUP 12-16 PCS			
54	80	Concentrate NOT PELLETT+ Water+Hay		GROUP 12-16 PCS			
55	81	Concentrate NOT PELLETT+ Water+Hay		GROUP 12-16 PCS			
56	82	Concentrate NOT PELLETT+ Water+Hay		GROUP 12-16 PCS			
57	83	Concentrate NOT PELLETT+ Water+Hay		GROUP 12-16 PCS			
58	84	Concentrate NOT PELLETT+ Water+Hay		GROUP 12-16 PCS			

Figure 2: Detailed and completed information needed for analysis between 56 to 84 days of a dairy heifer's life. PCS: number of calves. BRSV (Bovine Respiratory Syncytial Virus), PI-3: Bovine parainfluenza type 3 virus. BVDV (Bovine viral diarrhoea); IBR (Infectious Bovine Rhinotracheitis); BRD (Bovine Respiratory Disease).

Results and Discussion

The result of this appointment and post office work will be a spreadsheet full of different information that includes nutrition, management, immunosuppression, vaccination and disease. This way to gather information, will allow the advisor to detect, very quickly, unwanted phenomena in a farm, which reduce the health status of the animals. It will be easy to detect failures

in the application of vaccinations under periods of stress or immunosuppression, different management too close together in time or too many stressing changes at once (i.e. grouping and change of feeding the same day).

Furthermore, it allows the consultant to suggest changes in the tempos of conducting management practices or suggest changes in the days of vaccination so that they do not coincide with periods

of stress and immunosuppression. Thus, maximizing the potential of vaccinations, not only in their ability to generate immunity, but also just when it is desired to generate immunity. As examples, vaccination for respiratory pathogens is strongly recommended at least 2 weeks before transport or grouping and vaccination for BVDV is strongly recommended 3 to 4 weeks before insemination/

matting in order to avoid abortion or persistently infected bovines. Surprisingly, the advisor can sometimes suggest changes that will be better for health status but also for the production costs of the farmer. As an example, reduction on feeding milk replacer to calves without any impact on performance (Figures 3 & 4).

Figure 3: Critical point in the heifer rearing process in a dairy farm. Blue oval shows the stress factors in orange (late dehorning, sudden weaning and grouping) in 15 days and the immunosuppression caused, having a negative impact on the booster of respiratory disease vaccination (in red). Red oval shows the consequence: endemic respiratory disease in this group of animals. PCS: number of calves. BRSV: Bovine respiratory syncytial virus. PI-3: Bovine parainfluenza type 3 virus. BVDV: Bovine viral diarrhoea. IBR: Infectious bovine rhinotracheitis. BRD: Bovine respiratory disease.

Figure 4: Final management and vaccination schedule after analysis of situation described in Figure 3.

Blue oval shows the stress factors in orange (late dehorning, sudden weaning and grouping) in 15 days and the immunosuppression caused, having a negative impact on the booster of respiratory disease vaccination (in red). Red oval shows the consequence: endemic respiratory disease in this group of animals. PCS: number of calves. BRSV: Bovine respiratory syncytial virus. PI-3: Bovine parainfluenza type 3 virus. BVDV: Bovine viral diarrhoea. IBR: Infectious bovine rhinotracheitis. BRD: Bovine respiratory disease.

Changes on management procedures, timing on management and vaccination protocol reduced respiratory disease after grouping. Decisions taken were: Dehorning at 15 days of age, gradual weaning and vaccination protocol started a week earlier. Results were a spare of milk and a 60% decrease of BRD cases. PCS: number of calves. BRSV: Bovine respiratory syncytial virus. PI-3: Bovine parainfluenza type 3 virus. BVDV: Bovine viral diarrhoea. IBR: Infectious Bovine Rhinotracheitis. BRD: Bovine respiratory disease. ML: Milk

Conclusion

Continuous and detailed review of management procedures together with stress factors and vaccination protocols in ruminants'

farms is needed to maximize health status. This audit must be individualized. Results and changes set must be written, analyzed and described in an easy, accurate and understandable way for the farmer.

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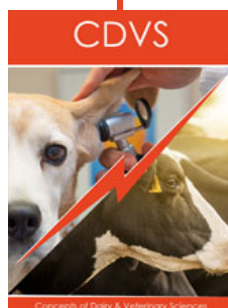
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