

Département des Sciences Vétérinaires,  
Faculté des Sciences Agronomiques et Vétérinaires,  
Université IBN –KHALDOUN de Tiaret, Algérie.

## **INCIDENCE OF MASTITIS IN VARIOUS BOVINE BREEDINGS IN TIARET AREA (ALGERIA)**

(With 5 Tables)

By

***K. GHAZI and A. NIAR***

(Received at 16/3/2006)

### **SUMMARY**

Mastitis is considered among principal pathologies which strike dairy livestock and the bovines in particular; considering their economic and medical importance, it is significantly considered to highlight the parameters which play a role in the appearance of this pathology. Our study related to a sample of 500 milking cows, and during a whole year. These cows differed from age and breed point of view, but they lived under the same defective conditions of breeding from the habitat, hygiene and food point of view. The results of the study revealed that, cows were infected for the period of stalling (winter and autumn), with a percentage of 26% and 22, 6% respectively, whereas for the period of the meadows (spring and summer) the infection was less frequent (15% and 17, 8%). Imported bovine milking breeds, showed a larger sensitivity towards mastitis i.e. Cross breeds: 15%; Pie noire race: 46, 6% and pie rouge race: 10, 4%. However, local breeds were more resistant compared to the others, with a rate of mastitis of only 9, 4%. Age did not have a direct influence on incidence of mastitis. Cows could be prone to the infection at any moment of their life, being given rigorous conditions of the Algerian breeding. Posterior udder quarters were more exposed to the infection, with 25, 84% and 25, 51% respectively for lefts to rights posteriors, whereas lefts and right anterior quarters have a percentage of 24, 32% each one. Present results showed that bacteriological quality of milk was very bad, following a bacterial contamination of collected milk, by Enterobacteria (100% of cases), Staphylococci (54% of cases), and Streptococci ones (13% of cases). Results of this study emphasized that the hygienic side does not have much consideration among stockbreeders, and consequently 50 to 80% of the herds suffer from mastitis.

**Key words:** *Mastitis, dairy herds milk; CMT, cows.*

## INTRODUCTION

Mastitis is an inflammation of the mammary gland or udder of the cow. The term mastitis is from the Greek word mastos, for breast, and it is inflammation. The response to injury to the udder of cows is called inflammation. Mastitis is the reaction of milk -secreting tissue to injury produced by physical force, chemicals introduced into the gland or most commonly from bacteria and their toxins (Poutrel, 1985). Clinical syndromes vary enormously since the acute ignition, with toxemia and until fibrosis, which develops so discreetly that it escapes the attention. Algeria, as a milk consumer country has adapted a policy of importation of improved milking cows, in order to reduce its dried milk imports, which cost the economy, millions of dollars per annum. However, these imported milking cows do not carry out the anticipated results and this is undoubtedly due to bad breeding and hygiene conditions, just as ignorance of conduct of breeding codes of our stockbreeders.

Mastitis can be presented in various clinical forms:

- Latent mastitis: characterized by the presence of germs, without inflammatory reaction, nor visible deterioration of lactic secretion.
- Sub-clinical mastitis: always characterized by the presence of germs, only, there is a hyperleucocytosis and certain modifications of the chemical properties of milk.
- Clinical mastitis: symptoms and effects of inflammation are significant and at a differing degree; according to the intensity and the speed of appearance of symptoms; we can distinguish:
  - 1- Per acute mastitis: very explosive, with accentuated general signs being able to go to the gangrene (Nickerson, 1987).
  - 2- Acute mastitis: milk is of abnormal appearance, and the animal can show hyperthermia (Schweizer, 1973).
  - 3- Sub-acute mastitis: it causes deteriorations of milk, with presence of curd, especially in the first milk jets (Poutrel, 1985).
  - 4- Chronic mastitis: it appears by an atrophic or hypertrophic sclerosis of the mammary gland, and always has an hyperleucocytosis. This form is most dangerous, because it almost always involves reform of cows.

### **Importance of mastitis:**

**1- Economic:** For stockbreeders, a cow reached of mastitis represents initially a loss of milk which can be about 6 to 85%, in addition to reforms anticipated cows. One should not forget either the attempts treatments, or the high cost that it represents. The milk industry suffers also an injury, because the chemical modifications of milk coming from sick animals and the antibiotic residues used to treat them influence unfavourably the aptitude of milk for transformation, just as the quality of it's under products. One should not forget both cow's premature reform, and the price of their renewal (Serieys, 1985).

**2- Medical:** The modifications of the aspect of mastitis milk, the change of its composition or pus which it contains, make lose with this one its food capacity, to become harmful for the consumer. Mastitis milk can contain in addition to banal germs, pathogenic ones, like those of brucellosis and tuberculosis, persons in charge are susceptible for major zoonotic disease. It can also contain enterotoxins; indeed, 10% of stocks of *Staphylococcus Aureus*, in charge for mastitis, produce a thermo stable enterotoxin (Beens and Luquet, 1987). These last can cause very serious nervous and digestive men disorders. *Streptococcus agalactiae* was discovered in certain woman urinary tract infections and new born mortals' meningitis (Rainard, 1979). It can also cause endocarditis and osteomyelitis. According to Watts and Owen (1988), the existence of antibioresistants stocks, implied in the mammary gland infections can generate difficulties in human antibiotherapy due to an acquisition of resistance character. It is the same for the presence in milk, residues of treatments, antibiotic in particular, being able to reveal bacterial antibioresistant stocks or to start allergies (Rainard, 1979).

## **MATERIALS and METHODS**

This study was carried out on a sample of 500 cows, and it was spread out over one year period (from January 2003 to December 2003). The 500 cows were distributed according to breeds, in the following way: 260 cows of "pie noire" breed; 75 cows of cross breeds; 54 cows of "pie rouge" breed and 111 of local breed cows. All these cows belonged to officially agreed farms with Tiaret Milk Office. At the time of each visit, we noted the age of the cow, its breed, its identification number, and the season. We were also interested in the conditions of hygiene, and the method of draft, before beginning inspection, palpation and the California Mastitis Test or C.M.T (Schalm and Noorlander, 1957). After

each clinical examination, we carried out sterile sampling for bacteriological analysis, which took place on the level of Microbiology Laboratory, Agronomic and Veterinary Sciences Faculty, Tiaret University (Algeria).

## RESULTS

### 1- Relation between age and mastitis:

In a general way, present results spread out over the year showed that among the 500 cows tested where 255 of them belonged to the age group 2 to 5 years, and 304 cows on the whole were affected with mastitis (60, 8%). However, the remainder of the cows (n = 145), belonged to the age group of 6 years and more, of which 103 cows were affected with mastitis (71,3%) (Table 1).

**Table 1:** Relation between age and the mastitis.

Age group of affected cows	Total number	Number of positive cases	Percentage
2-5 years	355 71%	304 60,8%	85,63%
6 years and more	145 29 %	103 20,6%	71,03%

### 2- Relation between mastitis and season:

With regard to mammary gland infection frequency according to the season, present results showed that:

**During summer:** Among the 132 examined cows, 46 cows were of "pie noire" breed (34, 84%). Rates of infection among "pie rouge, cross and local breeds were respectively 6%, 11, 4% and 15, 15%.

**During autumn:** Among the 134 cows tested, all "pie noire" cows were infected, whereas the rate of infection among "pie rouge", cross and local breeds was respectively 14, 5%, 20, 25% and 5, 4%.

**During winter:** The totality of the 134 "pie noire" breed cows examined also presented mastitis, whereas the rate of infection among "pie rouge", cross and local breeds was respectively 13%, 17, 7% and 10. 8%.

**During spring:** Among the 104 cows tested, 51 of "pie noire" cows were affected (49%), 08 of "pie rouge" breed (7, 6%), 10 of cross breeds (13%) and 06 cows of local breeds (3, 7%).

### 3- Relation between mastitis and breeds:

From the 500 cows tested in our study, 407 were suffered of mastitis; among the positive cases, 233 were of "pie noire" breed cows

(46, 6%), 52 of "pie rouge" breed (10, 4%), 75 of cross breeds (15%) and 47 cows of local breeds (9, 4%) (Table N° 2).

**Table 2:** Relation between mastitis and breeds.

Breeds	Pie noire	Pie rouge	Cross	Local	Total
Total number	260	54	75	111	500
Number of infected cows	233	52	75	47	407
Percentage (%)	96.61	96.26	100	42.34	81.4

**4- Degree of attack per udder quarters with C.M.T:**

Results of the California Mastitis Test (CMT), realised on udder quarters showed that 1517 quarters were reached with variable degrees mastitis, and according to the position of the quarter (right anterior, left anterior, right posterior and left posterior).

These degrees varied from "+" (slightly positive), and up to +++ (very positive). Among the 1517 sick quarters, 392 were lefts posterior (25, 84%), 287 were rights posterior (25, 51%); the right and left anterior affected quarters, were 369 for each one (24, 32%) (Table 3).

**Table 3:** Degree of infection according to the position of the udder quarter, by mean of C.M.T. method.

Udder quarter	+ ve	++ ve	+++ ve	Total
Right anterior	183 49,59%	144 39,02%	42 11,38%	369 24,32%
Left anterior	182 49,32%	135 36,58%	52 14,09%	369 24,32%
Right posterior	168 43,41%	146 37,72%	73 18,86%	287 25,51%
Left posterior	179 45,66%	138 35,2%	75 14,13%	392 25,84%

**5- Bacteriological examination:**

Bacterial analysis results showed three dominating bacterial species in this study. They are in fact the Enterobacteria (100%), Staphylococcus (54%) and Streptococcus (13%) (Table 4).

**Table 4:** Frequency of the various isolated bacterial species.

Bacterial species	Enterobacteria	Staphylococcus	Streptococcus
Number of contaminated cases	100	54	13
Frequency	100 %	54 %	13 %

**5- Results of C.M.T on milks of mixture:**

C.M.T test was carried out on milks of mixture on the level of Tiaret Milk Office (Algeria); Tests revealed that 21% of the samples presented the degree (±) which means light mastitis frequency; 75% of the samples presented the degree (+), which means a middle average mastitis frequency and 4% of the samples presented the degree (+ +) which means a very significant mastitis frequency (Table 5).

**Table 5:** Results of C.M.T on milks of mixture.

Cellular numerating	300.000 – 500.000	500.000 – 1.000.000	+ 4.500.000
Degree of infection	+ -	+	++
Sample number	21	75	4
Frequency (%)	21 %	75 %	4 %

## DISCUSSION

Analysis of present data included breeding distribution on all Tiaret territory, and cows tested belonged to officially agreed stockbreeders, who delivered their milk to Tiaret Milk Office. These cows were from different breeds and ages, but they lived under the same conditions (bad hygiene, bad habitat, unbalanced food and bad draft). Results revealed that among the 500 cows, 407 were positive for mastitis (81, 4%). This result proves that the present situation is very far from the allowed standards in a sizeable breeding, but it reflects the serious problem in which lactating animals live in Tiaret. With regard to the influence of the season, it was noticed that mastitis frequency is more significant in winter (26%) and autumn (22, 6%), than in spring (15%) and summer (17, 8%). Similar results were reported by Bendixen *et al*, (1988) and Kinsella (1990). According to these authors, mastitis is higher during period of stalling than period of pasture. This is primarily due to the unfavourable environmental conditions (moisture, litter,

cleanliness of the buildings, and non-observance of zootechnical standards for the livestock buildings and of food). Several authors reported an increase in mastitis frequency with age (Shultz, 1977; Dohoo *et al.*, 1982 and Bendixen *et al.*, 1988). Our results are different from those reported by these authors, because we noticed that youngest cows (except first calf cows) were most sensitive to mastitis. Imported bovine breeds were more struck by mastitis; "Pie noire" breeds are more affected, with an incidence of 46, 6%, followed by cross breeds (15%), "Pie rouge" breeds (10, 4%) and finally by local breeds, with only 9, 4%. This is primarily due to the genetic selection, and also to the bad adaptation of these cows to local environment and climate. These same reports were made in Algeria by Barnouin and Karaman (1986); Belkhiri (1993), which evoked brittleness of crossed milk cows with respect to the mastitis. There is almost no difference in mastitis localization, between anterior and posterior udder quarters (24, 32% for the firsts, and 25, 72% for the seconds) in present study, and this is inherent in the disastrous conditions of bovine breeding in our area. Regarding microbiological analysis, it was possible to find the three usual mastitis families; it not means that other germs cannot be found. In a parallel serologic study on brucellosis, on 60 cow's milk samples randomly taken, 13, 33% of these samples were positive by the use of a highly reliable test, the "Lacteliza" (Niar, 2003). In several samples, we found an association of several bacteria at the same time, and that was announced by Bind *et al.* (1980). The fact that all collected samples contain enterobacteria indirectly proves the lack of hygiene of these cattle sheds, and the bad hygiene of the draft, since these germs have a faecal origin. Several studies proved the contamination of cow's milk by these three varieties of germs (Benbrahim, 1976; Riahi, 1981; Speers and Guilmour, 1985). Results of C.M.T test prove that the ¾ of milk mixtures samples were contaminated; that also proves that 50 to 80% herd's cows were infected. This result testifies unfortunately to quite dominant mammary gland pathology in Algerian breeding.

## CONCLUSION

From present results, the following elements are considered:

- "Pie noire" cows breeds were more struck by mastitis;
- Youngest cows had the most sensitivity to mastitis (apart from first calf cows);
- Absences of hygienic measurements, and bad quality of cow's milk.

## REFERENCES

- Barnouin, J. and Karaman, Z. (1986):* Continuing eco-pathological survey: 9. Influence of the level of production on the pathology of the dairy cow *Ann Rech Vet.* 1986; 17(3): 331-46. French.
- Beens, H. and Luquet, F.M. (1987):* Guide pratique d'analyse microbiologique des laits et produits laitiers. Ed. Technique et document Lavoisier pp : 63-67.
- Blkheiri, A. (1993):* Contribution à l'étude étiologique des mammites, des qualités des laits et mise œuvre d'un plan de prophylaxie, Thèse Ing. Institut National de l'Enseignement Supérieur d'Agronomie. Blida, Algeria.
- Benbrahim, A. (1976):* Etude de contamination microbiologique des laits de collecte d'une laiterie de casablanca. Thèse Vêt. I.A.V. Hassan II, Rabat. Maroc.
- Bendixen, P.H.; Wilson, B.; Ekesbvo, I. and Astrand, S.B. (1988):* Diseases frequencies in dairy cows in Sweden. *Mastitis Prev. Med.*, 5, 263-274.
- Bind, J.L.; Leplatre, J. and Et Poutrel, B. (1980):* Les mammites: L'échantillon et son exploitation. Mises au points techniques rôles du praticien et du laboratoire. *Bull. GTV.*1727.
- Dohoo, I.R.; Mrtin, S.W.; Meek, A.M. and Sandals, W.C.D. (1982):* Disease, production and culling in Holstein Frisian cows, I, the data, *Prev. Vet. Med.* 1: pp 321-334.
- Kinsella, A. (1990):* A note on the incidence of clinical mastitis in commercial Irish dairy herds. *I rish J. Agri.Res.* 29, 79-82.
- Niar, A.; Aggad, H.; Benallou, B.; Guemmour, D.; Ould Ali, A.; BENCHAIIB, F. and AISSAT, S. (2003):* Incidence de la brucellose animale sur la santé humaine. Deuxièmes Journées Scientifiques de l'Andrs, Oran le 17 et 18 Décembre 2003.
- Nickerson, R.A. (1987):* Resistance mechanisms of the bovine udder: New implication for mastitis control at the teat end, *J Am Vet. Med. Assoc.* 1987 Dec 1;191 (11):1484-8.
- Poutrel, B. (1985):* Généralités sur les mammites des vaches laitières. Processus infectieux, épidémiologie, diagnostic, méthodes de contrôle. *Rec. Vet.*161: 497-510.
- Rainard, P. (1979):* Traitement de la mammite de la vache laitière. Thèse. *Doc.Vet.* 5-7-12.



- Riahi, N. (1981):* Contribution à étude de la qualité bactériologique et chimique des laits des centres de collecte du Gharb. Thèse Vet. I.A.V, Hassan II, Rabat. Maroc.
- Schalm, D.W. and Noorlander, D.O. (1957):* Experiments and observations leading to development of the California Mastitis test, J Am Vet. Med. Assoc. 1957 Mar 1;130 (5):199-204.
- Schultz, L.M. (1977):* Somatic cell counting of milk in production testing programs control technique. J. Am. Vet. Med. Assoc. 170, 1244- 1246.
- Schweizer, R. (1973):* Practical execution of mastitis control within the framework of the Udder Health Service (UHS) in the canton of St. Gallen. Schweiz Arch Tierheilkd. 1973 Aug; 115(8): 357-65.
- Serieys, F. (1985):* Interpretation of the cell concentration of cow's milk for the diagnosis of mammary infection Ann Rech Vet. 1985; 16(3): 263-9. French.
- Speers, J.G.S. and Gilmour, A. (1985):* The influence of milk component on the attachment of bacteria, farm dairy equipment surface. Journal of Applied Bacteriology. 59(4): 325-323.
- Watts, J. and Land Owens, E. (1988):* Laboratory procedures on bovine mastitis. Am Society for Microbiology Animal Meeting Workhop May, 8, Miami J. Am.Vet. Med. Assoc 19. pp.1487.