

Effects of weaning age and weight on lamb growth rate of Morada Nova breed raised in a tropical extensive production system

Efeito da idade e do peso ao desmame no ganho de peso de cordeiros Morada Nova criados em sistema extensivo de produção no trópico

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ABSTRACT

The aim of this research were to study the effect of weaning age and weight on post-growing rate (PWG) and to estimate the optimal weaning age (WA) and weight (WW) of Morada Nova-white variety breed lambs raised under extensive system conditions. A total of 31 male and female lambs were evaluated, being 19 lambs born in April/May 2001 and 12 lambs born in February/March 2002. Lambs were distributed in the following treatments at weaning: 1) weaning age = T1: weaned at 60 days; T2: weaned at 75 days; T3: weaned at 90 days, and 2) weaning weight = T1: weaned with 9 to 10.4kg weight; T2: weaned with 10.5 to 12.4kg weight and T3: weaned with above 12.5kg weight. The PWG was recorded through successive weightings done every fourteen days from weaning to 180 days of age. Data were analysed through a statistical model that included age and weight at weaning, sex and year of birth as fixed effects. Lambs weaned with 60, 75 and 90 days of age showed non-significant differences ($P>0.05$) on PWG. However, WW had a significant influence ($P<0.05$) on lamb weight. The group weaned with 9-10.4kg had smaller live weight than those weaned with 10.5-12.4kg or above 12.5kg. No differences were found between these last two groups. Also, sex had significant effect ($P<0.05$) on lamb growing with males being heavier than females (20.7kg and 17.6kg, respectively). Year of birth did not affect PWG. It was concluded that weight at weaning is more important than age at weaning on post-weaning growing of lambs. The most efficient live weaning weight on white Morada Nova lambs raised in extensive system production is over 10.5kg.

Key words: hair lamb, management, sheep.

RESUMO

O trabalho teve como objetivo avaliar o efeito da idade e do peso ao desmame no ganho de peso posterior de cordeiros da raça Morada Nova-variedade branca, bem como determinar a idade e o peso mais adequados de desmame de

cordeiros mantidos em sistema extensivo de criação. Foram avaliados 31 cordeiros machos e fêmeas, sendo 19 nascidos nos meses de abril e maio e 12 nascidos durante os meses de fevereiro e março de 2002. Ao desmame, os cordeiros foram distribuídos nos seguintes tratamentos, considerando-se: 1) idade ao desmame (ID) = T1: desmame com 60 dias de idade; T2: desmame com 75 dias de idade; T3: desmame com 90 dias de idade; e 2) peso ao desmame (PD) = T1: desmame com peso entre 9 - 10,4kg; T2: desmame com peso entre 10,5 - 12,4; T3: desmame com peso acima ou igual a 12,5kg. O crescimento posterior dos cordeiros foi avaliado através de pesagens sucessivas quinzenais até atingirem a idade de 180 dias. Os dados foram analisados pelo procedimento estatístico GLM, considerando-se a idade e o peso ao desmame, o sexo e o ano de nascimento como variáveis independentes. Cordeiros desmamados com 60, 75 e 90 dias de idade não apresentaram diferenças significativas ($P<0,05$) nos ganhos de peso pós-desmame, porém observaram-se diferenças entre os grupos de peso ao desmame. Cordeiros desmamados com peso entre 9 e 10,4kg apresentaram pesos pós-desmame inferiores ($P<0,05$) aos desmamados com pesos entre 10,5 e 12,4kg e acima ou igual a 12,5kg, não havendo diferenças entre esses últimos grupos. O sexo teve efeito significativo ($P<0,05$) no peso dos cordeiros, sendo os machos mais pesados que as fêmeas (20,7kg e 17,6kg, respectivamente). O ano de nascimento não teve efeito significativo no ganho de peso pós-desmame dos cordeiros. Concluiu-se que o peso ao desmame é mais importante que a idade no ganho de peso pós-desmame e que o peso mínimo para o desmame de cordeiros da raça Morada Nova, em condições extensivas de criação, é de 10,5kg.

Palavras-chave: cordeiro deslanado, manejo, ovino.

INTRODUCTION

Sheep, as well as goats exploitation, is an important socio-economic activity in northeast Brazil,

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mostly for small producers of the semi-arid region, where animals are raised in extensive system conditions for meat production. In spite of its importance, production has not improved in the last decades and the market still finds low quality carcass characterised by small size and without finishing (SELVAIVE-VILLARROEL & SOUZA JUNIOR, 2005). In recent years, due to the major demand of lamb meat by the local market, there are more interests by the producers for better system production that assure a good meat quality throughout the year.

In this context, where the objective of exploitation is the production of lambs for slaughter, with a necessary an adequate management and nutritional approach for lamb fattening and carcass quality, identification of the optimal age and weaning weight is essential for further growing in order to reach the most efficient slaughter weight (OLIVEIRA et al., 1996).

The present work aims to study and compare the effects of weaning age and weight for later growth and to estimate de optimal age and weight of weaning in Morada Nova breed lambs raised in semi-arid conditions in northeast of Brazil.

MATERIAL AND METHODS

The experiment was carried out at the Vale do Curu Experimental Farm of the Federal Ceará University, located in Pentecoste, State of Ceará. A total of 31 male and female lambs of Morada Nova-white variety breed were evaluated under extensive system conditions, being 19 lambs born in April/May 2001 and 12 lambs born in February/March 2002. The lower number of animals born and used in each period is due to the fact that they belong to a variety in extinction.

To compare the effects of weaning age and weight on later lamb growth, lambs were distributed, in each year and equally by sex, in the following treatments according with weaning age = T1: weaned at 60 days; T2: weaned at 75 days; T3: weaned at 90 days. Lambs were also classified according to the weight at weaning (WW), independently of age, in the following treatment: Treatment 1 = weaned with 9 to 10.4kg weight (5 males and 5 females); Treatment 2 = weaned with 10.5 to 12.4kg weight (4 males and 8 females) and Treatment 3 = weaned with above 12.5kg weight (3 males and 6 females).

Post-weaning lamb growth (PWG) was evaluated by weighting animals every 14 days, from

weaning to 180 days of age. The experimental design was entirely at random and data of live weight and average daily gain (ADG) were analysed by the least squares method using GLM procedure (Generalized Linear Models) of the "Statistical Analysis System" (SAS, 1999) and means compared by "t" test with 5% of probability. In the statistical model, weaning age or weaning weight, sex, year of birth and their interactions were considered as fixed effects. As interactions between treatments, sex and year of birth were removed from the model for final analysis since were not significant ($P>0.05$). Weight data were adjusted for weaning age according to the formula described by LÔBO (1994).

RESULTS AND DISCUSSION

There was no effect ($P>0.05$) of WA on PWG, either in total lamb weight gain (Table 1) or daily weight gain (Table 2). The non difference on PWG of lambs weaned at different ages observed in this study is in accordance with reported on literature (CANEQUE et al., 2001) and it could be due to the fact that lambs at 60 days of age have a ruminal digestive system sufficiently developed to obtain nutrients from solid food. Beside this, ewe milk yield is very small after two months of lactation with low contribution for lamb nutrition (KARIM et al., 2000). Therefore, under semi-arid tropical conditions, lambs can be weaned after 60 days of age from which growth is not affected if they have a good nutritional condition. Weaning at 35 days of age has been reported by MULLER et al. (2006) in intensive system production conditions.

The ADW found in this study was lower than reported in literature. FREITAS et al. (2005) have shown, in Santa Inês hair breed which were weaned at 56 and 98 days, ADG of 143g and 150g in lambs slaughtered at 126 days of age, while MULLER et al. (2006) reported ADW of 182 g and 183 in lambs weaned at 35 and 42 days and slaughtered with 28kg of liveweight.

Different to age, the WW had a significant effect ($P<0.05$) on PWG. Lambs weaned with 9.0 to 10.4 kg showed lower PWG than those weaned with 10.5 to 12.4kg or weaned with 12.5kg or over, being not different between these two groups as shown in table 3. However, animals weaned with lower weight had similar average daily gain (ADG) to the other groups (Table 4), showing that the difference observed at the end of the experiment was due to the less initial live weight.

Table 1 - Means and standard deviation of live weight (kg) of white Morada Nova lambs weaned with 60, 75 and 90 days of age.

Weigh at age (days)	-----Weaning age (days)-----			Mean
	60 days (n = 11)	75 days (n = 9)	90 days (n = 11)	
Initial	10.1 ± 0.53	11.3 ± 0.71	12.3 ± 0.87	-
105	13.5 ± 0.72 ^a	14.1 ± 0.78 ^a	14.8 ± 0.81 ^a	14.1
120	15.3 ± 0.75 ^a	15. ± 0.81 ^a	15.8 ± 0.83 ^a	15.4
135	15.7 ± 0.80 ^a	15.4 ± 0.86 ^a	16.9 ± 0.89 ^a	16.0
150	16.8 ± 0.81 ^a	16.3 ± 0.88 ^a	17.6 ± 0.90 ^a	16.9
165	17.6 ± 0.81 ^a	17.5 ± 0.88 ^a	19.0 ± 0.91 ^a	18.0
180	19 ± 0.85 ^a	18.7 ± 0.86 ^a	19.9 ± 0.98 ^a	19.2

Values followed by similar letters in the same row do not differ at P<0.05.

Observing table 3, which shows the effect of WW on lamb growth, makes it evident that animals weaned with live weight above 10.5kg had better performance than those weaned with live weight between 9 and 10.4kg. However, ADG was similar in all groups showing that those weaned with less weight did not have a catching up growth. As post-weaning growth of lambs depends on solid food intake as well as on their genetically potential for growth (NAGPAL et al., 1994), weaning weight is an important factor for later growing because the increase of live weight is reduced in relation to food intake when animals approach to maturity (THOMPSON & PARKS, 1983).

At weaning, within a group with similar age, there were lambs with different weights and those heavier were the ones with best development efficiency during lactation period, influenced by factors such as milk yield and length of lactation period affected by age and body condition of the ewe at lambing (GODFREY et al., 1997; PLOUMI AND EMMANOUILIDIS, 1999). After weaning, it was expected that lambs weaning with lower weights would

have less growth rate by the effect of weaning stress and poor quality of the native pasture. Also, smaller lambs may have a less developed digestive system. However, these aspects were not observed in the present study and lambs had a similar ADG between groups with values ranging from 61g⁻¹d (T3) to 70g⁻¹d (T2) showing that, at weaning, all lambs got their digestive system developed. Initial different weight was maintained up to six months of age, showing that WW is an important factor of influence on later growing rate and should be considered as important criteria for lamb weaning determination.

The different weight data analysis of Morada Nova lambs raised in extensive conditions showed that growth rate is not sufficient to produce early lambs with adequate slaughter weight to attend the market demand. In additional, those analyses showed that lambs raised in tropical climate has less development than those described for sheep raised in extensive condition in temperate climate.

Comparing the effect of weaning age and weight on pos-weaning growth rate, it was observed that lambs weaned with heavier weights reached higher

Table 2 - Means and standard deviation for average daily weight gain of white Morada Nova lambs weaned with 60, 75 e 90 days of age.

Interval of age (days)	Average daily weight (g)*			Mean
	60 days (n = 11)	75 days (n = 9)	90 days (n = 11)	
120 – 135	27 ± 04 ^a	16 ± 06 ^a	77 ± 07 ^a	40
135 – 150	74 ± 23 ^a	58 ± 24 ^a	42 ± 26 ^a	58
150 – 165	52 ± 10 ^a	74 ± 11 ^{ab}	92 ± 12 ^b	72
165 – 180	84 ± 14 ^a	82 ± 16 ^a	60 ± 16 ^a	75
Mean	71 ± 05 ^a	60 ± 06 ^a	67 ± 06 ^a	66

(*) Values followed by similar letters in the same row do not differ at P<0.05.

Table 3 - Means and standard deviation of post-weaning live weight of White Morada Nova lambs weaned at different weight intervals.

Weigh at age (days)	Live weight intervals (kg)*			Mean
	9 – 10.4kg (n = 10)	10.5 – 12.4kg (n = 12)	>12.5kg (n = 9)	
105	11.4 ± 0.5 ^a	14.6 ± 0.5 ^b	16.0 ± 0.5 ^b	14.0
120	13.0 ± 0.5 ^a	15.9 ± 0.5 ^b	17.4 ± 0.6 ^b	15.4
135	13.8 ± 0.6 ^a	16.5 ± 0.7 ^b	17.8 ± 0.7 ^b	16.0
150	14.7 ± 0.7 ^a	17.5 ± 0.7 ^b	18.6 ± 0.7 ^b	16.9
165	15.8 ± 0.7 ^a	18.5 ± 0.7 ^b	19.4 ± 0.7 ^b	17.9
180	16.9 ± 0.7 ^a	19.8 ± 0.8 ^b	20.7 ± 0.8 ^b	19.1

(*) Values followed by similar letters in the same row do not differ at $P < 0.05$.

weights at 180 days, however, lambs weaned with older ages, which had longer milk intake period, did not show better post-weaning performance than those weaned earlier. The difference on post-weaning live weight of lambs weaned with different weights was bigger than that observed on lambs weaned with different ages.

Sex had significant effect ($P < 0.05$) on growing rate. The male final weight were heavier (20.7 ± 0.7 kg) than in female (17.6 ± 0.5). The average daily gain was 77g in males and 55g in females. These results confirm most literature reviewed (BATHAEI & LEROY, 1997; FERNANDES et al., 2001). Sex difference could be explained by the influence of sexual hormones on animal development affecting body dimensions and fat deposits, as well as, muscle and bone tissues.

There was no significant difference between years at final weight in spite that lambs born in 2002 were heavier ($P < 0.05$) from weaning to 120 days of age and showed smaller advantage on the other weighing. It is known that year or even month of birth may cause variations on weight and performance of lambs due to climatic variations and/or management (BATHAEI &

LEROY, 1997). In this study, differences between groups were only observed on the first post-weaning days, probably as a consequence of lambs from 2002 being born at the beginning of the raining season (February/March), having, therefore, more access to forage than those born in 2001 (April/May) and having higher weights at weaning. Later on the dry period animals showed similar live average daily gain (2001 = 0.074g and 2002 = 0.058g) with no significant differences ($P > 0.05$).

CONCLUSION

Body weight is more important than weaning age on lamb growth and it should be considered on weaning decision. The minimum body weaning weight for white Morada Nova lambs reared in extensive conditions should be over 10.5kg.

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Table 4 - Means and standard deviation for average diary gain (kg) of white Morada Nova lambs weaned with different weight intervals.

Interval between days of age	Average daily gain (g)*			Mean
	9 – 10.4kg (n = 10)	10.5 – 12.4kg (n = 12)	>12.5kg (n = 9)	
105 – 120	79 ± 20 ^a	89 ± 21 ^a	93 ± 21 ^a	87
120 – 135	50 ± 28 ^a	42 ± 28 ^a	21 ± 08 ^a	37
135 – 150	62 ± 24 ^a	63 ± 26 ^a	52 ± 26 ^a	59
150 – 165	72 ± 12 ^a	66 ± 10 ^a	75 ± 13 ^a	71
165 – 180	75 ± 15 ^a	89 ± 16 ^a	66 ± 16 ^a	77
Mean	68 ± 06 ^a	70 ± 06 ^a	61 ± 61 ^a	66

(*) Values followed by similar letters in the same row do not differ at $P < 0.05$.

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