

## Seasonal Prevalence of Primary Disease Dairy Herds in North-Eastern of Algeria

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**Abstract:** The serums coming from 450 dairy cows have been analyzed for the detection of the brucellosis, the prevalence observed of the infection is of 10-44%, the test of the Intradermotuberculation for the detection of the tuberculosis raised that the prevalence observed of the infection is of 8-22%, with a significant difference ( $p < 0.05$ ) between the individuals of 2 years and those aged of  $> 4$  years. All studied sanitary trouble were present during all year with a predominance of the mastitis especially in beginning of spring, where the prevalence attain 44-88% and or the troubles of reproduction bound have the stake bottom were the order of 14-88%, the respiratory trouble especially appeared in winter with a peak of 21-77%, the digestive trouble were the order of 11% in the spring whereas the parasitosis, the piroplasmosis reached their maximum in summer with 21-55%, the locomotive trouble were constantly present all along the year touch the same beasts practically, with a peak in estimated winter to 18-22%, what showed that the season has an effect on the emergence of these different trouble with a valor highly significant  $p < 0.001$ .

**Key words:** Tuberculosis, brucellosis, bovine mastitis, reproduction disorders, respiratory disorders digestive disorders, piroplasmosis, lameness, seasonal prevalence, primary disease, North-Eastern of Algerian

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### INTRODUCTION

Like a lot of developing countries, Algeria had always resort to the yearly import of massive quantities of milk and score of thousands of dairy bovines to high output (Haddad, 2001). This provision to the level of the world market will certainly persist in years to come considering the importance of the present raw milk deficit (Tisserand and Fevrier, 1989).

The performances of production of the Algerian dairy bovine livestock appear very lower to the fixed objectives, often optimistic. Indeed, in all exploitation of bovine, the females are destined to assure a dairy production and/or of maximal meat. However, several factors of food, therapeutic, pathological nature or management are susceptible to spoil the reproductively and productivity of these animals what essentially results in a decrease of the dairy production (Fourichon, 2001; Weigler *et al.*, 1990). The sanitary problems constitute an important constraint for the development of the dairy bovine raisings, the impact economic of the health unrests in the French dairy raisings is estimated on average to 232 cow<sup>-1</sup> (Fourichon *et al.*, 2001). Only a third of this cost is bound to the expenses of health mastery. The two

third remaining are due to the induced losses that correspond to the resulting loss of profit of the effect of the illnesses on the reached animals. The estimating cost of the pathologies in raising consists in adding the veterinary fees, the cost of the treatments, analysis and possible vaccinations (Seegers *et al.*, 2002) to which it is necessary to add the bearish consecutive losses of milk production, the effects of the disease on the quality of the products (rate, cells, weight of carcass) and on reproduction. The longevity of the animals often difficult to encode (Fourichon, 2001; Fourichon *et al.*, 2001).

The objective of the present research that took place in the Northeast Algerian, zone well-known by its density of the dairy bovine raising, was to detect the emergence of the affections and disease of the dairy raisings and to hierarchize their seasonal importance in order to define the priorities of action and to put preventive actions in place upstream of these pathologies.

### MATERIALS AND METHODS

**Presentation of the research farms:** The study took place in the region of EL Tarf situated in the extreme Northeast of Algeria, border to Tunisia. It occupies a surface of

300,000 ha; it is limited at the North by the Mediterranean Sea. The recorded middle pluviometry varies between 600 and 800 mm year<sup>-1</sup>. The humid period spreads from September to May; it represents 95% of the yearly pluviometry. The average temperatures vary from 11°C in winter to 25°C in summer; the lowest temperatures are recorded in the month of January; the maximum appears in July and August. The middle relative humidity varies between 71 and 79%, the minimum being located between 43 and 53% and the maximum between 92 and 96%. The different fodders cultivated in the region are the vesse oat, the barley, the fodder corn, the fodder sorghum to quoted it of the hay of natural prairie, alfalfa, clover.

The farms of study are buildings of raising follow-ups by private breeders, sheltering some animals in free rest cure. All aspects of the comfort of the animals are not satisfied. The study was about 450 cows of Holstein race magpie black exploited for the dairy production, aged between 2 and 6 years, belonging to four raisings locate in the region of EL Tarf during 4 years, from September 2002-2006.

These farms practice a raising in free rest cure with logette, the abreusement is automatic, the mechanical bill, the mode of reproduction is assured by goes up natural and the artificial insemination. The food is constituted mainly of green grass or clover, of extract, residual of tomato, hay and ensilage.

**Personal follow-up:** During the personal follow-up we listed the observed pathological cases while being based on the clinical signs, to treat the sick topics, to track down the dairy cows against the brucellosis, the tuberculosis and the mastitis and tried to make diagnostic treatments especially against some parasitosis. In most cases, we have more to make to symptomatic statement that to real etiologic diagnosis for the identification of the pathologies (Miller and Dorn, 1990; Ftheichon *et al.*, 2001). The list of definitions of pathological trouble is discussed.

**Digestive troubles:** Digestive signs include diarrhea, indigestion, meteorisation, foreign body.

**Respiratory troubles:** Respiratory signs include cough, difficulties to breathe, out-flows to the nostrils and pulmonary attacks.

**Locomotive troubles:** Lameness.

**Trouble of reproduction:** Metritis, vaginitis and abortions.

**Parasitism:** Strongylosis, fasciolosis, coccidiosis, piroplasmosis, burrs and ticks.

All gotten data have been treated with the help of the software Minitab 2005, the significativity of the observed differences are appreciate by Chi Two low (Lazar and Schwartz, 1987).

#### **Biologic taking and methods of laboratory analysis**

**For the detection of the Brucellosis:** Blood has been collected by punction to the jugular vein in sterile tubes without anticoagulating and has been centrifuged to 10,000 rpm during 10 min seen some harvesting the serum that is kept in -20°C until the moment of the analysis. The test in the pink Bengal has been achieved according to the method described by Morgan *et al.* (1969). The positive cases have been confirmed by the reaction of complement fixation (Alton *et al.*, 1998).

**For the detection of the tuberculosis:** The Intra Dermo Tuberculation (IDT) simple with the PPD tuberculin (purified proteinic Derivative) normal measured out in 20,000 UCT mL<sup>-1</sup> (Communal Units of Tuberculin) has been used (Dego and Tareke, 1974). The positivity of the test has been valued according to the following protocol:

**J<sub>0</sub>:** Measure of the thickness of the Dermis (D1) and intradermal injection of bovine tuberculin purified.

**J<sub>3</sub>:** Means 72 h later; measure of the thickness of the Dermis (D2) and calculation of D2-D1.

The interpretation of the results has been done like follows:

- If D2-D1 < 2 mm, the reaction is negative
- If 2 mm < D2-D1 < 4 mm, the reaction is doubtful
- If D2-D1 is superior to 4 mm, the reaction is positive (Benet, 1996)

**For the detection of the mastitis:** Deducted samples of milk in sterile tubes of 25 mL have been used to value the prevalence of the mastitis by the California Mastitis Test (CMT) (Schalm *et al.*, 1971; Schalm and Noorlander, 1957; Fontaine, 1987; Marshall *et al.*, 1993; Dingwell *et al.*, 2003).

## **RESULTS**

**Tuberculosis and brucellosis:** For the brucellosis, the number of positive animals is of 47, either a prevalence observed of 10-44%. With a limit of risk  $\alpha = 0.05$  we have one confidence interval that situating between 0.0794 and 0.1362. For the tuberculosis, the number of positive animals to the IDT is of 37 either a prevalence observed of

Table 1: Effect of age on the seroprevalence of the brucellosis and the tuberculosis

Age	2,5-4 ans	>4 ans
Brucellosis	(22) 4.88%	(25) 5.55%
Tuberculosis	(02) 0.44%	(35) 7.77%

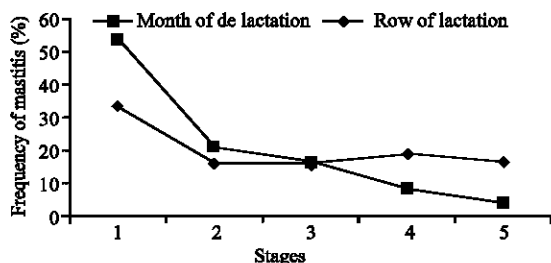


Fig. 1: Frequency of the mastitis according to the stages and the row of location

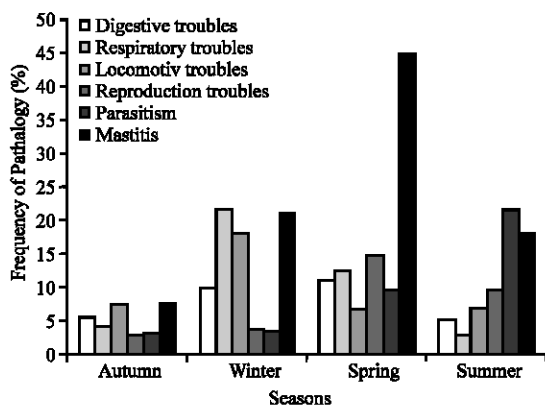


Fig. 2: Global seasonal prevalence of the main pathologies (troubles)

8.22%. With a limit of risk  $\alpha = 0.05$  we have one confidence interval that situating between 0.0602 and 0.1113. This prevalence increases distinctly with age. A significant difference between the animals of 2 years and those aged of >4 years ( $p < 0.05$ ) has been observed. The Table 1 indicates the effect of age on the seroprevalence of the two diseases.

**Mastitis:** On the 450 studied dairy cows 68 presented signs of clinical mastitis during the period of lactation (beginning of the spring), either a prevalence 15 and 11%, the samples tested by the Californian Mastitis Test (CMT) raised that 134 dairy cows had a sub-clinical mastitis, either a prevalence of 29-77%.

The Fig. 1 shows the distribution of the cases of mastitis (clinics and sub-clinical disconcerted) according to the stage of lactation and the row of lactation, it indicates an impact raised rightly of the mastitis after the

calving followed of a regular decrease. Elsewhere, we remark a reduction then a stabilization of the impact of the mastitis with the row of lactation.

**Other pathologies:** The studied troubles were present during all year, the most frequent pathology was especially the mastitis at the end of winter and in beginning of spring, where the prevalence reached 44-88% and where the trouble of reproduction bound to the low stake were the order of 14-88%. The apparition of the respiratory troubles is especially, important in winter with a peak of 21-77%, the digestive troubles were valued to 11% in the spring, whereas the parasitism (especially the piroplasmosis) reached its maximum in summer with 21-55%. The locomotive troubles are constantly present all along the year touching the same subject practically, with a peak in estimated winter to 18-22%, in light of these results, the season has a highly significant effect on the presence of these different troubles ( $p < 0.001$ ) (Fig. 2).

## DISCUSSION

The seroprevalence of the brucellosis recorded in the study is of 10-44%. She is superior to the one report by other researchers who studied the disease in Algeria (Aggad, 2002, 2003) in Libya (El-Sanousi and Omer, 1985) to Morocco (Radiscon, 1998) and in Tunisia (Refai, 2002), with rates inferior to 5%. It demonstrates that the bovine brucellosis is persist and rages at the endemic state with frequent epidemic blazes (Boudilmi and Benhabylles, 1991). What is in agreement with an insufficient detection of the livestock.

The bibliographic information on the prevalence of the bovine tuberculosis are very rare (Benkirane, 1998) and the elements of comparison are therefore limited enough. Nevertheless, the prevalence observed of 8-22% is widely superior to the value of 1-82% found in Morocco (Fikri, 2004) but distinctly lower to those relate by Akakpo (1987), for Niger (18 and 3%) and Togo (22 and 5%) and (Traore *et al.*, 2004), 27 and 7% for the Burkina-Faso.

The prevalence of the infection increases with age it is of 0.44% among the cows aged from 2-4 years and 7-77% at those of >4 years. It can be explained by the fact that the brucellosis is of chronic nature and by the possibility of an exposure that increases with age. (Acha and Szyfres, 1989) for dairy bovines that have a long enough economic life.

The prevalence of the clinical mastitis is of 15 and 11%. This value is lower to the prevalence of 32 and 6% reported by Bouaziz *et al.* (2000), 23 and 1% by Koutchoukali (2000) in the region of Constantine the east of the Algeria, 42 and 2% by Niar *et al.* (2000) in the

region of Tiaret to the Algerian west, 30% by Rahmouni-Alami and Mazouz (2003), to Morocco, 29% by Seegers *et al.* (1997) and 31 and 7% by Faye *et al.* (1994) and Ramisse *et al.* (1982) in France.

The CMT stay in the study the best test to detect the sub-clinical mastitis (Ruegg and Reiman, 2002). The results indicate a prevalence of 29-77% that is lower to the one of 50% observed by Heleili (2002) in Maroco, of 64% in India (Saxena *et al.*, 1993) of 62% in Ethiopia (Deogo and Tareke, 2003), of 52% in Uruguay (Giannechini *et al.*, 2002) and on the other hand this prevalence is superior to the one of 5 and 25% reported by Pluvinage *et al.* (1991).

The frequency of the clinical mastitis is raised more in the beginning of the lactation what is in agreement with the results of several studies (Rahmouni-Alami and Mazouz, 2003; Bazin, 1983; Wilesmith *et al.*, 1986; Erskine *et al.*, 1988; Elbers *et al.*, 1998; Waage, 1998; Peeler *et al.*, 2002). It underlines the importance of the prevention in the beginning of the lactation and to the tarissement.

One also notes that the impact of the mastitis increases with the rank of lactation. It is marked more among the aged cows; these observations are in agreement with the observations signalled by other researchers (Dohoo *et al.*, 1984; Wilesmith *et al.*, 1986; Morse *et al.*, 1987; Bendixen *et al.*, 1988; Sargeant *et al.*, 1998).

In the study, the mastitis take care the first rank of the troubles of the dairy cow what agrees with several results of the works (Kossaibati and Esslemont, 1997; Miller and Dorn, 1990; Sischo *et al.*, 1990; Niar *et al.*, 2000). Come then the troubles of reproduction, the respiratory troubles and the digestive troubles. It is different from what has been observed by Mouchet *et al.* (1986) and Pieters (1989) who signal a rate important of the metabolic illnesses classified in second position. These differences can be explained by contexts of very different raisings between these two studies. Concerning the lameness, the results are in agreement with those of Desrochers (2005) who report a frequency of 2-30%, whereas Esslemont (1990) notify a frequency of 4-30%.

The parasitic trouble of which rates are constant in autumn, winter and in spring with principally of the digestive and respiratory parasitosis, increase in summer with a rate of 21-55% that corresponds to a blaze of bovine piroplasmosis. It is about disease transmitted by the ticks causing heavy losses within the livestock bovines with an especially summery impact (July and August). The theileriosis and the babesiosis constitute a major hindrance to the development of raising. Clinically the disease results in a sharp access that lasts about

15 days, characterized by an elevated and continuous hyperthermia with a strong mobilization of the phagocytic cells. The mortality reaches 20-40% often A rate of infection of the dairy bovines of 39.04% in July August has been reported by Dib (2005) in North of Algeria. In Tunisia (Bouattour, 1996) report that the piroplasmosis constitute the principal dominant pathological affecting the Tunisian dairy bovine raising, particularly touching the dairy cows of imported races.

## CONCLUSION

In Algeria, it exists only few or not of relative data to the pathologies of the dairy bovine livestock. Besides, the veterinary presence is often insufficient to assure the control and followed it of the evolution of the disease on the field.

This study permitted to estimate the prevalence of some disease and trouble of health of the dairy raisings. It takes out again of it that with a prevalence of 15 and 11% for the clinical form and 29-77% for the sub-clinical form, the mastitis take care the first rank of these pathologies all along the year and especially in the spring, where one also notes a strong percentage of reproduction trouble (14-88%) and of digestive trouble (11%).

In winter with respectively 21-77% and 18-22%, the digestive and locomotive trouble come rightly after the mastitis. The parasitosis presents with constant rates in the farms of study, reach a peak of 21-55% in summer with a lightning piroplasmosis blaze for the dairy cows.

The brucellosis and the tuberculosis of which the impact on the public health is very important are frequently detected in the dairy bovine raisings and the raised rates of infection in the study are already more important than those reported. In light of these seasonal prevalences of the different pathologies of the dairy cows, a double objective proves to be indispensable.

In short-term, it is primordial to put an adequate prevention program that should consist in a regular detection of these disease in place, to the reform of the brucellosis subject and tubercular with measures of accompaniment (compensation, etc.) and especially, to lead a big campaign of sensitization and information of all actors. In long-term, the profession should mobilize itself in order to institute a good conduct of the herd progressively, while minimizing the risks of disease that can touch the animals.

This good conduct necessarily passes by a correct food adapted to the imperatives of the new fashions of production, hygiene of life of the healthy herd and a permanent and efficient veterinary control.

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