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Epidemiological study of bovine brucellosis in area Constantine

Kabouia R.[1], Khaled H.[2], Kerrour M.[1], Bouazziz O.[1] and Belmerzoug M.[1]

[1]*Laboratory Management the Animal Health and Production, Institute of Veterinary Science, University Constantine1*
[2]*Department of Veterinary Science, University of Blida Saad Dahleb*

ABSTRACT

Brucellosis is a major common to humans and different animal species zoonoses. The bacteria belonging to the genus Brucella, they cause a multitude of symptoms in cattle, but the most attractive is the abortion that occurs mainly in the last third of gestation. The objective of this work is on the one hand the study of seroprevalence of the disease with serological tests that are buffered antigen test and complement fixation as a confirmatory method, and secondly, the development of a strategy adapted to the epidemiological situation. Dice 2000 until 2005, the wilaya of Constantine recorded prevalence above 1%. So the disease becomes enzootic great with a heterogeneous distribution across the various municipalities. The number of households experiencing a significant increase after the peak of 2001 and continues to grow even in the first half of the year 2007. The best strategy is vaccination of all cattle in the province with the RB51 vaccine, which has a very high protective efficacy.

Key words: bovine brucellosis, Brucella serology, wilaya of Constantine

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INTRODUCTION

Pets are an important source of nutrients primarily protein content. However, these animals are endangered as a result consumption of food of animal origin or due to their promiscuity. In this regard appears brucellosis as a major zoonotic bacterial diseases in humans represents a risk to public health, although it is a debilitating disease that fatal, have its consequences and its varied symptomatology contribute to worse prognosis.In animals, the economic losses are related to reproductive diseases (abortions, infertility, decreased milk production) and especially the sanctions assigned to the food industry.

Algeria is not far from one of the most affected by the disease in domestic ruminants countries. Bovine brucellosis locates north of the country, against, in the steppes and interior regions is brucellosis in small ruminants is the most dominant. Consumption of milk and raw milk products has been estimated at 85% of human infections **[1].**

MATERIALS AND METHODS

No serological test is not alone, suitable for all epidemiological situations. All have limitations, particularly for individual diagnosis **[2, 3]**. In Algeria, the two methods used for the detection of bovine brucellosis are buffered antigen test and the complement fixation method as a confirmatory method **[4].**

1. Buffered antigen test or rose bengal test.
This is the first test used for the detection of bovine brucellosis. This is a qualitative test for the detection of IgM and agglutinating IgG1 by interaction with an antigen of B. abortus S99 or S1119-3 stained with rose bengal set buffered acid suspension **[5]** This is a specific test, economical, quick and easy execution **[6]**.

2. Complement fixation method

Positive sera with the first method will undergo a second confirmatory method which is the method of complement fixation. This is confirmatory method used around the world. The principle of this technique is the search lytic complement-fixing antibodies by interaction with a brucella antigen. The system developer is a preformed complex and titrated erythrocytes and anti-erythrocyte antibody. A bovine serum is considered positive after a titration greater than or equal to 20 IU (this serum causes an inhibition of 50% haemolysis) **[5]**. Unlike the buffered antigen test, this test is quantitative, sensitive, specific, very delicate and requires trained personnel **[6]**.

RESULTS AND DISCUSSION

1. annual prevalence

Table 1: Prevalence of bovine brucellosis in the wilaya of Constantine during the years 2000 to 2007 (January-June)

year	Prevalent of case			Prevalence homes		
	numbers detected	Number of positive cases	Annual prevalence	farms visited	infected farms	Annual prevalence
2000	1355	19	1,40 %	140	13	9,29 %
2001	1509	55	3,64 %	155	24	15,48 %
2002	1307	40	3,06 %	142	11	7,75 %
2003	1904	41	2,15 %	227	10	4,41 %
2004	3068	33	1,08 %	280	19	6,79 %
2005	4627	30	0,65 %	520	21	4,04 %
2006	6283	45	0,72 %	622	23	3,07 %
2007 (january-june)	4048	45	1,11 %	375	25	6,66 %

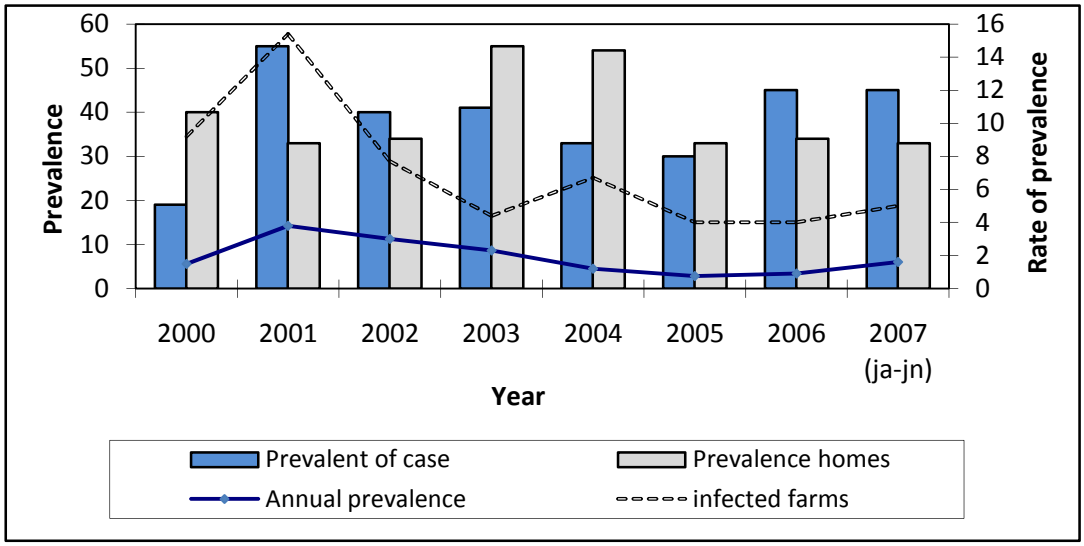

Figure 1 Graphical representation of the prevalence of bovine brucellosis in the wilaya of Constantine during the years 2000 to 2007 (January to June)

Looking at Figure No. 01, there is a decrease in annual prevalence dice the year 2002 until the year 2004, after the peak in 2001 (3.64%). The last 2 years 2005 and 2006 saw a stable annual prevalence rate (0.65% and 0.72%) although the number detected is significantly increased. During the first 6 months of the year 2007, we note that there is an increase in prevalence. For the prevalence of households, the presence of three peaks annual prevalence is marked. The first in 2001 (with 15.48% and 24 households) and the second in 2004 (6.79% and 19 households), it adds to the rise in prevalence semester in 2007 (6.66% and 25 households). The prevalence is gradually increasing dice the year 2004. For a period of 5 consecutive years the annual prevalence rate has not decreased below 1%. Brucellosis takes enzootic look with this high rate wilaya. With the exception of 2000 where the difference between the results obtained for each of the municipalities was insignificative, other years have recorded significant values of chi-square test which aims to study the distribution of the disease within the province. In many cases, registered in the wilaya of Constantine peaks corresponded to peaks reported in the surrounding wilaya. The common marking persistence of outbreaks: Constantine, El Khroub, Zighoud Youssef and Hamma Bouziane. For other cities, broadening the screening procedure is necessary to unmask end of the disease.

Table 2 Stamping of animals declared positive for the province of Constantine during the years 2000 to 2007 (January to June)

Year	affected animals	animals slaughtered	dead animals	Animal bodies
2000	19	18	0	1
2001	55	47	0	8
2002	40	17	3	20
2003	41	39	0	2
2004	33	28	2	3
2005	30	27	0	3
2006	45	32	0	13
2007 (January-june)	45	27	0	18

2.3. Control Measures

The choice of strategy will depend mainly on the prevalence of disease, socio-economic and political will **[7].** The main strategies are:

- Screening associated with stamping: applied since 1995, this strategy has not been successful in the context of disease eradication. Elevations prevalence rates are often observed and the risk of outbreaks are still present. In addition, stamping has dramatic impact on the growth of the national herd. Added to this is the high transaction cost of screening.
- Vaccination of young animals and disposal of reagents: with this strategy, the possibility of distinguishing between vaccinated and infected animals is possible, but the only disadvantage is the slow stability of immunity in cattle and consequently, the risk of Epizooties intensify.
- Mass vaccination of all livestock through the territory of the province: it is the most appropriate given the context epidemiology method. After an operation identification and animal identification, this strategy may be associated with screening and removal of reactants initially, so that affected animals do not persist long in herds. The recommended vaccine is the RB51, this vaccine strain, rough B. abortus, free O chain is generally desired by the diagnostic tests, therefore, the possibility of detection is not completely eliminated **[8]**. This vaccine causes less abortions and has a higher than other vaccines which indicates its wide use efficiency **[9, 10]**. The indicated dose is about 1 to 3.4 x 10^{10} CFU. Vaccination between the age of 3 to 10 months or between 10 to 12 months to protect all vaccinated animals in areas with high prevalence. For pregnant cows, the recommended dose is 10^{9} CFU **[11]**. Control programs undertaken by countries affected by the various forms of animal brucellosis require huge financial funds at the end to reduce the prevalence first time and thereafter, the eradication of the disease. For example, in Mongolia, a vaccine companion that lasted 10 years was able to reduce the disease by 52%, the cost of vaccination was estimated at 8.3 million dollars and net profit was 18.3 million Dollars **[12]**.

2.2. Culling of positive cases

By observing Table N ° 02, we note that there are some number of affected animals which do not undergo stamping. For each year, animals remain pending. This is an important factor not only in the persistence of a home in relation to the high resistance of the organism in the external **[13]** medium.

But especially its spread as brucellosis spreads from 2 types of animals:
- Those who are suffering from acute brucellosis and abortion are the main cause of the spread of the disease in a herd.
- Those with a chronic subclinical infection and shed intermittently or permanently germs in vaginal secretions or milk.

CONCLUSION

Although bovine brucellosis been a national program to combat dice the year 1995, she is looking enzootic in the wilaya of Constantine. Several factors contribute to the rise in prevalence , the most important are :

- The absence of an accurate census of the population.
- The misapplication of health regulations .
- Non-compliance with health measures prophylaxis.
- The absence of inter- sanitary control and inter wilaya .
- The exhaust of a large number of animals in the screening operation .
- The increased commercial exchange that disrupt the screening successive movements.
- The disorganization of livestock markets .

The plan developed by public authorities should be checked and the application of vaccination is a necessity to have a late continuation under brucellosis eradication across the region.

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