Survey and Trend of Some Zoometric Parameters Correlated to the Growth of Male Subjects of Mediterranean Italian Buffalo for Meat Production

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Abstract: In this study was evaluated the presence of hereditary disposition to meat production in Mediterranean Italian buffaloes through the analysis of variation of certain important parameters related to the production of meat, in 40 young subjects having the same age. The parameters studied were: live weight, daily weight gain (DWG), withers height, thoracic circumference and trunk length. These values were investigated by controls every 21 days during the period of major growth of the animals, that is from the 240th day of life up to the attainment of slaughter weight. This work has pointed out that there are significant differences in growth between animals of the same age. The data suggested that hasn't yet been made any selection about the presence of hereditary disposition to meat production in Mediterranean Italian Buffalo.

Keywords: Buffalo, meat production, weight variability, daily weight gain.

1. INTRODUCTION

To increase the breeding of the male buffalo calves is difficult in Italy because of a series of restriction caused by lack of information about the nutritive and nutritional quality of buffalo meat, but it also caused by misinformation about organoleptic quality of this product. In the last ten years there was the starting up in trading of buffalo meat which is, still now, at the beginning of its potentiality. For consequences doubt exists in the breeding world about investing in this field. It's necessary to fill gaps still alive on the argument improving knowledge in the meat buffalo breeding. In fact, although buffalo meat has interesting nutritional properties the market demand still remains very small because of alimentary habits of consumer and insufficient information [1]. The aim of this work is to evaluate the presence of hereditary disposition to meat production in Mediterranean Italian buffaloes through the comparison of: live weight, daily weight gain (DWG), withers height, thoracic circumference and trunk length in young subjects. Particularly the growth of male calves was investigated following both the trend in weight and in the Daily Weight Gain (DWG).

2. MATERIALS AND METHODS

2.1. Subjects

In total 40 male buffalo calves randomly selected purebred Mediterranean Italian Buffalo coming from one herd were tested. Calves were kept in the same conditions and received the same diet during a non-fixed period and when reached the pre-established weight were slaughtered [2]. They were fed with a steady diet composed by corn silage and oat hay as based forage; soy, cornmeal and bran as concentrated feed and a supplement of vitamins and mineral salts until the animals gained nearly 320 kg of body weight. Beyond all subjects had touched this value, the hay took silage place and with concentrated feed and supplements to give a good diet for animals finishing. Animals were slaughtered at the average life weight 320 kg (SD = 10.5 kg). Calves were slaughtered during one hundred days (to allow the achievement of the weight) in 2011.

2.2. Differentiation of Subjects

During the experimental period the animals were pooled into age groups in order to have significant results and were weighted every 21 days. The animals were monitored from the 240th day of life up to the 350th day of life and were sending to the slaughterhouse when they gained 320 kg of body weight. The subjects alive after the limit of 350 days were monitored the same up a maximum of 450 days. At the beginning of the experimental period (240 days of life) the animals were divided in two groups, termed *M* and *P* (Minus and Plus) including the subjects whose body weight was, respectively, inferior or superior to the average of the live weight (176,8 kg). The subjects really utilized for data collecting were 37 because 3 out of the initial 40 remained out of the test.

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3. MEAT PRODUCTION PARAMETERS DETERMINATION

3.1. Weight Variability

During the experimental period the animals were weighted every 21 days. Particularly they were weighted two times at intervals of 24 hours and the average of these two values was taken in accent in order to avoid environmental and accidental errors (Charts **1** and **2**).

3.2. Daily Weight Gain Variability

The daily weight gain of an animal is one of the major characteristics evaluated fo meat production since it determines the speed of tissue growth. It is the result of the amount of mass that an animal gains in a 24-hour period, and this variable is dependent of the amount and quality of feed provided, as well as the growth stage and/or the animal body state [3]. The DWG of the subjects were investigated (Chart **3**) by

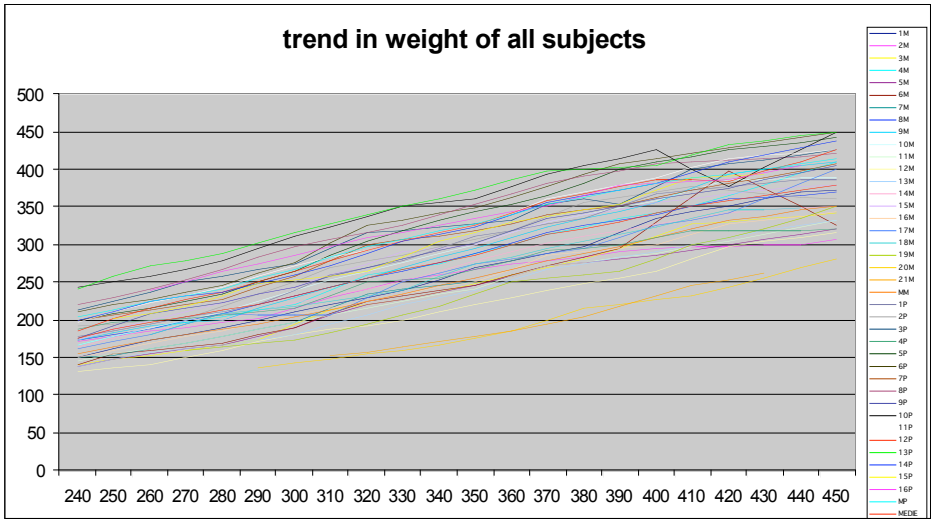

Chart 1.
MM trend in weight (average) of MINUS group (orange line).
MP trend in weight (average) of PLUS group (light blue line).
MEDIE trend in weight (average) of both groups (red blue line).

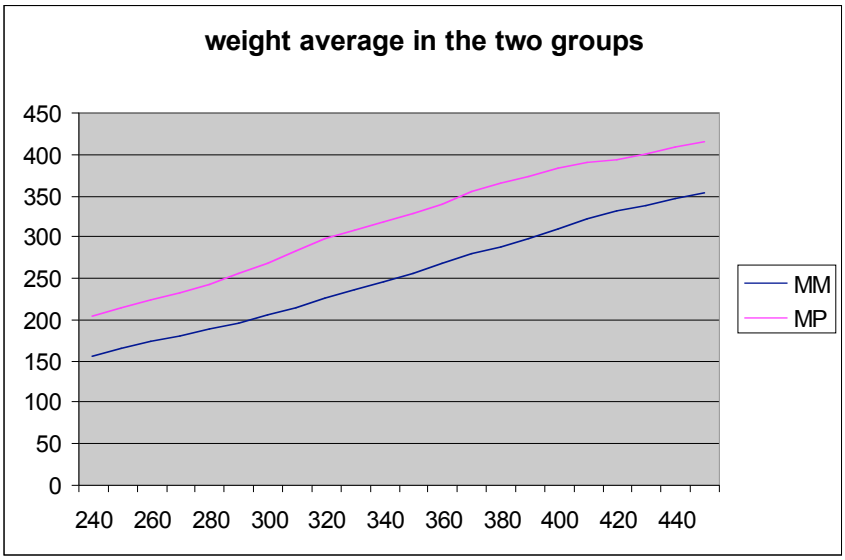

Chart 2.
Differences between the average trends in weight in the two groups.
MM minus group average weight (blue line).
MP plus group average weight (pink line).

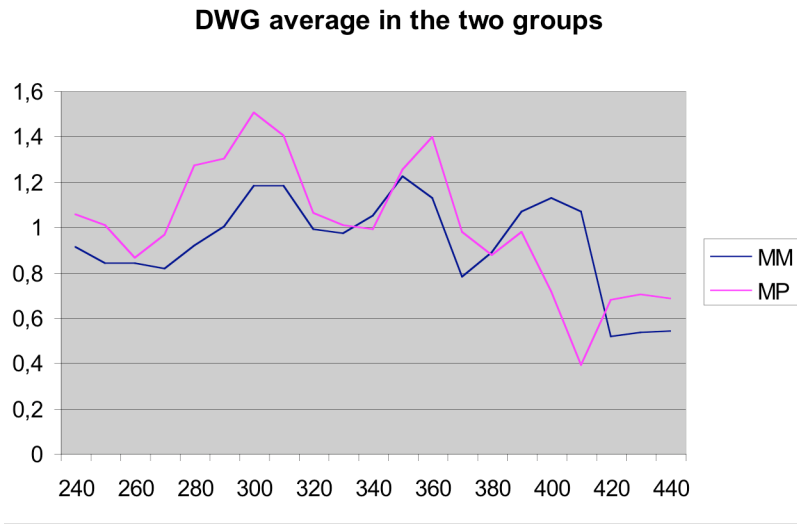

Chart 3.
Differences between the DWG (average) in the two groups.
MM minus group average DWG (blue line).
MP plus group average DWG (pink line).

means of mathematical calculations from the weight data.

3.3. Withers Height

The withers height was measured to calves. After weighting in the scale cage, the calves were measured by hand of operator by the tape measure. Then the data were recorded (Chart **4**).

3.4. Thoracic Circumference

The thoracic circumference was measured together with other biometric parameters in the scale cage and recorded (Chart **5**).

3.5. Trunk Length

The trunk length of calves was determined with the same methodology used to collect data for the previous parameters (Chart **6**).

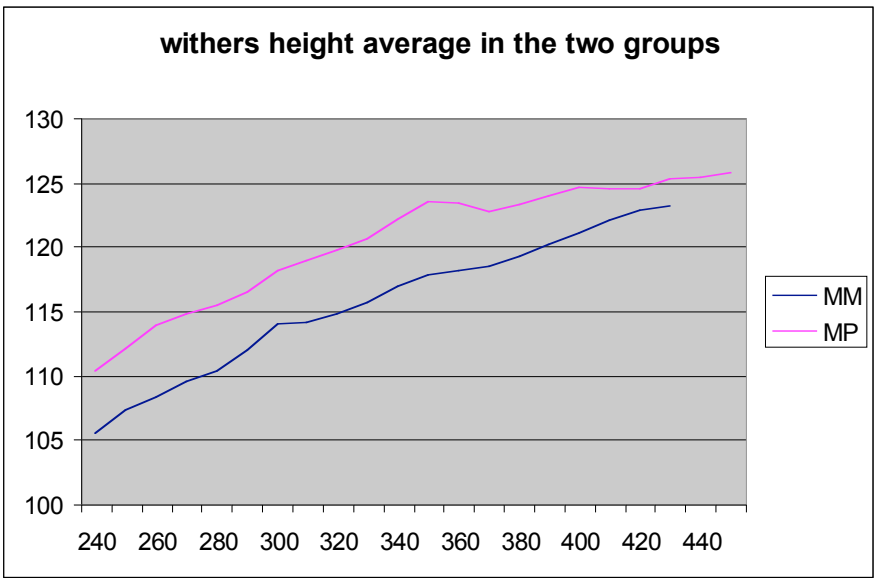

Chart 4.
Differences between the wither height (average) in the two groups.
MM minus group average wither height (blue line).
MP plus group average wither height (pink line).

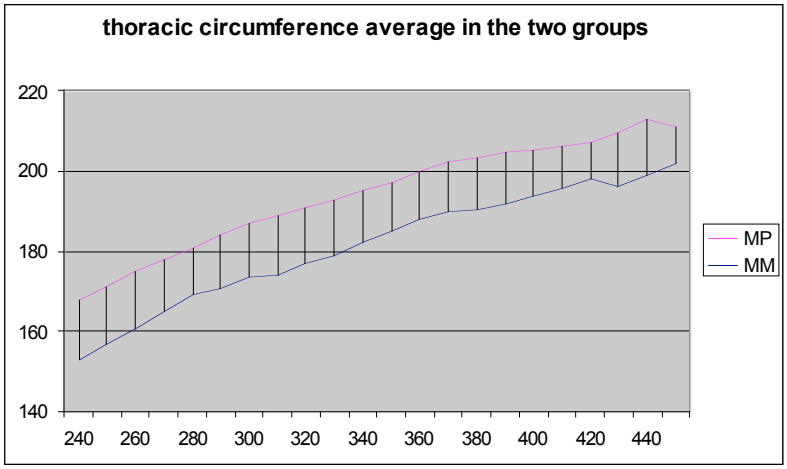

Chart 5.
Differences between the thoracic circumference (average) in the two groups.
MM minus group average thoracic circumference (blue line).
MP plus group average thoracic circumference (pink line).

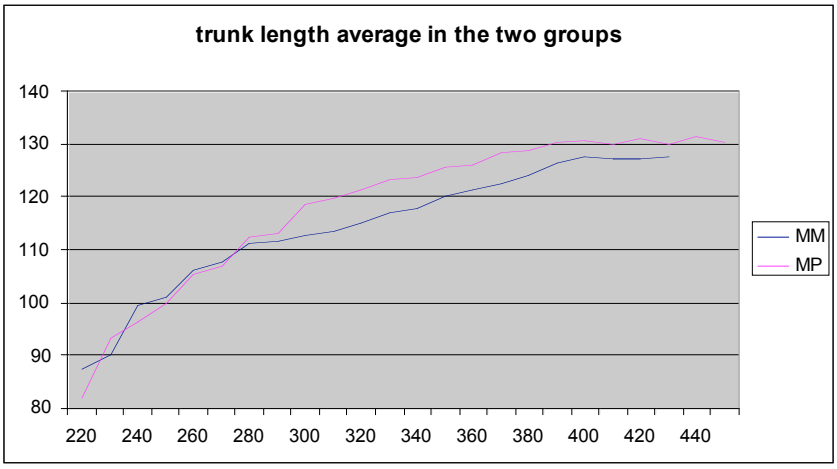

Chart 6.
Differences between the trunk length (average) in the two groups.
MM minus group average trunk length (blue line).
MP plus group average trunk length (pink line).

4. RESULTS AND DISCUSSION

In this study, we investigated the presence of hereditary disposition to meat production in Mediterranean Italian buffaloes. The variation of certain important parameters related to the production of meat was calculated. Specifically, we evaluated the presence of hereditary disposition to meat production in Mediterranean Italian buffaloes, reared in confined livestock, through the comparison of: live weight, daily weight gain (DWG), withers height, thoracic circumference and trunk length in young subjects. With regard to Terzano *et al*. [4] whom showed the effect of rearing systems on body weight, body measurements and relative indexes and, therefore, that there are significant differences between animals reared in intensive feeding and those reared on pasture system (particularly the second ones showed a lower withers height, a lower thoracic circumference but especially a lower live weight), in our study we have not had the opportunity to estimate the possible differences with animals reared to the pasture due to because of the scarcity of pastures in our area [5].

Analyzing the data on Charts **1** and **2** appears a huge difference in weight at same age. On entire group the average of live weight, at 240 days, is 176.8 kg with a deviation of 40 kg. This means that there are subjects who have difference in weight of about 80 kg between them (almost twice of their weight) at same age. While

the *M* group started, at the beginning of the trial, with an average weight of 155.2 Kg (below the average weight of the entire group, 176.8Kg); the *P* group started with an average weight of 203.0 Kg, although they were the same age. This weight difference was maintained constant throughout the study period. In fact, whereas the animals of *P* group went to the slaughter of around 350 days of life (10 days S.D) having reached the 320 kg; the subjects of *M* group have reached the slaughter weight (320 Kg) only at 450 days of life, that is far after 100 days. As just explained, in our case, the difference in weight can not be associated with the year of birth as it appears in Oliveira *et al*. [6] where it is detected that the year of birth statistically influenced on all weights in Murrah buffaloes.

Consistent with the trend in weight, the other parameters have maintained a constant difference too. Considering that the trial involved the period of major growth of the animals, being these in the full development of all their traits, the expected growth of the subjects revealed a slower DWG and increase in weight for *M* group corresponds to *P* group. Starting from a difference in weight, between two groups, of 40 Kg at the same day of life (beginning of the trial – 240° day), at 350° day of life the difference amounted to 70 Kg, p to 450 days of life in which this difference reaches 94.3 kg.

On this basis, accounted what above said, it is evident that after the 350 day the majority of subjects *P* remained out of the test (they went to the slaughter), and then to avoid misinterpretation looking at the charts relative to: DWG, withers height, thoracic circumference and trunk length, the final difference may seem smaller than its really is.

Specifically the DWG, represented in graphic 3 shows two bends corresponding to the two groups in which it can be seen points of inflection in correspondence of the summer periods particularly in July and August (relative to 330-340 and 370-380 days of life).

Observing the graph of all biometric parameters (Chart **7**) it is evident the greater tendency to the transverse parameters compared to those longitudinal. In other words, although thoracic circumference and trunk length seem to have a similar and constant pattern, the increase in thoracic circumference is greater than the increase in trunk length (less of exponential in curve). In addition the difference in thoracic circumference increase between the two groups appear greater than the difference in trunk length increase in the same.

In conclusion, it's possible to assert that hasn't yet been made any selection about the presence of

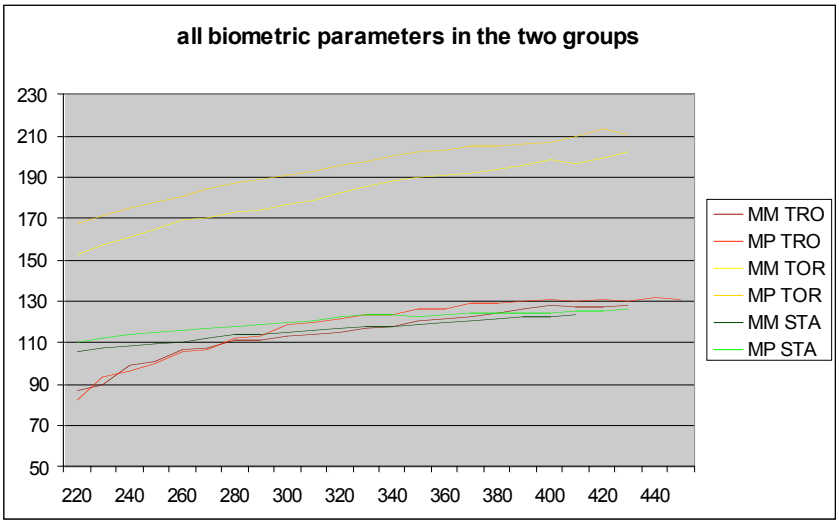

Chart 7.
MM TRO minus group average trunk length (brown line).
MP TRO plus group average trunk length (red line).
MM TOR minus group average thoracic circumference (yellow line).
MP TOR plus group average thoracic circumference (orange line).
MM STA minus group average wither height (dark green line).
MP STA plus group average wither height (light green line).

hereditary disposition to meat production in Mediterranean Italian Buffalo. The choice of breeding, in fact was always made according to milk productions and then the buffalo population kept a strong genetic variability respect to the animal's weight. It's, in fact, what is best demonstrated in our data processing. These data are also confirmed by what happens in milk buffalo population in which we have subjects by very different body-mass going from 450 kg of middleweight, as adult milk buffalo of small amount, to buffaloes of 900kg as great deal although there have been changes of morphological conformation due to an intense selection dam line, as a result of the arrival of functional Checks [7].

REFERENCES

[1] Trani A, Barone CMA, Faccia M, *et al.* Determination of volatile. J Anim Sci 2007; (Suppl. 2): 1153-6.

[2] Dos Santos TAB, Jorge AM, Pardo RB. Evaluation of muscle tissue. J Anim Sci 2007; 6(Suppl. 2): 1187-90.

[3] Tonhati H, Ferreira Lima AL, Buffalo meat: production and quality. Atti II Congr Naz All Buf Roma 2003; 67-79.

[4] Terzano GM, Mazzi M, d'Elisi MG, *et al*. Effect of intensive. J Anim Sci 2007; 6(Suppl. 2): 1237-40.

[5] Martiniello P, Terzano GM, Pacelli C, Mazzi M, Sabia E. Qualitative and quantitative biomass. J Anim Sci 2007; (Suppl. 2): 1241-1244.

[6] Oliveira JFS, Mattos JCA, Schammass EA, Gonçalves D, Oliveira ACAS, Jorce AM. Growth rate of Murrah Buffaloes. Atti V World Buffalo Congress 1997; pp. 404-7.

[7] De Rosa C, Peretti V, Di Palo R, Coletta A, Amante L, Campanile G, Zicarelli L. Morphologic evolution of buffalo cow bred in Italy. Atti II Cong Naz All Buf 2003; 119-23.

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