A STUDY OF FACTORS WHICH INFLUENCE BIRTH AND WEANING WEIGHT IN LAMBS

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303 birth and weaning weights of West African (WA), Black-headed Persian (BP) West African crossbred .(WAC) and Dorset Horn crossbred (DHC) lambs were analysed by Least Squares. The lambs came from the flock in the Agronomy Faculty. They were kept indoors from birth to three weeks old ant were supplemented with grass and concentrate. The effects of breed, sex, month of birth, year of birth, litter size, single and twin and the covariable ewe weight at parturition were studied. Analysis of Variance indicated a significant ($P < 0.01$) effect of breed, sex, year, litter size and ewe weight on weaning weight. Adjusted means were 2.33, 2.41. 2.50, 2.96 for birth weight and 12.79, 12.18, 13.67 and 15.78 kg for weaning weights in breeds WA, BP, WAC and DHC. Birth and weaning weights for the ram lambs were 2.61 and 14.55 kg, while for ewelambs they were 2.49 and 12.74 kg; for single 2.83 and 14.55 kg ant for twin births 2.27 and 12.74 kg respectively. Mean ewe weight was 33.69 kg with regression coefficients of 0.60 and 0.50 with birth and weaning weights respectively.

Key words: Sheep, birth weight, weaning weight

The importance of sheep production as a source of animal protein in Venezuela has been increasing during recent years. The relationship of birth weight to weaning weight and weaning weight to slaughter weight is economically very important in lamb production and is affected by genetic, physiological and environmental factors. These factors have been studied in temperate breeds under environmental and management conditions very different to our own but there is very little information available relating to tropical sheep breeds. The objectives of this work were to study the effects of breed, sex, month of birth, year of birth, litter size and ewe weight at parturition on birth weight and weaning weight in lambs of tropical breeds, and their crosses with temperate breeds, maintained under intensive production systems.

Materials and Methods

The data used in this study were 303 observations of lambs from single and double births of West African, Black-headed Persian, West African crosses and Dorset Horn crosses, from the flock in the Sheep Section of the Facultad de Agronomia de la UVC in the years 1976, 1977 and 1978. The West African and Dorset Horn crosses were the result of crossing rams of these breeds with ewes from the general flock of the Sheep Section, where there is a high percentage of West African, Barbados Black-belly and Creole blood. The sheep were kept under a system of rotational grazing of Bermuda Grass (Cynodon dactylon) with mineral supplement when they were not pregnant and for the first four months of gestation. The pasture was fertilized throughout the year and irrigated in the summer. Natural service was used, introducing the ram three weeks after parturition.

In the final month of gestation the sheep were kept inside and fed cut Bermuda grass and 0.25kg of concentrate (18% crude protein) until the lambs were weaned at 10 weeks of age. The lambs had free access to Cenchrus ciliaris hay and concentrates starting with 28% crude protein, available ad libitum from three weeks of age using a system of gates to prevent access by the ewes. The lambs and their mothers were weighed after birth and then weekly until weaning. The data were analyzed by least squares.

Results and Discussion

The Analysis of Variance by least squares for birth and weaning weight can be seen in Table 1. There were significant differences in birth weight, due to breed, sex, year of birth and litter adze. The results of other work with tropical sheep show significant effects of litter size, ewe weight and year, but not of sex (Bodisco et al 1973), while Gonzalez (1972) and Reveron et al (1978) both reported differences for sex and litter size but the former found no differences due to year and the latter no differences due to ewe weight.

Table l:
Analysis of variance for birth and weaning weight

Variables	Degree of freedom	Mean squares	
		Birth weight	Weaning weight
Breed	3	5.784**	177.008**
Sex	1	.826*	207.562**
Month of birth	11	.152	44.448*.
Year of birth	2	1.396~*	1.927
Litter size	1	16.261**	187.774**
Weight of ewe at parturition			
Linear	1	1.811**	150.408**
Quadratic	1	.954*	---
Residual	283	.218	8.454

* P<.05
**P <.01

Differences in weaning weight due to breed, sex, month of birth and litter size were reported by Bodisco et al (1973) and Gonzalez (1972). Bodisco et al (1973) also reported differences due to year and litter size but not to sex. Gonzalez (1972) found no influence of the weight of the ewe.

Significant effects of these factors on birth weight and weaning weight have been found in sheep of temperate breeds with the degree of effect varying with management conditions (Eltavil et al 1970, De Baca et al 1956, Sidwell et al 1964) with a positive correlation between birth and weaning weights. Birth and weaning weights according to breed are shown in Table 2. There were no appreciable differences between tropical breeds, but there were between these and the weights of

Table 2:
Birth and weaning weight separated by breed

Breed	Birth weight (kg)	Weaning weight (kg)
West African	2.3 + 0.1a	12.8 + 0.3ab
Persian Black Head	2.4 + 0 1ab	12.2 + 0.4a
West African cross	2.5 + 0.1b	13.7 + 0.5b
Dorset Horn cross	2 9 + 0 1c	15.8 + 0.4c

abc Values in the same column with different letter" are significantly different . (P C 0.01)

lambs from mothers of tropical breeds crossed with Dorset Horn rams. The birth and weaning weights observed are similar to those recorded for tropical breeds by Butterworth et al (1968) Castillo et al (1972), Gonzalez(1972), Combellas (1974), Reveron et al (1976), Reveron et al (1978), Combellas (1980), but less than those reported for temperate breeds (Barnicoat et al 1949, Davies 1963, Spedding 1970, Hodge 1966, Langlands 1973, British Sheep 1976).

Table 3 shows the adjusted means for birth weight and weaning weight.

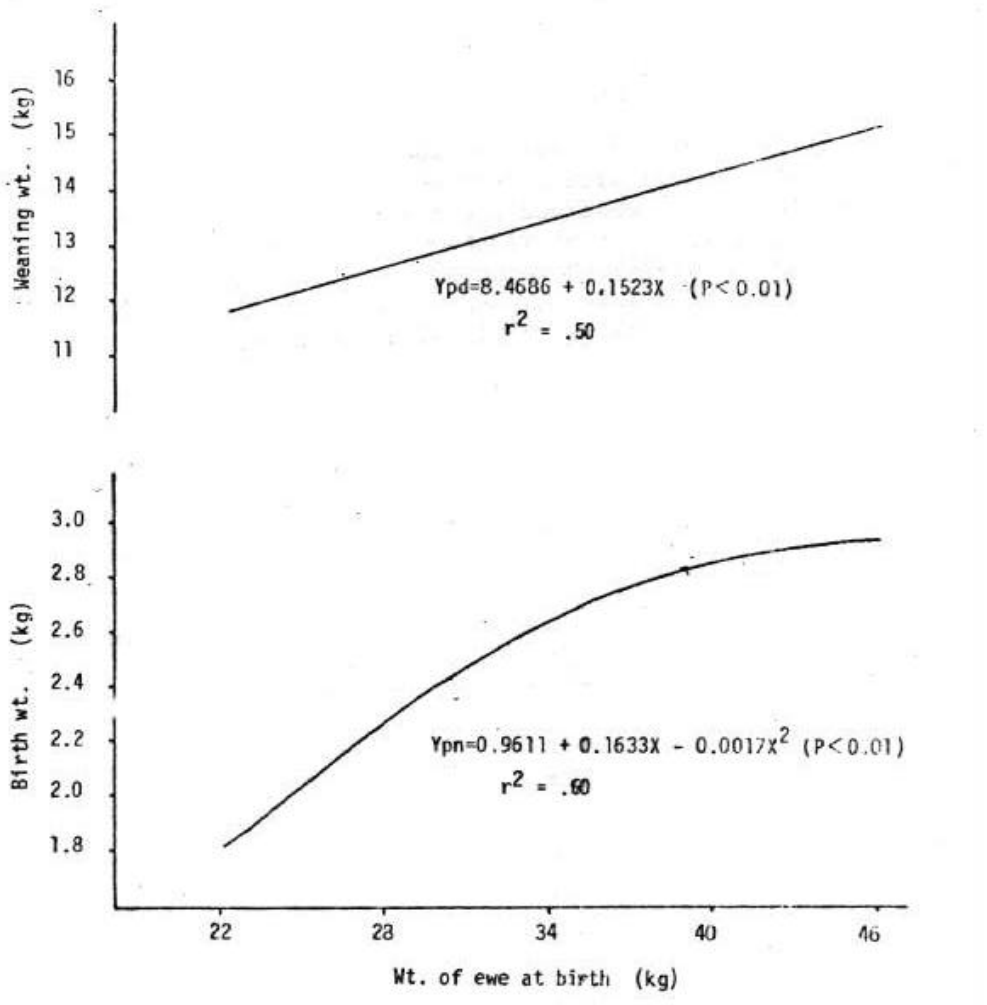
Table 3:
Birth and Weaning weights separated by sex, year and litter

Source of variation	Birth weight (kg)	Weaning weight (kg)
Sex		
Male	2.61	14.55
Female	2.49	12.74
Year		
76	2.45	13.8
77	2.49	13.6
78	2.70	13.4
Litter size		
Single	2.83	14.55
Twins	2.27	12.74

Sex and litter size gave significant differences for both birth and weaning weight. There was a significant effect of year on birth weight due to improvements in management and feeding of the ewes during pregnancy, but no significant difference in weaning weight between years was detected. There was no significant effect of month of birth on birth weight.

Ewe weight at parturition had a quadratic effect on birth weight and a linear effect on weaning weight (Figure 1), the weight of the lambs being greater as ewe weight increased. Birth and weaning weight had a linear relationship (r = .51).

Figure 1:
Relationship between ewe weight and and weaning weight



Conclusions

The results obtained show that environmental factors influence birth and weaning weight of lambs as much as genetic factors, with better weights being observed when the ewes were crossed with Dorset Horn rams. This demonstrates the potential for improving tropical sheep breeds by combining their great adaptability with the higher potential of temperate breeds.

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