

PRODUCTION AND REPRODUCTION PARAMETERS OF TROPICAL SHEEP BREEDS IN IMPROVED PRODUCTION SYSTEMS

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20% of the world sheep population is located in tropical and sub-tropical regions, formed in general by tropical hair producing breeds, primitive and was adapted to the environmental conditions and management to which they are subjected with the principal aim of meat production and the lesser objectives of skin, milk and manure production. Published information on their growth is scarce but indicates that they have a lower genetic potential than temperate breeds in productive as well as reproductive parameters. Mean values in improved production systems are 2.6 kg birth weight, 115 g liveweight gain per day, 580 g milk per day and 1.3 lambs per parturition. These parameters could be improved by crossing with temperate breeds when conditions of management and [ceding are such as to justify this policy.

Key words: Tropical sheep, production parameters, reproduction parameters

The sheep is one of the species most widely distributed throughout the world, having a high capacity of adaptation which has permitted it to survive in a great variety of environments from arid zones and semi-deserts, to cold mountainous regions. 20% of the world sheep population is located in tropical and sub-tropical regions with the production of meat being the main objective and to a lesser degree, production of skin, milk, manure and wool. The characteristics of different tropical sheep breeds vary slightly according to the environment from which they originated and the type of production for which they have been selected.

Sheep have been increasing in importance in the tropics due to the scarcity of animal protein in these areas. In South America interest in studying performance of tropical breeds has arisen in recent years and in this paper we will summarise published information on production and reproduction parameters in hair producing sheep in tropical America. However it should be noted that the majority of this work has been carried out in experimental stations under improved conditions of management and nutrition.

Production parameters

Birthweight: The values reported in the literature for various tropical breeds are reported in Table 1. It can be seen that there is very little variation between them when compared with those reported for temperate breeds.

Table 1:
Birth and weaning weights of lambs of tropical breeds

Reference	Breed	Birth weight (kg)	Weaning age (days)	Weaning weight (kg)
Gonzalez (1972)	Crossbred sheep	2.7	70	12.2
Bodisco et al (1973)	West African	2.8	90	12.5
	Barbados Black Belly	2.5	90	12.1
	Creole	2.8	90	12.1
Valencia et al (1975)	Black-headed Persian	2.5	90	10.3
	Tabasco	2.6	72	11.3
	Tabasco	2.6	90	14.3
Gonzalez (1977)	Black-headed Persian	2.6	70	11.8
Atencio et al (1979)	West African x	2.6	90	11.0
	Black-headed Persian			
Gonzalez&De Alba (1979)	Peliguey	2.5	—	----
Combellas et al (1979)	West African	2.3	70	12.8
	Black-headed Persian	2.4	70	12.2

The overall means for birth weights in the latter are 5.2 and 3.6 kg. for lambs from single or twin births respectively (Barnicoat et al 1949; Davies 1963; Hodge 1966; Spedding 1970; Newton 1973; Langlands 1973; British Sheep 1976). Birth weight is affected by genetic, physiological and environmental factors, with significant differences reported for sex (Gonzalez 1972; Valencia et al 1975; Reveron et al 1978; Atencio et al 1979; Combellas et al 1979), litter size (Gonzalez 1972; Bodisco et al 1973; Valencia et al 1975; Reveron et al 1979.; Combellas et al 1979) and weight of ewe at parturition (Gonzalez 1972; Combellas et al 1979).

Liveweight gain and weaning weight: Liveweight gains up to weaning are presented in Table 2. These values are less than those reported for temperate breeds which average 300 g/d (Barnicoat et al 1949; Davies 1963; Hodge 1966; Spedding 1970; Langlands 1973; Rattray et al 1975). The lower birth weights and liveweight gains of lambs from tropical breeds result in lower weaning weights, as can be observed in Table 1.

Yield and quality of carcass: Very little work has been carried out in this area. Chacon et al (1970) obtained carcass yields of 44.9% for lambs of tropical breeds and their crosses for entire and castrated animals, while Lopez et al (1979) reported values between 39.1 and 46.9 % for animals of mixed tropical breeds up to 5 years of age. Various characteristics of sheep carcass obtained in the Facultad de Agronomia U.C.V. can be seen in Table 3. These data are from West African lambs fed on hay and concentrates ad libitum and slaughtered at various weights after a 24 hour fast, not including the weights of head, hooves and viscera. The percentage of muscle was greater, and of fat lower, than the values reported for the temperate breeds (see Cuthbertson and Kempster 1978).

Milk production: It can be seen from Table 4 that the milk production of tropical sheep breeds, estimated by double weighing of the lamb, is lower than that reported

Table 3:
Liveweight gain in lambs of tropical breeds

Reference	Age (days)	Breed	Liveweight gain (g/day)
Before weaning:			
Butterworth et al (1968)	0-84	Black-headed Persian	93
Gonzalez (1972)	0-70	Cross-bred sheep	154
Combellas (1974)	0-70	West African	154
Pena (1976)	0-90	Tabasco	136
Reveron et al (1976)	0-90	West African	121
		Barbados Black-belly	113
		Creole	107
Rondon et al (1976)	0-84	West African cross-bred	137
Reveron et al (1978)	0-90	West African	129
Atencio et al (;979)	0-90	West African x	
		Black-headed Persian	91
Combellas et al (1979)	0-70	West African	150
		Black-headed Persian	140
Gonzalez 6 De Alba (1979)	0-84	Peliguey	68
After weaning:			
Chacon et al (1970)	103-197	Barbados Black-Belly	149
		Creole	148
Pena (1976)		West African	154
		Tabasco	65
		Peliguey	107
De Alba & Foote (1977)	0-240	Peliguey	107
Torres et al (1977)	--	Tabasco	79
Combellas (1980)	63-140	West African	98

Table 3:
Carcass characteristics of West African lambs

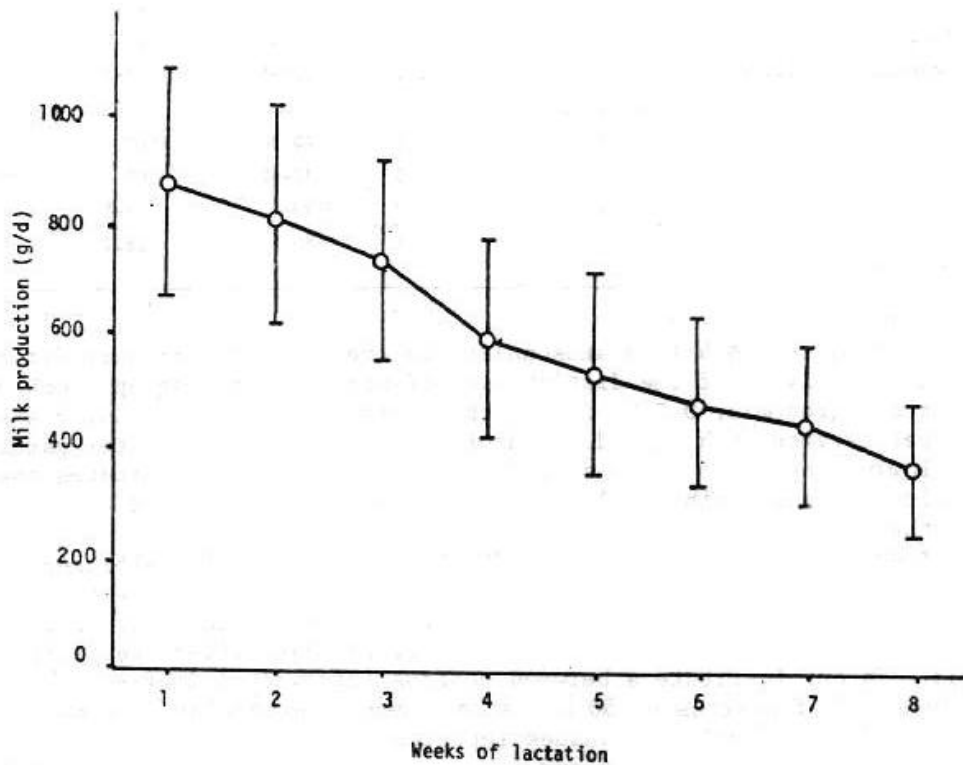
Liveweight (kg)	Carcass weight (kg)	Yield (%)	Muscle (%)	Fat (%)	Bone (%)	Age (days)
15.4	6.53	42.3	62.8	13.8	23.3	119
20.3	9.40	46.2	63.2	16.3	20.4	171
24.8	11.51	46.3	63.7	16.7	19.4	189
29.7	14.02	46.9	65.6	15.3	18.8	295

Table 4:
Milk production in sheep of tropical breeds

Reference	Breed	Ration	Lactation length (weeks)	Mean production (kg/day)
Butterworth et al (1968)	Black-headed Persian	Fresh forage + concentrate	12	0.63
Combellas (1979)	West African	Forage or hay + concentrate	8-12	0.59
Gonzales & De Alba (1979)	Peliguey	----	6	0.32

for temperate breeds. The lactation curve, also using the method of double weighing of the lamb, for West African sheep fed on hay of medium quality and 0.5 kg/d of concentrates, is shown in Figure 1. (Combellas 1979). The lactation peak is reached in the first week after parturition and thereafter production decreases rapidly, being very low after 8 weeks of lactation.

Figure 1:
Lactation curve for West African sheep



Reproductive parameters

Age at puberty: Values of 300 days for females (Pena 1976; Castillo et al 1977; Lozano and Martinez 1977) and 231 days for males (Lozano and Martinez 1977) have been reported for the Tabasco breed.

Litter size: The number of lambs per parturition and the percentages of single, double and triple births for tropical breeds are presented in Table 5. It can be seen that there is a low proportion of multiple births in these breeds, the most prolific breed being the Barbados Black Belly.

Interval between births: Data obtained in the Facultad de Agronomia, U.C.V using natural service, show an interval between births of 246 ± 44 days for West African sheep with 37% of the ewes conceiving while still lactating. Pena (1976) reported a value of 248 ± 61 days as the interval between births for the Tabasco breed, while Valencia et al (1975) reported that the first oestrus after parturition in Tabasco sheep was observed between 25 and 60 days after parturition.

Table 5:
Litter size and percentage of single, double and triple births

Reference	Breed	Litter size	Births (%)		
			Single	Double	Triple
Gonzalez et al (1972)	Crossbred sheep	1.2	75.0	24.6	0.4
Valencia et al (1975)	Tabasco	1.3	—	—	—
Castillo et al (1972)	Tabasco	1.2	80.1	19.9	0
Lozano & Martinez (1977)	Tabasco	1.2	77.1	21.0	1.9
Reveron et al (1976)	Creole	1.2	90-95	2-5	1
	Barbados Blackbelly	1.6	20-30	>60	10-15
	West African	1.5	30-40	>60	< 10
	Black-Headed Persian	1.2	>90	3-5	< 1
Combellas (1979)	West African	1.2	80.5	18.7	0.8

Seasonality of births: No seasonality in the frequency of parturition was observed on analysis of the distribution of births in the sheep flock of the Facultad de Agronomía, U.C .V. during the period 1965 to 1978, using a system of natural service with introduction of the rams four weeks after parturition, thus allowing the sheep to be served at first heat. This indicates that sheep of tropical breeds exhibit polyoestrus, presenting oestrus and conceiving throughout the year.

Duration and interval between oestrus: Valencia et al (1975) reported an interval between heats of 17.5 ± 1.5 days with a duration of 24 to 48 hours for the Tabasco breed, while Castillo et al (1977) found a duration of fertile heat of 28.4 ± 7.7 hours using controlled service 20 hours after the initiation of oestrus. In our Institute a between oestrus interval of 16.6 ± 2.7 days with a mean duration of oestrus of 50 hours has been observed for West African Sheep.

Length of gestation: The values reported for length of gestation in tropical breeds are reported in Table 6 and it can be seen that these are very similar to those of

Table 6:
Length of gestation

Reference	Breed	Length of gestation (days)
Gonzalez et al (1972)	West African Crossbred	151 ± 1.9
Pena (1976)	Tabasco	149.3 ± 3.1
Castillo et al (1972)	Tabasco	149 ± 3
Valencia et al (1975)	Tabasco	149.7 ± 3.1
Combellas et al (1979)	West African	148 ± 2.6

temperate breeds. A summary of the published information on a number of production and reproduction parameters on hair producing sheep in tropical; America is presented in Table 7. It can be seen that in general there is a lower genetic potential for the production of meat than in sheep breeds of temperate regions.

*Table 7:
Production and Reproduction parameters in tropical sheep breeds*

Birth weight	2.6	±	0.15 kg
Weaning weight	12.0	±	1.01 kg
Liveweight gain up to weaning	122.5	±	26.8 g/d
Liveweight gain after weaning	112.4	±	39.8 g/d
Carcass yield	44.7	±	2.9 %
Milk production.	0.58	±	0.06 kg
Litter size	1.3	±	0.15
Interval between births	247	±	53 d
Interval between oestrus	17.1	±	2.1 d

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