PARATUBERCULOSIS CONTROL PROGRAM IN NORTH WESTERN ITALY (PIEDMONT REGION) INVOLVING PRODUCERS ASSOCIATION*

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SUMMARY

Paratuberculosis (PTB) is a debilitating, infectious, costly disease which is taking an increasing importance in Italian dairy herds. In the Piedmont Region the seroprevalence of PTB was estimated at about 21.75%. On the basis of these results a voluntary control program involving producers association was developed. The objectives of the program were: 1) sensitizing producers to PTB; 2) providing diagnostic tools to the farmers involved in the control program 3) gradually reducing g the overall prevalence in the area and in participating herds.

Program design: Step 1) Information; Step 2) Screening; Step 3) Monitoring; Step 4) Biosecurity.

Keywords: Control program, PTB, Dairy cattle.

RÉSUMÉ

La paratuberculose en Italie devient de plus en plus importante dans les élevages laitiers.

À la suite d'une étude conduite dans la région Piémont sur le lait de mélange de 1 531 élevages, la prévalence a été estimée à 21,75%. Sur la base de ces résultats, on a proposé un plan volontaire de contrôle de la maladie.

Le programme comporte trois étapes :

- La sensibilisation des associations des éleveurs sur les risques liés à la maladie ;
- Le dépistage gratuit sur le lait de mélange avec le test ELISA ;
- La surveillance en ELISA sur le lait des animaux de plus de deux ans, trois fois par an (coûts à la charge de l'éleveur). En même temps ont été données les bonnes pratiques de gestion et les mesures de biosécurité pour limiter la diffusion de la maladie.

Mots-clés : programme de contrôle, paratuberculose, élevages laitiers.

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I - INTRODUCTION

Paratuberculosis (PTB) is a contagious, chronic, debilitating, infectious disease, characterized by progressive intestinal inflammatory process leading to chronic enteritis in cattle and other ruminants. The disease it is caused by *Mycobacterium avium* subspecies *paratuberculosis* (MAP) and is widely distributed in the world [Kennedy and Benedictus, 2001].

The dynamic of infection is very complex, as different conditions have been distinguished. The animal could be: susceptible, transiently infectious, latently infected, subclinically infected, clinically affected, and resistant. Susceptible animals can get the infection. Infected cattle can be transiently infectious (shedding MAP only during a limited period of time), latently infected (not infectious cattle), subclinically infected, or clinically affected. Subclinically infected cattle are infected and infectious, but they do not present clear clinical signs. Clinically affected cattle are infected, infectious and present clinical signs. Resistant animals cannot get the infection [Nielsen *et al*, 2009; Sergeant *et al*, 2008].

MA can be easily introduced into a herd, the main routes of transmissions are: fecal-oral, congenital and through mammary secretions. At herd level the main source of infection is represented by MAP-infectious animals [Nielsen et Toft, 2008]. MAP can be transferred directly, via oral uptake of milk or faeces containing MAP, and vertically via colostrum and in utero. Also the environment can be a source of infection as MAP shed into environment can survive for a long time. Calves less than 6 months are generally considered to be at the greatest risk of becoming MAP infected due to high permeability of the intestines.

Considering that, there isn't currently treatment for PTB the prevalence of the disease gradually increases if the control programs are not effectively applied. The disease has substantial negative effects on cow productivity, and thus can determine a major financial loss; the lower protein absorption cause decrease of milk production, weight loss, profuse diarrhea and death if the animal is not culling before [Chiodini *et al.,* 1984].

Overall estimates of the economic loss vary widely depending on production and pricing systems. At a national level, a loss of 21€ to 25€/cow or 190 to 234€ million/year was reported for the US dairy industry [Ott *et al*., 1999], 40€ million for The Netherlands [Kennedy and Benedictus, 2001].

The infection has been described in most of the intensive cattle production systems around the world [Kennedy and Nielsen, 2007]. A recent review of PTB prevalence in Europe reports that the animal level prevalence is around 20% [Nielsen and Toft, 2009]. Several countries have developed regional or national PTB control programs. At the beginning they were mainly based on test-and-cull measures. Now new programs are oriented towards control and not eradication, as eradication programs are very expensive for the whole industry [Garry, 2011].

Recently PTB is taking an increasing importance in Italian dairy herds and several surveys have been carried out [Lillini *et al.,* 2005; Pozzato *et al.,* 2011]. In northwest Italy (Piedmont Region) in a study including 1531 dairy herds a total of 123 resulted positive at bulk tank milk test ELISA and estimated seroprevalence, corrected by sensitivity and specificity, resulted 21.75%. On the basis of these results a voluntary control program involving producers association was established in Piedmont region. The aims of the program are: 1) sensitizing producers about PTB; 2) providing tools to farmers involved control the disease; 3) decreasing gradually the overall prevalence in the area and in participating herds.

This work describes the scheme of this control program.

II - MATERIAL AND METHODS

Piedmont is located in the Northwest Italy close to France and Switzerland It is one of the most important Italian regions for cattle farming, including 828.211 cows and ~ 16.594 herds, 65% of which are concentrated in the provinces of Turin and Cuneo. Dairy herds are about 3.855, dairy breeds (Italian-Friesian and Brown Swiss) represents 23% of cattle, mainly located in the eastern area of the Region (Padana plane).

To set a control program several steps were required. A study to estimate seroprevalence of dairy herds was carried out. Several meetings and workshops on PTB were organized for public and private veterinarians, laboratory, dairy producers and livestock producers associations. Educational materials (leaflets, papers, slides) have been developed and are available from multiple sources. According to Garry [Garry, 2011] before starting a control program, it is important that the producers understand the nature of the disease, how it spreads in a herd and the various aspects of a good PTB control program. Furthermore, depending on the control program is implemented, the cost can be high. To increase the level of compliance, vet practitioners should be more involved in the activity and advice should be coordinated amongst all the stakeholders [Sorge *et al.*, 2010].

To set cost-effectiveness monitoring plan a simulation analysis was carried out (data unpublished) considering the following parameters:

- Combining accuracy of different diagnostic tools (serological, biomolecular, cultural tests). Diagnostic sensitivities and specificities of tests have been evaluated at herd and single animal level. Including also pooling test;
- Prevalence data;
- Costs of tests;
- Herd characteristics (size, type, management…).

III - RESULTS

A diagnostic set was established. The benefits, liabilities, and costs of various testing strategies have been evaluated and a program including cost and time to reduce the prevalence has been showed to producers associations. Program design is in Figure 1:

STEP 1: Information

The local dairy producers association and the Veterinary Medical Research Institute for Piemonte, Liguria and Valle d'Aosta (IZS PLVA) will organize meetings to inform the livestock producers and the practitioners about the following aspects:

- what is PBT - how it spreads into the herds;
- how to control (effective herd biosecurity management protocols);
- cost of monitoring;
- cost derived by loss of production, disease management and culling;
- different monitoring strategy.

Outputs from step 1 are leaflets, paper, working meeting and estimated of the costs for applying a simple monitoring plan. Figure 2 shows one of the leaflets developed.

STEP 2: Screening

A free ELISA screening test on bulk tank milk (BTM) will be performed for every herd. The survey step can give indications about the level of farm prevalence and, in particular, identify herds with a high level of infection. Bulk milk samples will be tested with the ELISA test (Pourquier - Screening/Verification) to evaluate the presence of PTB in the dairy herds. Results of tests will be discussed with the farmers and veterinary public health.

Figure 1

PTB program plan

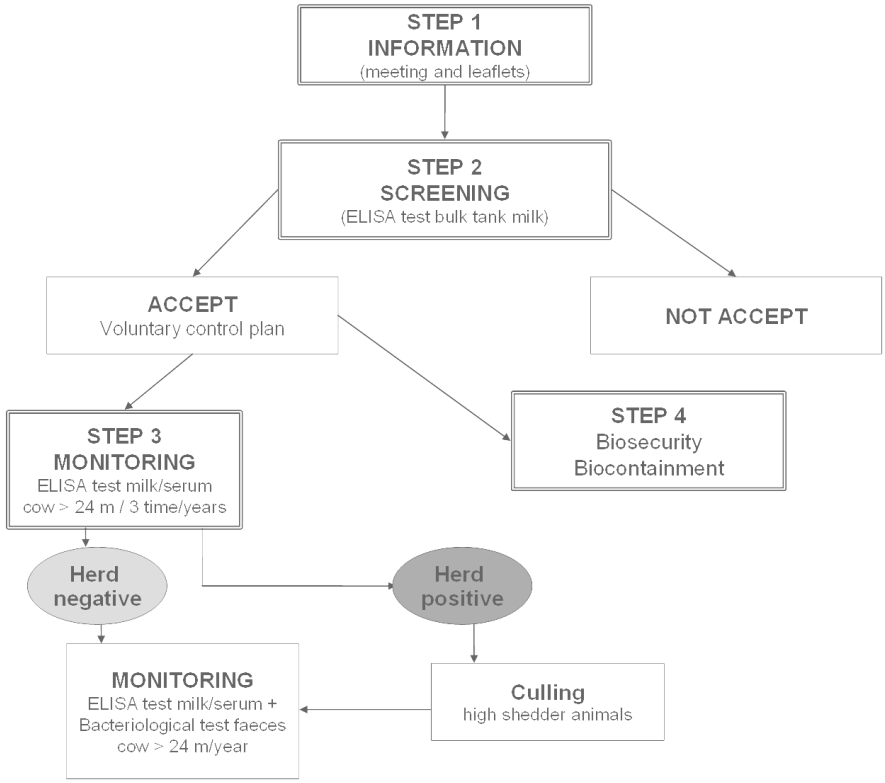

Figure 2

Information about PTB for livestock producers

STEP 3: Monitoring

All cattle aged >24 months will be tested 3 times a year for PTB antibodies in milk or serum samples. The costs for these tests will be paid by the farmers. This step is intended for farms tested negative to the control of bulk milk. The positive samples are subjected to further confirmatory tests with specificity of 100% (culture faecal). Herds tested positive during four controls in the year must eliminate high shedder animals. A herd is considered negative for PTB if results for all cows tested during 3 controls are negative.

The aim of this Step is to identify the prevalence of infected animals in the farm and allow classifying the herd as negative (IC 95%).

STEP 4: Biosecurity

A set of biosecurity and biocontainment measures will be set up on infected herds. For a proper conduct of the protocol is necessary that appropriate procedures are adopted in farm management. To prevent the spread of the infection it is necessary that a good level of internal and external biosafety is guaranteed.

IV - DISCUSSION

The current PTB program is a voluntary control program whose costs are borne by farmer. Primary objectives of the current program are to reduce contamination of farms and farm products, preserve the status of non-infected herds and reduce impact of PTB on the social, economic and trade aspects. The long term aim is to eradicate PTB, with the establishment of successful control strategies, costs effective surveillance and certification programs.

Although some producers will choose to take no further action to control PTB on the dairy, the herd veterinarian should continue to update producers as new PTB information becomes available. The educational process should include a discussion of the difference between « cost » and « investment ». For many dairy producers, any financial outlay is seen as a charge, and most producers strive to attain the lowest possible cost of production [Garry, 2011]. Control of PTB requires expenditure of both time and money. A control program should have definable objectives and these objectives must have a value for the producer. In order to PTB control program to work, it is important to establish the long-term goals to determine if the costs of the program will be wise investments for the future profitability.

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