

COMPARISON OF THE APPARENT DIGESTIVE ABILITY OF HIGH AND LOW FLEECE YIELDING INDIGENOUS AND CROSS-BRED SHEEP IN THE RAJASTHAN DESERT

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A comparative study of the apparent digestive ability of the Marwari breed of sheep of the Rajasthan desert, and Russian Merino × Marwari cross (F₁ progeny) were maintained on *Lasiurus sindicus* hay. Animals of the two breeds had similar dry matter and crude protein intakes and dry matter digestibility. The Marwari had shown a significantly higher crude protein digestibility in comparison to the cross-breds.

Metabolic trials were conducted over a total period of 21 days (15 days of pre-experimental feeding and 7 days of actual trial in metabolic cages) on 8 two-tooth rams of the Marwari breed and 8 similar animals of Russian Merino × Marwari crosses (F₁ generation). *Lasiurus sindicus* hay (80% D.M.; 4.25% C.P.), a predominant and palatable grass species of this desert was used as the experimental feed. These trials were conducted in the open at Jodhpur (26°05' N., 73°01' E.) during the spring of 1970. The average maximum and minimum ambient temperature and wind velocity during the study period (\pm S.E.) were $32.9 \pm 1.01^{\circ}\text{C}$, $16.29 \pm 0.68^{\circ}\text{C}$ and 5.2 ± 0.26 km/hr respectively.

The experimental animals were specially selected from the Institute's flocks of these two breeds, located at Jodhpur, on the basis of consistency in fleece production per unit body weight over two consecutive clips. Four of the 8 animals of both the breeds were consistently high fleece yielders, occupying positions among the top ten yielders within the flocks, and were designated F⁺ animals, while the remaining animals of each of the two breeds consistently occupied position among the last ten in yield capacity within the flocks. These latter animals were designated F⁻ animals. At the beginning of this study, all the animals were wearing about 4 months' growth of wool.

The mean initial body weight and mean wool yield per unit body weight in respect of the two categories of animals of the two breeds have been presented in Table I. The wool yield data pertain to the clip immediately preceding the beginning of this study.

The digestibility percentage of the feed was estimated on the basis of daily dry matter intake and dry faecal output. The N balance in respect of each animal was worked out by calculating the difference between N intake and the total N excreted in the faeces and urine. The body weights of the animals were recorded at the beginning of the pre-experimental period and again after 3 weeks when the metabolic trial was over.

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TABLE I

The body weights and wool yields of high and low fleece yielding sheep of the two breeds

Breed	Initial body wt. kg \pm S. E.			Greasy fleece yield (g/kg body wt.) (\pm S E.)		
	F+	F-	't'	F+	F-	't'
Marwari	38.37 \pm 2.51	37.31 \pm 1.25	Not significant	42.0 \pm 0.6	22.7 \pm 1.1	Significant at 0.1% level.
Russian Merino \times Marwari	32.50 \pm 1.13	32.25 \pm 0.14	-do-	69.3 \pm 3.05	39.1 \pm 1.2	-do-

Data presented in Table II indicates that except for the significantly higher ($p < 0.001$) CP digestibility and body weight gain exhibited by the Marwari animals, the two breeds did not differ from each other in any other respect. The F+ and F- cross-breds had similar apparent digestive abilities. Interestingly, however, the F- Marwari animals

TABLE II

Results of digestibility trials with F+ and F- Marwari and Russian Merino \times Marwari sheep on Lasiurus sindicus hay. (Values are means \pm Standard Errors: there were 4 animals of each fleece type of each breed.)

Observations	Marwari			Russian Merino \times Marwari		
	F+	F-	Pooled	F+	F-	Pooled
Mean daily dry matter intake, (kg/100 kg body wt)	1.99 \pm 0.07	2.09 \pm 0.19	2.04 \pm 0.10	2.21 \pm 0.17	2.26 \pm 0.15	2.24 \pm 0.10
Mean digestibility of dry matter %	55.20 \pm 3.75	62.60 \pm 2.30	58.89 \pm 2.52	53.71 \pm 4.10	58.37 \pm 4.75	56.04 \pm 3.07
Mean daily crude protein intake g/100 kg body wt	84.93 \pm 2.95	88.88 \pm 8.30	86.90 \pm 4.17	94.71 \pm 6.95	96.04 \pm 6.45	95.38 \pm 4.42
Mean digestibility of crude proteins (%)	56.67 \pm 3.80	77.51 \pm 1.80	67.09 \pm 4.42	52.40 \pm 5.33	55.47 \pm 7.40	53.94 \pm 4.42
Mean nitrogen retention g/100 kg body wt	3.43 \pm 1.22	8.22 \pm 0.92	5.82 \pm 1.16	4.46 \pm 1.39	5.34 \pm 2.16	4.90 \pm 1.21
Percentage change in body wt over the trial period	-0.53 \pm 1.45	+3.12 \pm 0.97	+2.59 \pm 0.89	-3.23 \pm 1.45	-2.07 \pm 0.34	-2.55 \pm 0.81

Significant differences: (1) CP digestibility: Between breeds, $p < 0.001$; Between fleece types within Marwari, $p < 0.01$.

(2) N retention: Between fleece types within Marwari, $p < 0.05$.

(3) Body weight change over trial period: Between breeds, $p < 0.001$.

had relatively superior CP digestibility and N-retention ability in comparison to the F⁺ animals of this breed. The significantly higher N retentive capacity of the F⁻ Marwari animals is reflected in the considerable, though not significant, increase in their body weight at the end of the trial period and therefore the F⁻ animals of this breed to be typical of the breed as a whole, in view of the fact that the overall yield per head of sheep in this breed is low and that the breed is very well established in this tract and hence presumably well-adapted to utilise the forage available in the region. As a breed in which wool production gets a low prerogative, the Marwari is more likely to utilise the absorbed amino acid nitrogen (AAN) for tissue growth. The superior CP digestibility and N retentivity of the F⁻ Marwari are, presumably, reflected in their body weight gain over the trial period. The F⁺ Marwaris are, apparently, different from their F⁻ counterparts in being endowed with the faculty of channelling a higher proportion of the absorbed AAN to wool.

Dolling and Moore (1960) and Schinckel (1960) had observed that at uniform levels of feeding and after correction for body weight, sheep with the highest food intake produced the greatest amount of wool. In addition to being voracious, such animals were also found to be more efficient converters of feed to wool. However, the observations on the dry matter intake of F⁺ and F⁻ Marwari and cross-bred animals do not tend to support this generalisation. The similarity in digestive activity between these two breeds of sheep, as observed by us, was anticipated in view of the earlier observations of Blaxter and Wainman (1964) that there was little difference in digestive activity even between sheep and cows.

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