Journal of Biosciences and Medicines, 2025, 13(2), 500-509
https://www.scirp.org/journal/jbm
ISSN Online: 2327-509X
ISSN Print: 2327-5081

Epidemiological and Therapeutic Profile of Mastitis in Small Ruminants in the Labé Region (Guinea)

Lanan Wassy Soromou[1,2*], Gobou Lolahara[3], Hamani Marichatou[3], André Delamou[1]

[1]Département de Biologie Appliquée, University of Labé, Labé, Republique de Guinée
[2]Département de Médecine Vétérinaire, Institut Supérieur des Sciences et de Médecine Vétérinaire de Dalaba, Dalaba, Republique de Guinée
[3]Centre d'Excellence Régional sur les Productions Pastorales: Viande, lait, Cuirs et Peaux (CERPP), Université Abdou Moumouni de Niamey, Niamey, Niger
Email: *lanan-wassy.soromou@univ-labe.edu.gn

How to cite this paper: Soromou, L.W., Lolahara, G., Marichatou, H. and Delamou, A. (2025) Epidemiological and Therapeutic Profile of Mastitis in Small Ruminants in the Labé Region (Guinea). *Journal of Biosciences and Medicines*, **13**, 500-509.
https://doi.org/10.4236/jbm.2025.132038

Received: January 11, 2025
Accepted: February 25, 2025
Published: February 28, 2025

Abstract

Mastitis is an inflammatory infection of the mammary glands that is frequently observed in animals. The aim of this study was to determine the prevalence of this infection, identify the pathogens responsible and highlight the risk factors in the region of Labé (Republic of Guinea). The survey involved 96 farmers in three prefectures (Koubia, Labé, Lélouma) and covered 3,199 animals, including 611 lactating females. The clinical survey revealed 49 suspected cases of mastitis, mainly in goats. The analysis showed a prevalence of clinical mastitis of 2.95% and a mortality rate of 18.35%. The identified risk factors were the hygiene of the premises, the age of the females, husbandry practices and the lack of regular veterinary care.

Keywords

Small Ruminants, Mastitis, Prevalence, Labé

1. Introduction

Agriculture and livestock play a central role in the West African economy, providing more than half the jobs in the sub-region [1]. In the Republic of Guinea, the sector is one of the main pillars of rural development, accounting for 21% of GDP and employing 52% of the working population [2]. Among livestock, small ruminants are of particular importance, being a major source of income and food security for rural communities, as well as playing a key role in

the fight against poverty [3].

However, the livestock sector faces many challenges, not least diseases that compromise herd productivity. Among these, mastitis stands out as a major inflammatory disease of the mammary glands, the economic and health consequences of which are significant and often underestimated [4]. By affecting milk and meat production, this disease has a direct impact on farm profitability, while presenting risks to animal and human health [5]. It affects the udder tissues of dairy cows, causing inflammation, discomfort and a drop in milk production and quality [6].

Under normal conditions, the annual rate of cases of clinical mastitis on goat and sheep farms in France does not exceed 5% of animals [7]. These cases generally concern sporadic bacterial mastitis. Mastitis, particularly subclinical forms, can lead to a reduction in milk production of up to 35%. It is a major health and economic concern for dairy farms worldwide [8] [9]. Mastitis is a global challenge that impacts animal health in both developing and developed countries [10]. On a farm in Kaolack, a total of 101 lactating cows from traditional peri-urban agriculture were studied. The prevalence of mastitis in these animals was 12.5%, suggesting that effective management of sick cows should be put in place to improve milk production [11]. Another study in the Benadir region of Somalia found mastitis prevalence in other species such as camels at 34.4% [10].

Despite the impact of this disease, comprehensive data on its prevalence and associated risk factors remains largely unavailable in Guinea. This gap is particularly evident in the region of Labé, a key pastoral area where livestock plays a central role in the local economy. This study aims to fill this gap by investigating the prevalence of mastitis in small ruminants, identifying the main risk factors, describing the clinical manifestations and providing recommendations for effective prevention and control measures.

2. Materials and Methods

2.1. Materials

The Republic of Guinea, located in southwestern West Africa, extends over 245,857 km^2 with a 300 km Atlantic coastline. It is surrounded by the Atlantic Ocean to the west, Sierra Leone and Liberia to the south, Cote d'Ivoire and Mali to the east, and Guinea-Bissau, Senegal and Mali to the north [12]. It is subdivided into four (4) natural regions and eight (8) administrative regions [13]. The Labé of region, the largest in Middle Guinea, was chosen for this study, focusing particularly on the prefectures of Labé, Lélouma and Koubia. A variety of materials were used to collect data for this study.

2.2. Methods

Type of study

Our survey, which involved collecting data in the field, was of the retro-prospective, cross-sectional type.

Sampling

The study was conducted in three prefectures of the administrative region of Labé. We randomly targeted nine communes where the study was carried out in 96 small ruminant farms.

Archives search

We first contacted veterinary officials in the region of Labé. Using a pre-established survey form, we asked these officials questions to obtain information about the existence of diseases in small ruminants and the methods used to combat them. Finally, we analysed some of the archives made available in order to find data on small ruminant diseases, particularly clinical mastitis.

Survey of farmers

For this study, a survey form was used to gather information on the farms (demographic data, husbandry practices and management, herd size, breeds reared, feed) and the history of mastitis (symptoms, impact on productivity, cases of mortality or recurrence). Other questions focused on herd health management (protocols, treatments, preventive measures), farmers' level of awareness and knowledge, difficulties encountered, as well as their collaboration with vets and access to veterinary products.

Clinical examination

In order to investigate the symptoms of clinical mastitis in females (ewes and goats) on the various farms, an individual clinical examination was carried out on lactating females. The mammary glands were examined for shape, consistency, sensitivity to touch, the presence of lesions and the appearance of the milk.

As part of this study, milk samples were taken from lactating females showing clinical symptoms of mastitis on small ruminant farms in the Labé region. The animals' teats were disinfected with 70˚ alcohol, then the milk was collected in sterile tubes after elimination of the first draft. Each tube was labelled with information on the locality, owner, date of collection, lactation number and age of the animal.

Laboratory examination

The samples taken and packaged were exported to the Regional Veterinary Laboratory in Labé for analysis. The Gram staining method was used to detect germs.

Data analysis

Google Forms, Excel and SPSS were used to process the data collected in the field.

3. Results

3.1. Epidemiological Aspects

Breeder survey:

Over a period of four (4) months, a survey of 96 livestock farmers in the region of Labé identified 3199 animals, including 611 suckling females. The results show a predominance of goats over sheep, the latter being less exploited because of

management difficulties, low demand for meat and the high risk of theft. Farmers mainly practise extensive rearing for meat production, with limited specialized supervision.

As shown in Figure 1, an analysis of the distribution of farmers according to the age of their suckler females reveals that 31.3% of farmers own breeding females aged 7 years, while 34.4% own females aged 8 years or more. These females, often at the end of their reproductive cycle, are generally more vulnerable to health problems, particularly clinical mastitis. This vulnerability can be explained by changes in the anatomy of the organ, but also in their immune defences. In addition, herd management problems can exacerbate this situation.

Older females often receive less attention in terms of veterinary care or management, which increases their risk of contracting mastitis due to poor hygiene practices or late treatment. This situation highlights the importance of increased surveillance and proactive management to prevent and treat clinical mastitis, in order to maintain herd health and maximize productivity.

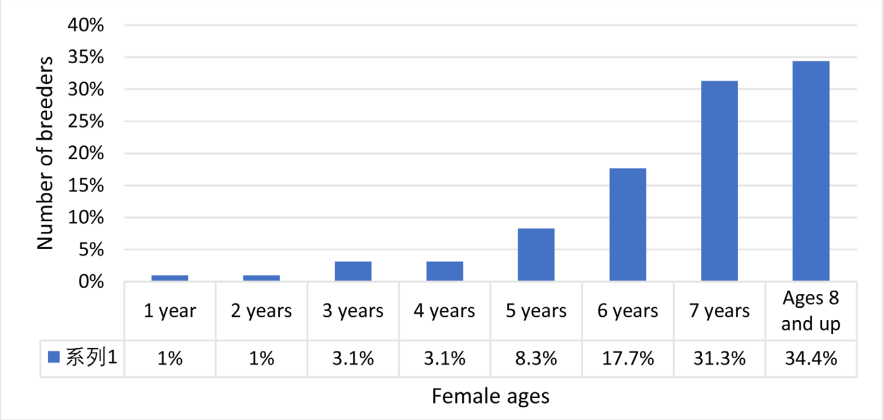

Figure 1. Breeders by age of females.

Herd management:

In semi-intensive systems, goats return to their paddocks alone after grazing, while sheep require more rigorous supervision. Some farmers supplement the animals' diet with supplements such as green leaves and corn bran to improve their adaptation and performance.

Animal health management:

To manage their herds' health, farmers often resort to self-medication or traditional remedies such as tree bark. They only call in the vets when symptoms become serious.

Clinical examination:

Clinical examination of lactating females in the Labé region revealed a 2.95% prevalence of clinical mastitis, with 18 confirmed cases out of 49 suspected. Symptoms included udder induration, inflammation and teat lesions.

Sample collection:

From 26 farmers, 49 milk samples were taken, mainly from goats.

***The birthing of females*:**

The analysis of the results indicates that older females with multiple parturitions are more susceptible to mastitis, suggesting that parturition rank is an important risk factor. Animal health management strategies should incorporate this factor to improve mastitis prevention and treatment.

Of the individuals observed (Table 1), 14 three-year-old females were identified, 11 of which were in their third parturition rank, while only one female had reached her eighth parturition rank. Analysis of the data revealed a correlation between farrowing rank and the incidence of mastitis. The older females, having undergone several births, appear to be particularly vulnerable, as illustrated by the case of an eight-year-old female showing increased susceptibility. This observation reinforces the importance of integrating the birth rank into animal health management strategies, particularly for the prevention and treatment of mastitis.

In particular, older females with a high parturition rank should be given special attention to optimise the monitoring and management of their health.

Table 1. Parturition status of females.

Age in years	1st	2nd	3rd	4th	5th	6th	7th	8th	Total
1	6	0	0	0	0	0	0	0	6
2	3	6	0	0	0	0	0	0	9
3	0	1	11	2	0	0	0	0	14
4	0	0	2	5	2	3	0	0	12
5	0	0	1	2	0	1	0	0	4
6	0	0	0	0	1	1	0	0	2
7	0	0	0	0	0	0	1	0	1
8	0	0	0	0	0	0	0	1	1
Total	9	7	14	9	3	5	1	1	49

***Suspicion rate for clinical mastitis*:**

As illustrated in Figure 2, the rate of suspected clinical mastitis in the region of Labé was 8.02%. Particularly high rates were registered in Lélouma (16.45%), followed by Koubia (6.92%) and Labé (4.33%). These variations can be attributed to a number of factors, including variations in animal health management practices on farms, local environmental conditions, and access to appropriate veterinary care.

***Laboratory analyses*:**

From the 49 samples analysed, we found 18 positive cases of mastitis, with staphylococci being the most common bacteria, representing 36.73% of positive cases (Diagram 1). These findings indicate that more than a third of the small ruminants investigated are affected by mastitis, which represents a significant rate

of infection. These data highlight the need for appropriate preventive strategies and rigorous management to limit the impact of mastitis on animal health and milk productivity. The implementation of preventive measures could play a key role in reducing infection rates.

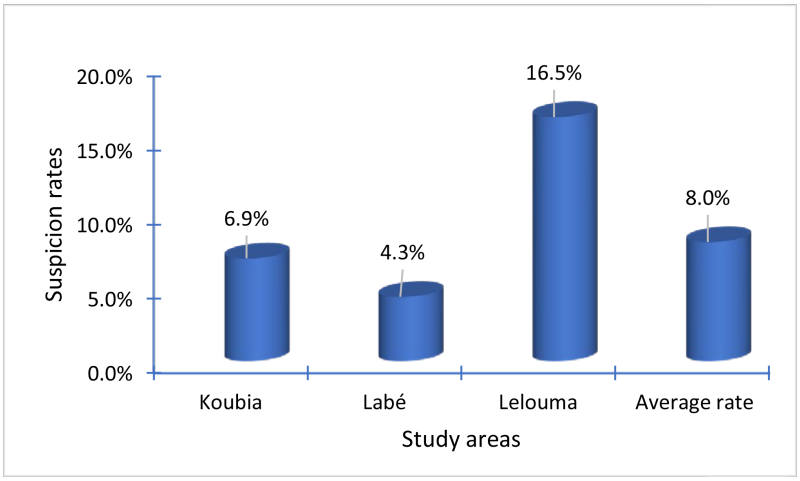

Figure 2. Suspicion rate of clinical mastitis cases by prefecture.

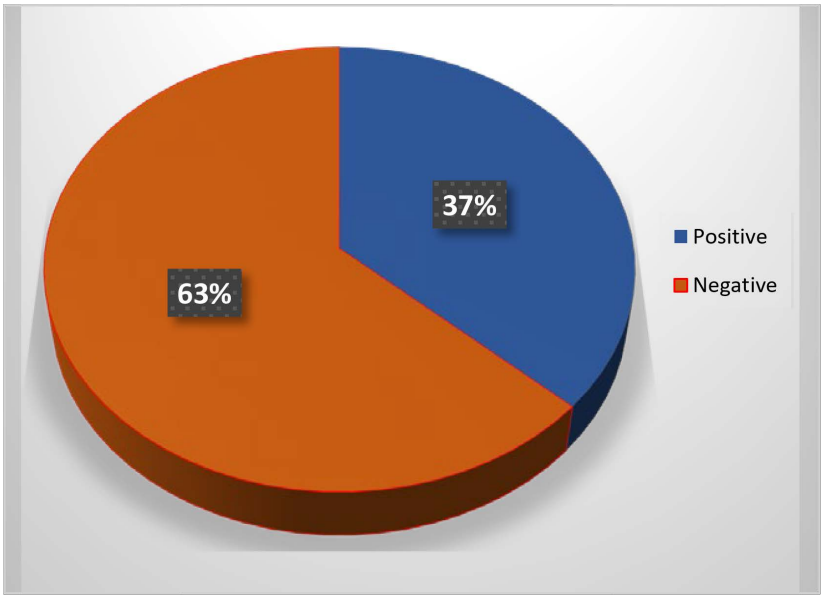

Diagram 1. Laboratory analysis results.

Distribution of identified bacteria

The results show that staphylococci (33.3%) and streptococci (16.7%) are the most frequently encountered pathogens, confirming their dominant role in breast infections. Other bacteria such as microcoques (11.1%), Klebsiella (5.6%) and Bacillus (5.6%) were also identified, indicating a certain diversity of pathogens. Co-infections, notably between staphylococci and Pasteurella (11.1%), were also observed (**Figure 3**). These results underline the complexity of mammary infections in small ruminants, and the need for appropriate treatment and management

strategies. The diversity of pathogens highlights the importance of a rigorous approach to limiting the impact on animal health and milk production.

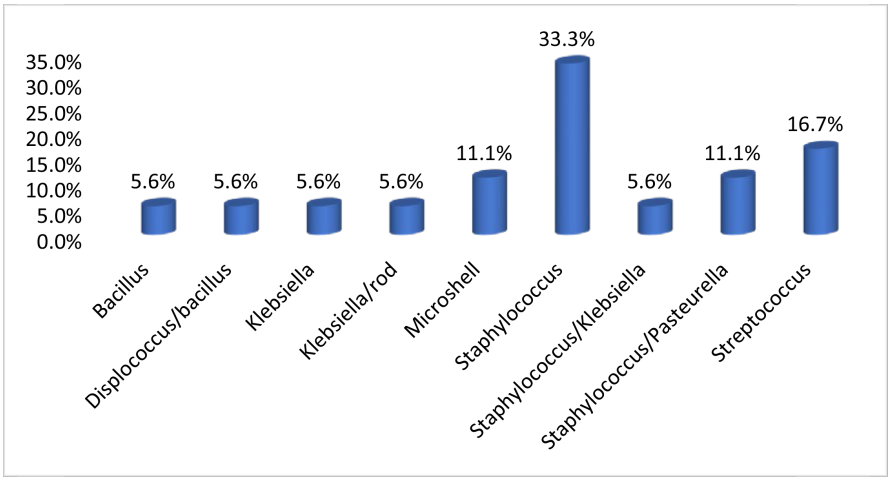

Figure 3. Type of bacteria identified per sample.

Gram staining results

As shown in **Figure 4**, the results of Gram staining show that 66.7% of the bacteria identified are gram-positive, 27.8% are gram-negative and 5.6% of samples contain both gram-positive and gram-negative bacteria. This predominance of gram-positive bacteria suggests that they are the main cause of mammary infections in small ruminants. Consequently, treatment strategies with antimicrobials that are effective against these bacteria would be preferable. The presence of both gram-positive and gram-negative bacteria also highlights their important role in mastitis, necessitating appropriate therapeutic approaches. The co-infections further increase the complexity of infection management and require comprehensive evaluation to ensure effective treatment.

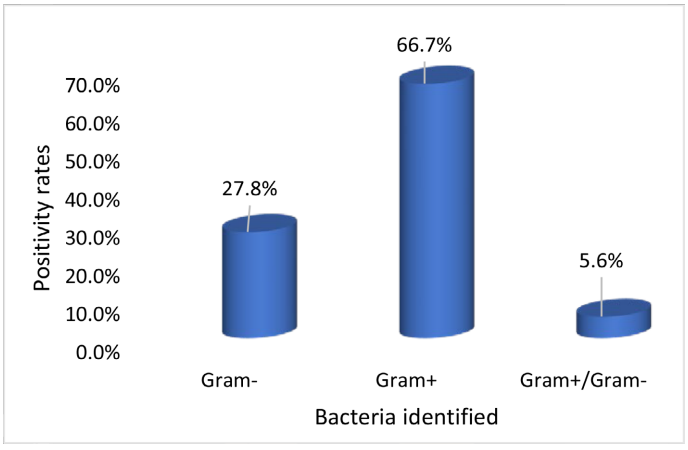

Figure 4. Positivity rate by gram stain.

Observed risk factors:

In the farms surveyed, the risk factors observed for clinical mastitis mainly

include favourable factors such as hygiene, rearing method, feeding method, age, lactation rank, etc. These factors have a negative impact on animal health, and their management requires an integrated approach based on hygiene, environmental management, feeding and regular monitoring. These factors have a negative impact on animal health, and their management requires an integrated approach based on hygiene, environmental management, feeding and regular monitoring.

Risk factors for clinical mastitis observed in lactating females of small ruminants on farms in the Labé region.

3.2. Therapeutic Aspects Obtained from Veterinarians

A survey of veterinarians in the region of Labé highlighted the high prevalence of clinical mastitis in small ruminants, a condition considered a major concern by local livestock farmers. This condition, which is often linked to environmental and management factors, is generally managed symptomatically. Veterinarians mainly use antibiotics (amoxicillin, Cloxacillin, Ampicillin, …) and anti-inflammatories (NSAIDs and glucocorticosteroids). However, this approach remains limited, as they feel that there is no specific, adapted protocol for the complete management of the disease, which prevents more targeted and effective management.

4. Discussion

This study highlighted the epidemioclinical parameters of mastitis in small ruminants in the Labé region. The study involved 96 breeders, the majority of whom (66.67%) were men, with a low level of education, in line with the observations of [3], who stress that lack of education represents a barrier to the adoption of modern breeding technologies. Most livestock farmers practice small-scale traditional livestock farming, often in parallel with agricultural activities, and raise mainly Djallonké ruminants [14].

Concerning clinical cases, the disease was observed in 2.95% of lactating females, with an average suspicion rate of 8.02%, similar to the results of Sabit Nadjet *et al.* (2017), who indicate that the prevalence of clinical mastitis in small ruminants generally remains low on farms, often below 5% [15]. This rate of suspicion could also reflect a lack of early diagnosis or insufficient identification of symptoms.

Microbiological analyses showed 36.73% positivity among samples, with bacteria such as streptococci, micrococci and Bacillus, in agreement with the observations of Myo Rovai and Contreras (2007) [16], who note the predominance of staphylococci and streptococci in breast infections. Gram staining revealed that 66.7% of bacteria identified were Gram-positive, and 27.8% were Gram-negative, in line with Mathilde's (2017) findings on the prevalence of Gram-positive bacteria in breast infections [17].

Risk factors for clinical mastitis include poor farm hygiene and unfavorable environmental conditions, such as wet bedding, which are supported by various

studies. In addition, age and number of lactations are significant risk factors, confirming the findings of Poutrel *et al.* (2020), who noted an increase in mammary infections with the number of lactations [18].

Clinical mastitis has a significant impact on herd productivity and family income. With a culling rate of 48% of affected animals, economic losses due to mastitis are considerable, well above the 5% - 10% usually observed in other contexts, as reported by Ghlib Farouk *et al.* (2019) [19]. Moreover, mortality rates, averaging 18.35%, are mainly due to feeding and care management problems, which is consistent with the observations of Ba Diao *et al.* (1996) on high mortality in goat herds in West Africa [20]. These losses underline the importance of proactive health management and improved feeding and veterinary care management to improve the health and productivity of small ruminants.

In conclusion, mastitis, as an inflammation of the mammary gland, represents a significant threat to milk production and the welfare of small ruminants. This study highlighted the high prevalence of the disease, which is influenced by factors such as hygiene conditions, herd management, and animal characteristics. Clinical signs, including induration of the udder and the presence of pus in the milk, directly affect the health of females and milk production. The pathogens identified, mainly bacteria, underline the need for early detection and appropriate treatment to limit economic losses. An integrated approach, taking these different factors into account, will enable more effective mastitis management strategies to be developed, protecting animal health and ensuring the economic viability of livestock farms.

Acknowledgments

We would like to thank the veterinary staff located in the 12 localities of the study area.

Ethics Approval and Consent to Participate

This study strictly follows the AARIVE guidelines of Animal Research Reporting of *In Vivo* Experiments.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

[1] Renard, M. and Cheikh, A. (2004) Agriculture and Livestock in West Africa. *African Journal of Agriculture and Livestock*, **12**, 45-58.

[2] African Development Bank Group (2018) Guinea Country Strategy Paper 2018-2022. https://www.afdb.org/fileadmin/uploads/afdb/Documents/Boards-Documents/Guinea__CSP_2018-2022.PDF

[3] Pousga, S. (2019) Small Ruminant Livestock Production in West African Rural Communities. *Revue Ouest-Africaine de Zootechnie*, **15**, 25-40.

[4] Abdullah, A. (2016) The Impact of Infectious Diseases on Ruminant Livestock

Production in Africa. *Revue Soudanaise de Médecine Vétérinaire*, **20**, 112-128.

[5] Watson, D.L. and Buswell, J.F. (1984) Mastitis in Livestock: Economic and Health Implications. *Veterinary Research Journal*, **8**, 145-162.

[6] Panchal, J., Patel, A., Patel, S. and Goswami, D. (2024) Understanding Mastitis: Microbiome, Control Strategies, and Prevalence—A Comprehensive Review. *Microbial Pathogenesis*, **187**, Article 106533. https://doi.org/10.1016/j.micpath.2023.106533

[7] Bergonier, D., De Crémoux, R., Rupp, R., Lagriffoul, G. and et Berthelot, X. (2003) Mastitis of Dairy Small Ruminants. *Veterinary Research*, **34**, 689-716. https://doi.org/10.1051/vetres:2003030

[8] Seegers, H., Fourichon, C. and Beaudeau, F. (2003) Production Effects Related to Mastitis and Mastitis Economics in Dairy Cattle Herds. *Veterinary Research*, **34**, 475-491. https://doi.org/10.1051/vetres:2003027

[9] Huijps, K., Lam, T.J. and Hoogeveen, H. (2008) Costs of Mastitis: Facts and Perception. *Journal of Dairy Research*, **75**, 113-120. https://doi.org/10.1017/S0022029907002932

[10] Mohamed, S.A., Abdi, M.M., Mohamud, A.I., Mohamed, Y.A., Omar, A.A., Barre, A., Chouhan, C.S. and Ehsan, M.A. (2024) Prevalence of Mastitis and Associated Risk Factors in Lactating Camels (*Camelus dromedarius*) on Dairy Farms in Benadir Region, Somalia. *Open Journal of Veterinary Medicine*, **14**, 111-123. https://doi.org/10.4236/ojvm.2024.146008

[11] Kalandi Sow, M.A., Millogo, V., Faye, S., Ouédraogo, A.G. and Sawadogo, G.J. (2017) Prévalence et facteurs de risque des mammites subcliniques dans les élevages traditionnels de Kaolack au Sénégal. *Journal of Applied Biosciences*, **112**, 10978-10984. https://doi.org/10.4314/jab.v112i1.2

[12] Bah, M. (1997) Report on the Implementation of the Marine and Coastal Biodiversity Program. https://interfacelonny.com/documents/do-1604660417

[13] Camara, A. (2020) Institut National des Langues et Civilisations Orientales École doctorale n˚265 Langues, littératures et sociétés du monde. Institut National des Langues et Civilisations Orientales.

[14] Zonon, A. (2018) Investigating the Prevalence of Local Breeds in Traditional Breeding Systems in West Africa. *Journal of Animal Science*, **12**, 102-108.

[15] Sabit Nadjet, H., *et al.* (2017) Prevalence of Clinical and Subclinical Mastitis in Small Ruminants in Algeria. *Journal of Veterinary Research*, **35**, 89-94.

[16] Rovai, M. and Contreras, A. (2007) Microorganisms Involved in Mammary Infections in Small Ruminants. *Small Ruminant Research*, **67**, 22-29.

[17] Mathilde, S. (2017) Analysis of Mastitis-Causing Bacteria in Goats and Sheep on Intensive Farms. *Bulletin de La Santé Animale*, **11**, 210-218.

[18] Poutrel, B., *et al.* (2020) Study of Risk Factors for Mastitis in Small Ruminants in Rural Areas. *Sciences et Techniques de l'Élevage*, **9**, 334-345.

[19] Ghlib Farouk, S., *et al.* (2019) Economic Losses Associated with Small Ruminant Infectious Diseases in North Africa. *Revue de Médecine Vétérinaire*, **35**, 145-152.

[20] Ba Diao, M., *et al.* (1996) Mortality Factors in Goat Herds in West Africa: A Socio-Economic an Approach. *Cahiers Agricultures*, **5**, 278-284.