

Simmental is one of the European dual purpose cattle breeds imported into Turkey in order to increase milk and meat production. Recently, the breed has been distributed in large numbers to farmers in the eastern region of Turkey via agricultural projects.

The eastern region of Turkey has different weather conditions from the rest of the country, especially in winter. The temperature generally drops below zero C° for 4-5 months, and there is a lot of snow. Under these environmental conditions, the Simmental calves are currently reared like the calves of native breeds. This means that the Simmental calves are generally weaned not less than 4-5 months of ages. In Turkey, the price of milk is more expensive than calf starter. The amount of milk fed to the calves has to be limited to encourage the calves to consume dry feed for economic reasons. If the Simmental calves reared under the harsh climatic conditions of Eastern Turkey were weaned early, the feed cost to farmers would drop and their profit would increase.

An investigation was conducted in the eastern region of Turkey in order to compare the growth, feed efficiency, and body measurements of Simmental calves weaned at 5 and 7 weeks of ages.

The effect of weaning ages on the growth characteristics and feed efficiencies of Simmental calves

Mete Yanar, Naci Tuzemen and Herbert W. Ockerman
Animal Science Department,
The Ohio State University,
2029 Fyffe Road, Columbus
Ohio, 43210, USA

**Naci Tuzeman is currently at the Ataturk
Universitesi, Ziraat Fakultesi, Zootekni Bolumu,
25240, Erzurum, Turkey**

The experiment was conducted at Ataturk University, Erzurum, Turkey. Twenty new-born Simmental calves were used in this research. The calves were born in the fall to winter (September-February). The calves were allowed to stay with their dams to receive colostrum for the first two days. Then, they were allocated to the treatment groups for weaning at 5 weeks and 7 weeks of ages, according to sex.

The calves were housed in a building containing individual pens and were furnished with water-milk buckets, hay and calf starter feeders. The calves were fed during the six months research period. Two different calf starters called starter I and II were utilised in this research. Starter I contained 20% protein, 5% ether extract, 5.1% ash, and 8% cellulose, starter II's composition was 18.5% protein, 4.5% ether extract, 9.8% ash, and 9% cellulose. Starter I, which has relatively high protein content, was fed for the period between birth and 4 months of age, and then, starter II was offered to the calves. The dry hay whose proximate composition was 7% protein, 3% ether extract, 10% ash, and 28.4% cellulose was available in the pens throughout the study. The quantity of starter and hay that remained in the feeders were weighed daily and the amount consumed was re-

corded.

The amount of milk given the calves was 8% of their birth weight as suggested by Reddy et al.⁴ This quantity of milk remained constant during the milk feeding period.

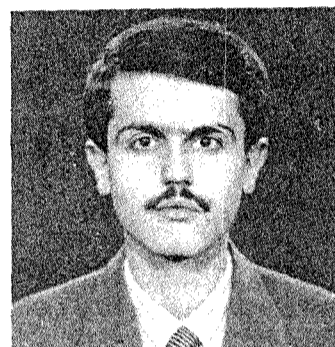
The weights were taken and recorded at birth, weaning (5 or 7 weeks), 4 months of ages of the calves.

The experimental data were subjected to ANOVA by using MINITAB statistics package programme.

Results and discussion

The data related with various weights of Simmental calves at birth, weaning, and 4 months of age are given in table 1. The average birth weights of calves assigned to the weaning age groups were not found to be significantly different ($P>0.05$). However, the average birth weight of male calves was 6.8kg heavier than female calves. This difference was statistically highly significant ($P<0.01$).

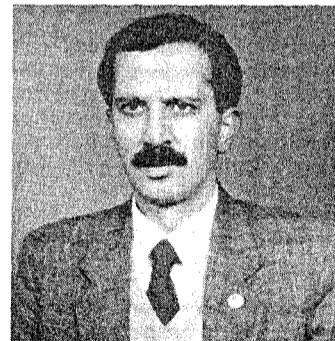
The weaning weights of Simmental calves weaned at 5 weeks of age were lighter than those of calves weaned at 7 weeks of age as would be expected. The results are in agreement with findings of Ugarte,⁵ and Winter.^{6,7} The common result of these studies regarding weaning weight is that weaning weight increases as



Mete Yanar has completed his master degree in the Department of Animal Science at 1987. His special area was associated with early weaning of dairy calves. The author has been working on his PhD degree in the Department of Animal Science at The Ohio State University since 1988.



Dr Ockerman, who is advisor of Mr Yanar, has been a full professor at The Ohio State University since 1962.



The third author, Dr Tuzemen, is an associated professor in the Department of Animal Science at Ataturk University and results were analysed and the manuscript was prepared in The Ohio State University

Table 1. The Performance of Simmental Calves

	Weaning Ages (Weeks)			Sex		
	5 n=10	7 n=10	S	Male n=10	Female n=10	S
Weights (kg) at:						
Birth	37.5±0.96	38.3±2.01	NS	41.3±1.98	34.5±1.24	**
Weaning	44.7±1.43	50.0±3.17	*	49.2±3.12	45.5±1.48	*
4 Month	85.5±6.33	84.0±6.79	NS	85.7±6.86	83.8±6.27	MS
Daily Gains in Weight (kg):						
Birth — Weaning	0.206±0.02	0.194±0.01	NS	0.170±0.01	0.230±0.02	NS
Weaning — 4 Month	0.527±0.06	0.502±0.06	NS	0.496±0.07	0.533±0.04	NS
Birth — 4 Month	0.401±0.05	0.390±0.04	NS	0.373±0.04	0.421±0.03	NS

* : P<0.05
 ** : P<0.01
 S : Significance
 NS : Non-Significant

age increases.

The weight differences in favour of calves weaned at 7 weeks of age disappeared at 4 months of age. The average 4 months weight of calves was not influenced significantly by either age of weaning or sex of calves (table 1).

Daily weight gains for the entire trial period (four months) were not significantly affected (P>0.05) by treatments under the cold environment of Eastern Turkey. The results in this research were similar to these under other environmental conditions reported by Quinones and Preston,³ Jorgenson et al.¹, Winter⁶ and Yun and Chung.⁸

The amount of consumed dry matter of feed per kg weight gain in a period between birth and 4 months of age was not significantly (P>0.05) influenced by either weaning time or sex (table 2). This finding is in agreement with results of Winter⁶ and Ogundula.² The feed efficiency ratio of calves weaned at 7 weeks of age was lower (P<0.01) than that of calves weaned at 5 weeks.

Gains in heart girth, body length, height at withers and chest depth were not significantly influenced by weaning time and sex.

The results of this research suggest that it is possible to wean Simmental calves reared in harsh environmental conditions of Eastern Turkey at 5 weeks of age without having adverse effect on their growth.

REFERENCES

- JORGENSEN, L.J., JORGENSEN, N.A., SCHING-OETHE, D.J., and OWENS, M.J. (1970): 'Indoor Versus Outdoor Calf Rearing at Three Weaning Ages', *Journal of Dairy Science*, 53, 6, pp 813-816.
- OGUNDULA, F.I. (1983): 'Performance of white Fulani Calves Weaned at Different Ages', *Nutritional Abstract and Review Series B*, 53m 1, p 276.
- QUINONES, M. and PRESTON, T.R. (1968): 'Early Weaning of Dairy Calves with Different Amount of Whole Milk and With or Without Alfalfa in the Concentrate', *Review of Cubana Ciencia Agricola*, 2, 2, pp 191-194.
- REDDY, P.G., MORRILL, J.L. and MINCHA, H.C. (1995): 'Effect of Early Weaning on the Cell Mediated Immuno Response of Dairy Calves', *Nutritional Report International*, 31m 2, pp 501-503.
- UGARTE, J. (1976): 'Rearing Dairy Calves by Restricted Suckling. 8. Effect of Weaning Age on Milk Production and Calf Performance', *Cuban Journal of Agricultural Science*, 10, 2 pp 137-143.
- WINTER, K.A. (1978): 'Response to Weaning at Two to Five Weeks of age by the Young Dairy Calf', *Canadian Journal of Animal Science*, 58, 3, pp 377-383.
- WINTER, K.A. (1985): 'Comperative Performance and Digestibility in Dairy Calves Weaned at Three, Five and Seven Weeks of Age', *Canadian J. Animal Science*, 65, 2, pp 445-450.
- YUN, S.G. and CHUNG, C.Y. (1985): 'The Effect of Weaning Time on Growth and Feed Efficiency in Dairy Calves', *Korean Journal of Dairy Science*, 7, 2, pp 49-55.

Table 2. The Feed Efficiencies and Body Measurements of Simmental Calves

	Weaning Ages (Weeks)			Sex		
	5 n=10	7 n=10	S	Male n=10	Female n=10	S
Feed Efficiencies†:						
Birth — Weaning	3.34±0.37	2.07±0.25	**	3.17±0.46	2.24±0.24	**
Weaning — 4 Month	4.83±0.37	5.02±0.73	NS	4.89±0.34	4.96±0.76	NS
Birth — 4 Month	5.22±0.95	4.92±0.96	NS	4.97±0.97	5.17±0.82	NS
Total Gains in Body Measurements (cm):						
Heart Girth	21.8±2.1	22.6±2.3	NS	20.1±2.5	24.4±1.2	NS
Body Length	17.0±1.8	19.0±1.6	NS	16.4±1.5	19.6±1.7	NS
Height at Withers	9.0±1.9	11.3±1.4	NS	8.1±1.6	12.2±1.4	NS
Chest Depth	8.7±0.9	8.5±0.9	NS	8.4±0.8	8.8±1.0	NS

† : Feed Efficiency = Consumed dry matter of feed (kg) / Weight gain (kg)
 * : P<0.05
 ** : P<0.01
 S : Significance
 NS : Non-Significant