



## Distribution phenotypic of the dairy production of goat in Tunisia

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### Abstract

To identify some genetic specificities of goat meat production in southern Tunisia, sixteen years data monitoring of 993 observations were analysed. Data distribution was studied to establish the performances regrouping pattern toward oasian breeding conditions depending on the dairy production. The average of production by lactation and daily lactation was 216.19 and 151.52 respectively. The coefficient of variation of those phenotypic varied largely between 0.5 and 0.25 respectively of production by lactation and daily lactation. Thus, goat data variation changes in relation to the phenotype.

Key words: Goat, dairy production, phenotypic distribution, Tunisia.

### Introduction

In the arid regions of southern Tunisia, the action of non genetic factors on the genotype expression can interfere with the checking on the quantitative genetic hypothesis and the methodologies application (Gaddour and Najari, 2013; Gaddour *et al.*, 2012c; Gaddour *et al.*, 2008; Najari *et al.*, 2007).

Since the first genetic indices, the evolution of the genetic value prediction is mainly related to the modality and the quality of the non-genetic factors correction (Najari et Gaddour, 2013; Gaddour *et al.*, 2012d; Gaddour and Najari, 2010; Gaddour *et al.*, 2007). Each genetic methodology is characterized by an additive contribution in this special stage with a direct impact on the efficiency and accuracy of genetic value predicted or genetic parameters estimated (Gaddour *et al.*, 2012a, b; Gaddour *et al.*, 2011; Najari *et al.*, 2007).

In this study, we aim to discuss the impacts of breeding conditions on phenotypic distributions of dairy performances in the oases of the southern Tunisia arid zone. The dairy production variability, their distribution, parameters and the phenotypic modelling have been used to illustrate the typical animal genotype responses towards the restraining action of ambiental factors.

The study pretends to identify the qualitative impact of these factors to optimize the livestock selection program in arid land. In fact handling animal genotypes to build improvement plans need to establish the typical producing behaviour of dairy production and their variation under restrictive breeding conditions.

### Materials and Methods

The studied livestock is a goat herd, which had resulted from a cross breeding program implemented by the Arid Land Institute (southern Tunisia) for the improvement of local goat genetic potentialities. The local goat population is characterised by its small size, the ability to walk long distances, the water shortage resistance and good kidding indices (Gaddour and Najari, 2010; Gaddour *et al.*, 2009).

Three breeds viz: Alpine, Damascus and Murciana were used. They were imported respectively from France, Cyprus and Spain (Gaddour and Najari, 2013). About 993 observations data were used for this study.

Statistical analysis was done by SPSS program and Stat box.

## Results and Discussion

Dairy production variations were analyzed at production and daily lactation to establish the average and the distribution parameters and tests (Table 1). The normality tests were applied in order to assess the statistical distribution pattern of the studied daily production. Such features are in close relation with quantitative genetics and animal selection (Najari *et al.*, 2007). In fact, the coefficient of variation is higher for the production by lactation. Moreover, the kurtosis and the skewness coefficient remain still negative at daily lactation. The normality hypothesis "kurtosis" was verified only at production by lactation and rejected at daily lactation. The skewness test of normality was rejected at production by lactation and at daily lactation (Table 1).

The husbandry intensification gave better conditions for genotypic expression by the satisfaction of the animal feeding needs. Furthermore, the analyzed performances developed from "improved" genotypes whose genetic expression, towards the environment, were not necessarily the same of the local breed due to genotype\*environment interactions (Chapuis *et al.*, 1995). The distribution phenotypic of the dairy production presented a particular distribution shape and the bell curve lost its right tail which represented the highest records (Figure 1). The shape of the performances distribution changed considerably according to the dairy production. These changes reflect a different expression of genotypes under different conditions.

For all quantitative characters, such as animal meat production, performances often follow a normal or bell curve distribution (Chapuis *et al.*, 1995). This aspect is one of the most important hypotheses for the genetic evaluation and the estimation of the genetic parameters for genetic improvement. However, such phenotypic distribution is not guaranteed under oasian breeding conditions. Due to environmental factors, the genotypic superiority can not be illustrated as a major phenotypic production. In such circumstances, performances of the genetically superior animals were constrained by non genetic factors and could be similar to phenotypes of other animals of minor genetic capacities (Najari *et al.*, 2007).

Dairy performances distribution cannot verify the normality hypothesis because the arid conditions can affect genotypes expression (Najari *et al.*, 2007; Chapuis *et al.*, 1995). This problem occurs especially with the best performing genotypes under drastic conditions. Hence, the hypotheses and several selection methodologies of the quantitative genetics have been elaborated and successes only under favourable breeding conditions (Shrestha and Fahmy, 2007).

### Conclusion

In conclusion, the specificity of the arid environment action upon the genotypes' expression appeared to have a direct effect on genetic methodologies application. The mixed model building for evaluation could not correctly estimate and correct some factors and interactions effects.

Table (1): Statistical analysis of the dairy production of goat.

Statistical parameters	Production by lactation (kg)	Daily lactation (days)
Observations	993	993
Average	216.19	151.52
Écart type	107.21	38.31
Minimum	33.2	60
Maximum	551	215
Coefficient of variation	0.5	0.25
Coefficient of «Skewness»	7.26	-3.03
Coefficient of «Kurtosis»	1.02	-11.95
Coefficient of dispersion	0.43	0.21
Normality test	«Skewness»	rejected
	«Kurtosis»	rejected

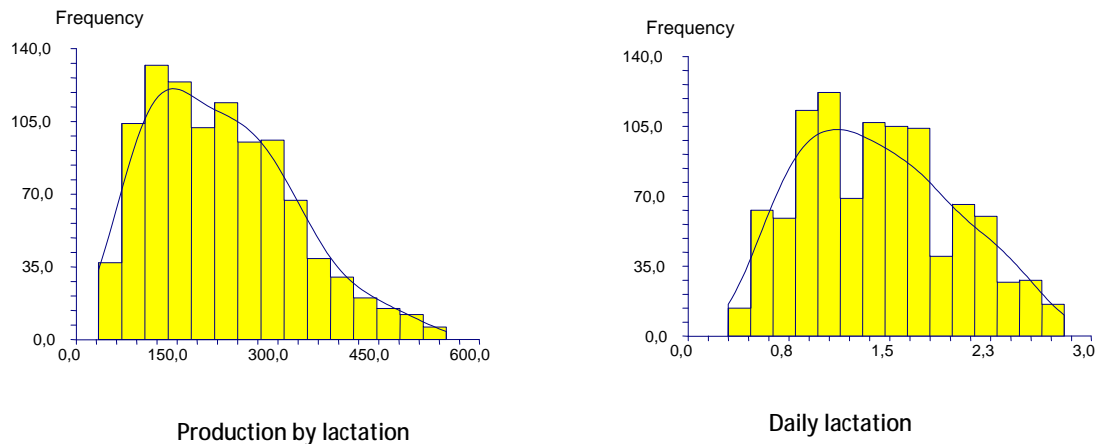


Figure (1): Distribution phenotypic of the dairy production of goat.

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