



# Correlation between Tail Length and Rate of Infected Quarters in Montbéliarde and Ameliorated Dairy Cattle, Algeria



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## Abstract

This study aimed to evaluate the impact of the tail's length of Modern Dairy Cattle and Ameliorated Dairy Cattle on the rate of infected quarters. 12 lactating cows were randomly selected; 6 breed Montbéliarde and 6 Ameliorated Dairy Cattle, subsequently the distance between the tail edge and the ground was measured with a tapeline. Then, California Mastitis Test was realized on milk samples collected from the 4 teats of each cow. Spearman test ( $p < 0.01$ ) showed that contamination risks of teats surface via the cow's tail, were associated to Ameliorated Dairy Cattle breeding and environmental hygiene level (litter).

**Keywords:** Tail length; Cattle genotype; Mastitis; Tank contamination; Algeria

## Introduction

Several studies showed that genetic selection affects the harmony of the compliance of the body (especially the hip height) [1]. The cows breed Montbéliarde (Mt) are among the most imported Modern Dairy Cattle (MDC) cows in Algeria. Also, according to skin color, the Ameliorated Dairy Cattle (ADC) cows include two dominant types; ADC-Pie Rouge (ADC- PR) and ADC-Pie Noire (ADC- PN). ADC cows are the result of several crossbreeds between the Algerian local cattle populations and the MDC breeds [2]. In Algeria, crossbreeding operations are mainly made by unqualified breeders, affecting thus the general harmony of different body parts of progeny. The cow's tail is one of these affected parts, being consequently of variable length that is not always correlated to hip height, additionally to be among the most moving organs and exposed to various environmental contaminants, in simultaneity of being relatively promiscuous to the surface of the teats. Accordingly, tail length should be considered as a principal factor of variability in rates of infection of the udder. This comparative study aimed to evaluate and compare the impact of tail length and cattle category, on the California Mastitis Test (CMT) positivity rate and the number of infected quarters in Mt and ADC cows.

## Materials and Methods

We visited 3 dairy cattle farms, located in the region of Doucen (governorate of Biskra). All herds had similar hygienic profiles. From lactating cows, we randomly chosen 6 Mt, 5 ADC- PR and one ADC- PN, then the distance between the end edge of the tail and the surface on the ground (DTG) was measured with a tapeline. After that, we realized a CMT test on milk samples collected from the 4 teats of each cow. CMT reaction was numbered from 0 to 4. The relationship between the number of cells and the score of CMT, was approximately established from the results of Schalm and Noorlander [3] and Schneider [4]. The quarters with a score  $\geq 2$ , was considered infected. The quarters with score ranging from 0 to 1, are classified uninfected. Statistical analysis via SPSS version 20. [5], included Spearman test ( $p < 0.01$ ) between the variable cow category (MDC /ADC) and the variable DTG.

## Results and Discussion

Results showed that all Mt cows ( $n=6$ ) had  $DTG \geq 15$  cm, whereas (5/6) of ADC cows had  $DTG \leq 15$  cm. The DTG showed an average value ( $21.33 \pm 5.77$ cm) for the Mt cows, and ( $10.17 \pm 8.22$ cm) for the ADC cows. The minimum values of DTG were

recorded for the cows coded; ADC-PN-8 (00 cm), ADC-PN-12 (04cm), ADC-PR-7 (05 cm) and ADC-PN-10 (07cm) (Table 1). Statistical analysis via SPSS version 20. (IBM, 2011), using Spearman test ( $p < 0.01$ ) between the variable cow category (MDC /ADC) and the variable DTG, was highly significant ( $p = 0.001$ ). Also, (2/6) of Mt cows had at least one of the posterior quarters

that is infected, whereas (4/6) of ADC cows had at least one of the posterior quarters that is infected. Only (1/6) of Mt cows, had two posterior quarters that were simultaneously infected, in opposition to (3/6) of the ADC cows with two quarters that were simultaneously infected (Table 1).

**Table 1:** Distribution of DTG and CMT positive quarters per cow.

Herd's Code	(A)						(B)				(C)	
Cow's Category	MDC						ADC					
Cow's Code	Mt-1	Mt-2	Mt-3	Mt-4	Mt-5	Mt-6	PR-7	PN-8	-PN-9	PN-10	PN-11	PN-12
DTG (cm)	35	17	16	15	20	25	05	0	15	07	30	04
CMT positive quarters	0	1 PL	0	0	0	4	3 AR PR PL	0	0	4	3 AL PR PL	1 PL

MDC: Modern Dairy Cattle; ADC: Ameliorated Dairy Cattle; Mt: Montbéliadre; PN: Pie Noire; PR: Pie Rouge; DTG: distance between the end edge of the tail and the surface on the ground; PL: Posterior Left; PR: Posterior Right; AL: Anterior Left; AR: Anterior Right.

About 96% of Algerian farmers hold a herd of less than 6 dairy cows [6]. Relatively small dairy ADC herds (1- 6 cows), are located in mountainous and forest areas, and are the result of multiple crossbreeds between the local population, primarily the Brune de l'Atlas and the imported breeds [7]. In these herds, mechanical milking, is generally reserved to herds inserted into a milk collection organisms, however, hand milking is dominantly practiced in the rest of the herds. Thus, the contamination risks of milking vessel content during milking, on one hand, and the surface of the teats, on the other hand, via the cow's tail, seem to be associated to DTG and environmental hygiene level (litter). These risks are amplified by the fact that in Algeria, a very small part of ADC cow's milk is collected, but dairy products are mainly oriented, in the raw status, to self-consumption, donation and feeding calves [8]. Also, zoonotic and abortive risks cannot be excluded in such circumstances [9,10].

### Conclusion

It is urgent to avoid the generalization of the ADC category, without considering the influence of cattle anarchic crossbreeding on the welfare of future progeny, on susceptibility to infections of cow's mammary glands and thus the safety of their milk. Therefore, it is suitable to adapt the dairy cow's genotype to dominant cattle breeding system. Crossbreeding operations and genetic selection should be exclusively accomplished by qualified personnel but not unwary breeders.

### Conflict of interest

The authors declare that they have no conflict of interest.

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