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## Milk Production Practices in the Sudano Guinean and Sudano Sahelian Zones of Cameroon

Awono Enama T.<sup>1</sup>, Edima H. C.<sup>1\*</sup>, Biloa D. M.<sup>1</sup> and Etoa F-x.<sup>2</sup>

<sup>1</sup>Department of Food Sciences and Nutrition, National Advanced School of Agro-Industrial Sciences, University of Ngaoundere, P.O. Box 455 Ngaoundere, Cameroon

<sup>2</sup>Department of Microbiology, Faculty of Sciences, University of Yaounde I, Cameroon

\*Corresponding Author E-mail: edimacarole@yahoo.fr

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### ABSTRACT

*In Cameroon, most of the research in milk sector has been focused on the physico-chemical and microbiological quality of milk without beforehand describing the breeding context. The present work therefore, aims at shading more light on the milk production conditions and practices. The study was carried out in sixty dairy farms of the Sudano-Sahelian and Sudano-Guinean zones of Cameroon. Investigation was based on a pre-designed questionnaire. The questionnaire was answered based on observations and discussions with the farmers. The main results show that dairy farms' environments are not favorable for cows' comfort and wellbeing. Only 30 % of the farms in the Soudano-Guinean zone have delimited milking area although these areas are not well managed. In the two zones, Gudali is the most involved breed in milk production. Cow feed is supplemented in the two zones and milking is manual. Milk production is more important in Soudano-Guinean zone than in Sudano-Sahelian zone as well as in the rainy and in the dry seasons. In the two zones, the dairy farm environment and practices do not favor the animals' wellbeing.*

**Key words:** zone / milking practices / environment/dairy farm/season.

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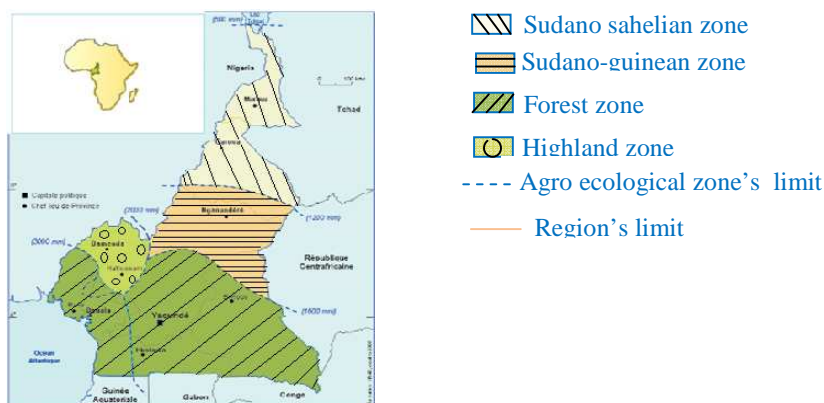
### INTRODUCTION

The Cameroon livestock population is estimated at about 5 million cattle with 95% of it found in the Adamawa, North, Far-North and the North-West regions, with an annual milk production of about 107 000 000 L<sup>1</sup>. This low milk production has led to a significant rise in the importation of milk and dairy products in order to satisfy the local demand of the population<sup>2</sup>. Therefore, in order to boost milk production in Cameroon, state authorities have embarked on the promotion and development of the dairy sector. In this regard, the technical, organizational and institutional problems relating to an increase in milk production has been tackled by different development programs (PNVRA, GESEP and SDDP). However aspects related to the characterization of the milk sector have not been given an equal attention<sup>3,4</sup>. Several works have been focused so far on the characterization (physic-chemical, microbiological) of milk and dairy products. These studies concern specifically the characterization of some molecules of milk<sup>5,6</sup> the sanitary quality of milk and dairy products<sup>6,7,8</sup> or the research of antibiotic residue in milk<sup>9</sup>. Few studies focused on breeding context. In 2014, Edima *et al.*<sup>10</sup> describe dairy farm breeding practices without emphasizing on environment conditions of dairy farms. The present work therefore, aims at shading more light on dairy farms' environment and milking practices in the Sudano Sahelian and Sudano Guinean zones of Cameroon.

## METHODOLOGY

**Zone of study:** The study was carried out in dairy farms of two agro ecological zones of Cameroon: the Sudano Sahelian zone and the Sudano Guinean zone (figure 1).

**Fig.1: Agro ecological zones of Cameroon (Adapted from PAN/LCD, 2007<sup>11</sup>)**



The characteristics of these zones are described in table 1.

**Table 1: Characteristics of the zone of study [11]**

Characteristics	Sudano Sahelian Zone	Sudano Guinean Zone
Location	8°20' -13°10' North latitude 12°30' - 15°40' East longitude	5° - 8°20' North latitude 9°30' - 15°40' East longitude
Altitude	500 - 1000 m	higher than 1000 m
Vegetation	savannah, steppe and peage	Savannah
Season	4 months of rain, 8 months of dryness	6 months of rain, 6 months of dryness
Pluviometry	500 - 1000 mm	1500 - 2000 mm
Temperature	max : 42°C, min: 17°C	Average temperature: 22- 24°C

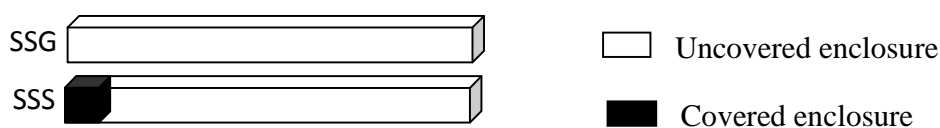
**Investigation and analysis:** In each zone, 30 dairy farms were randomly selected and visited. The farms were selected in such a way that every part of the two zones could be represented. The investigation consisted on the characterization of the livestock (breed involved, feeding, drinking source and milk production), description of the farms' environments, milking practices and materials used. This investigation was carried out by answering a pre-established questionnaire, observations and interview guides. The questionnaire and the guides were conceived in accordance with the guide of FAO and IDF (2012) for good practices in dairies. The questionnaire and the guides were filled out based on visual observations and interview with the farmers. The farmers were sensitized beforehand on the interest of the study and the accuracy of required information. The data obtained were analyzed in accordance with Sphinx plus Lexica V5 and Statgraphics Plus 5.0. Means, percentages and standard deviations were calculated using Microsoft Excel 2007. Comparison of data permits us to bring out the differences between the farms, the two zones and the impact of the seasons.

## RESULTS AND DISCUSSION

### Exposition to weather

All the visited farms in the Soudano-Sahalian zone and 90 % of the farms in the Soudano-Guinean zone presented uncovered enclosures (figure 2). This is contrary to the prescriptions of FAO and FIL (2012)<sup>12</sup>. Cows are exposed to bad weather (rain, heat). This exposition can lead to the stress and affect milk production. Meanwhile, 10 % of the visited farms in the Soudano-Guinean zone have covered enclosures and are well structured, guaranteeing the wellbeing of cows.

**Fig.2: Characterization of enclosures of dairy breeding farms**



SSS: Soudano-Sahelian Zone; SSG: Soudano-Guinean Zone

**Waste Management**

The management of wastes differs from one farm to the other. Only 10 and 20 % of farms respectively in Soudano-Guinean and Soudano-Sahelian zones manage their wastes well (figure 3). In this case, those wastes are systematically evacuated. In the other farms, wastes are dumped on the ground and dung is deliberately left on the ground as a means to improve soil fertility<sup>13</sup>. The presence of these wastes in farm areas contributes to unhealthy environment which is a potential source of contamination of produced milk. Moreover, this polluted environment does not favor cow’s wellbeing. Milk can be exposed to dust and other vectors carried by the wind.

**Fig.3: Waste management in dairy farms breeding**

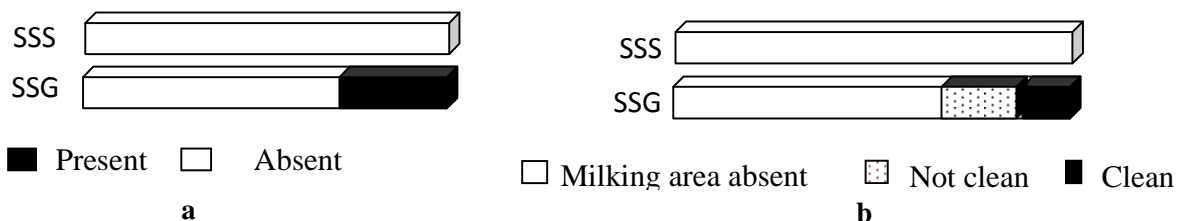


SSS: Soudano-Sahelian Zone ; SSG: Soudano-Guinean Zone

**Milking area**

In order to reduce the risks of contamination, FAO and FIL (2012) <sup>12</sup> recommend the fitting out of milking areas. In this study, we observed three categories of farm. Those without milking area, those with milking areas but not cleaned and those with milking area cleaned. Only 30% of dairy farms in the Soudano-Guinean zone have a milking area (figure 4 a). Unfortunately, all of those milking areas are not clean (figure 4 b) and this can justify the presence of dung and all kinds of waste. In farms without a milking area, milking is done anywhere in the enclosure.

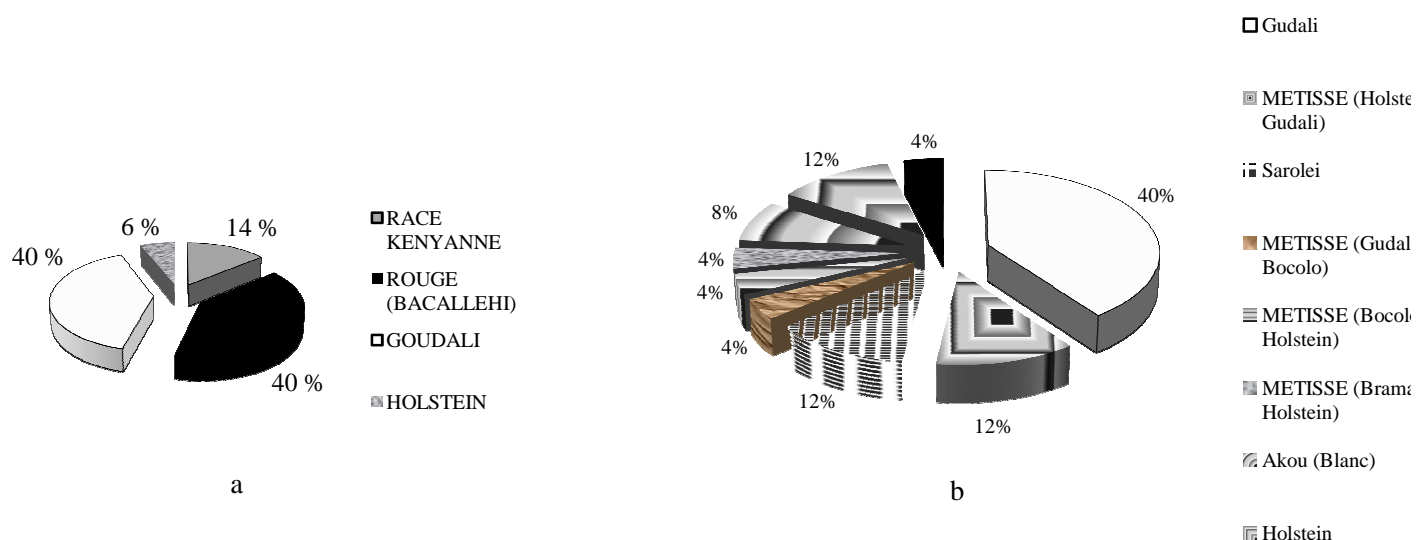
**Fig.4: Distribution of farms according to the presence of milking areas (a) and their cleaning (b)**



SSS: Soudano-Sahelian Zone; SSG: Soudano-Guinean Zone

**Breed involved in milk production**

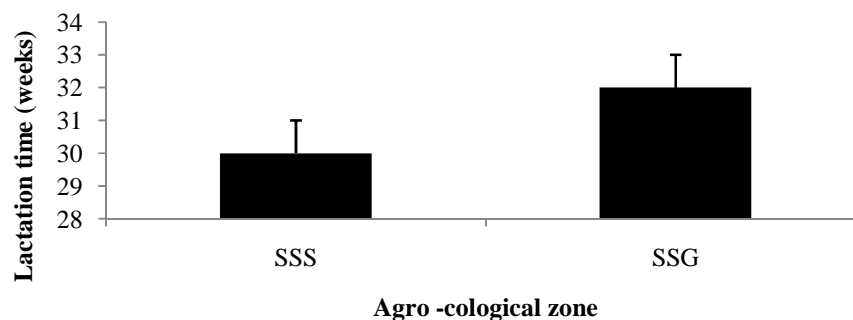
Breeds involved in milk production are more diverse in Sudano Guinean zone (figure 6). In this zone, seven (07) breed were numbered. The proportion of Holstein in the Sudano-Guinean zone (12%) predisposes this zone to better milk production than in Sudano-Sahelian zone. Indeed, they are not essentially dairy cow. Unfortunately, dairy cow are less represented in the dairy farms of the two zones.

**Fig.6: Distribution of cows according to the race in the Sudano Sahelian (a) and Sudano Guinean (b) zones**

The presence of *Gudali* and *Kenyan* breeds in the two zones is justified by their adaptability to local conditions. In fact, *Gudali* was developed by the Institute of Agricultural Research for Development (IARD) of Cameroon and this breed was intended initially for meat production. Their presence confirms mixed production targets for meat and milk in the two zones. The high diversity of breed observed in Sudano-Guinean zone can be due to good breeding conditions in this zone and also to the adaptability of these breed to local conditions. Less representativeness of milking breeds in the two zones is justified by their higher cost. In fact, one Holstein cow bought in the North-West region of Cameroon is between 1 222 and 1 527 €excluding transportation charges. Breeders found it too expensive and as alternative to the acquisition of pure milking breed, some of them practice artificial insemination. This justifies the presence of mongrel (Holstein X *Gudali*) in the Sudano Guinean zone.

### Duration of lactation

The duration of lactation varies very little from one zone to another. In fact, there is no significant difference for the duration of lactation in the two study zones. Lactation lasts on average 32 weeks in the Sudano Guinean zone and 30 weeks in the Sudano Sahelian zone (figure 7).

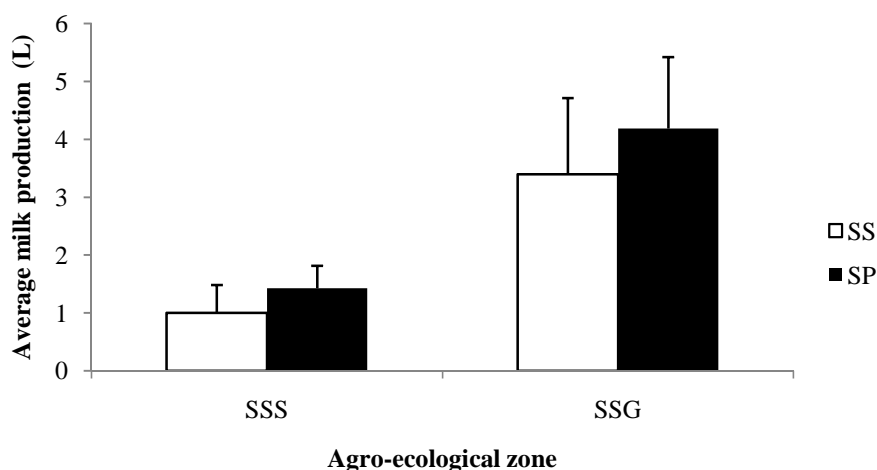
**Fig.7: Lactation period versus agro ecological zones**

SSS = Sudano Sahelian Zone ; SSG = Sudano Guinean Zone

### Milk production

Milk production is influenced by season in the two zones. During the dry season, the average daily production was estimated at 1 L per cow in the Sudano-Sahelian zone and at 3.4 L per cow in the Sudano-Guinean zone. During the rainy season, the production of milk increased to 1.5 L and 4.2 L in the Sudano-Sahelian and the Sudano-Guinean zones respectively (figure 8). Milk production is higher in the Sudano-Guinean zone than in Sudano Sahelian.

**Fig.8: Influence of the agro-ecological zone and season on milk production**



SSS = Sudano Sahelian zone; SSG = Sudano Guinean zone; SS = Dry season; SP = rainy season

These results were not similar to those of Libouga *et al*, 2001<sup>8</sup>, who found in some dairy farms of the Sudano-Guinean zone a daily production of 1.2 and 0.35 L respectively in the rainy and dry seasons. Nowadays, the daily production of milk has increased as a result of the use of milking breed such as *Holstein* and the vulgarization of artificial insemination techniques.

### CONCLUSION

In the Soudano-Sahelian and Soudano-Guinean zones of Cameroon, dairy farms are not structured and their environments are propitious to milk contamination. Milk production remains low (1 L/cow/day in Sudano-Sahelian zone and 3.4 L/cow/day in the Sudano-Guinean zone during dry season. 1.5 L/cow/day in Sudano-Sahelian and 4.2 L/cow/day in the Sudano-Guinean zone during the rainy season) because of bad practices of breeding and the implication of inappropriate breed. The emergence of the dairy sector in these zones needs revision of practices and more commitment both from actors and officials.

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