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**Effects of Birth Type, Genotype and Nutritional Management
on Growth Performance of Female Lambs**

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Abstract: The present study evaluated the growth dynamics of female lambs of the Tsigai breed (rusty variety) and triracial crossbreds (50% Suffolk × 37.5% German Blackface × 12.5% Tsigai) from birth to 8.5 months under controlled management conditions. A total of 124 female lambs were allocated into four groups: twin Tsigai (L1, n = 18), single Tsigai (L2, n = 62), twin crossbred (L3, n = 11), and single crossbred (L4, n = 33). Twin Tsigai females exhibited the lowest ADG during pre-weaning (187.51 g/day) and post-weaning (92.97 g/day), but the highest ADG in the final period (153.44 g/day).

Keywords: single, twin, feeding strategies, Tsigai, crossbred

• Introduction

Growth performance in lambs is influenced by a complex interaction of genetic and environmental factors. Genotype, birth type, and nutritional management are considered the most important determinants of early growth and development (Fogarty, 1995).

Birth type: Single-born lambs generally exhibit higher birth weights and superior growth compared to twins, due to reduced uterine competition and greater milk access (Dwyer, 2003).

Genotype: Crossbreeding (50% Suffolk × 37.5% GBF × 12.5% Tsigai) is used to improve growth rate, feed efficiency, and productivity through heterosis effects (Notter, 1999).

Nutritional management: Targeted feeding strategies can compensate for lower growth potential in twin-born or purebred lambs. Feed yeast (*Saccharomyces cerevisiae*) stabilizes ruminal pH, stimulates cellulolytic bacteria, and enhances fiber digestion (Newbold et al., 1996).

Objective: To evaluate the effects of birth type, genotype, and nutritional management on the growth performance of female lambs from birth to 8.5 months of age.

• Material and method

Study site: Experimental Base Reghin, Mureș County, Romania (2024)

Animals: 124 female lambs monitored from birth to ~8.5 months (~250 days)

Group	n	Breed / type
L1	18	Twin Tsigai (rusty)
L2	62	Single Tsigai (rusty)
L3	11	Twin crossbred (50% Suffolk × 37.5% GBF × 12.5% TI)
L4	33	Single crossbred

Periods monitored: Birth→weaning (62–67 d) · Post-weaning→7 months (150 d) · 7→8.5 months (42 d)

Feeding: Identical for all groups up to 7 months, and different for L1 after this period, for 42 days (06 Sep – 18 Oct 2024); they received a concentrated ration containing yeast. All groups received hill hay *ad libitum*.

Concentrate feed composition

Ingredient	L1 - birth–7 mo		L1 - 7–8.5 mo
	L2, L3, L4 - birth – 8.5 mo		
Corn flour (%)	55.00		40.00
Barley flour (%)	30.00		40.00
Sunflower groats (%)	12.00		15.00
Feed yeast (%)	—		2.00
Calcium (%)	2.00		1.50
Salt (%)	1.00		1.50
DP (g/kg DM)	101.44		112.64
NE (MJ/kg DM)	8.11		8.11

Measurements: BW (birth), WW (weaning), W7 (7 months), W8.5 (8.5 months); total gain (TG) and ADG calculated per period. Statistics: Tukey's test (JASP software).

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Birth type

Single-born lambs exhibited superior growth performance compared to twins across all periods, reflecting reduced intrauterine competition and greater milk availability.

Genotype

Crossbred lambs consistently outperformed purebred Tsigai lambs in BW and ADG throughout the study, confirming the beneficial heterosis effects of crossbreeding with meat breeds.

• Results and discussions

Table 1. Body weight dynamics — pre- and post-weaning period (mean ± SE)

Specification	L1 (n=18)	L2 (n=62)	L3 (n=11)	L4 (n=33)
BW (kg)	3.65 ± 0.16A	3.98 ± 0.09B	4.06 ± 0.20	4.46 ± 0.12AB
WW (kg)	15.86 ± 0.69ABa	18.01 ± 0.37A	19.77 ± 0.89a	19.32 ± 0.51B
W7 (kg)	29.79 ± 1.22ABa	33.98 ± 0.66abc	38.86 ± 1.56Ab	38.04 ± 0.90Bc
W8.5 (kg)	36.24 ± 1.33A	36.77 ± 0.72B	44.19 ± 1.71B	43.32 ± 0.99A

A,B - $p < 0.001$; a,b,c - $p < 0.05$ (same letters in same row differ — Tukey's test)

Table 2. ADG evolution from birth to 8.5 months (mean ± SE)

Specification	L1 (n=18)	L2 (n=62)	L3 (n=11)	L4 (n=33)
Birth-weaning	187.51 ± 9.63AB	227.17 ± 5.19A	233.63 ± 12.32	247.09 ± 7.11B
Weaning – 7 months	92.97 ± 6.91AB	111.31 ± 3.72a	135.66 ± 8.83A	128.18 ± 5.10Ba
7 – 8.5 months	153.44 ± 12.33A	66.28 ± 6.65ABC	126.84 ± 15.78C	125.69 ± 9.11B
Birth – 8.5 months	126.20 ± 4.70AB	131.68 ± 2.53CD	160.29 ± 6.01AC	155.63 ± 3.47BD

A,B,C,D - $p < 0.001$; a,b,c - $p < 0.05$ (same letters in same row differ - Tukey's test)



Figure 1 – Twin female from Tsigai breed – rusty variety (photo: original)



Figure 2 – Single female from Tsigai breed – rusty variety (photo: original)

Key findings:

Birth type: Single-born lambs consistently outperformed twins in BW and ADG across all periods. This reflects reduced uterine competition and greater milk availability.

Genotype: Crossbred lambs (L3, L4) outperformed Tsigai (L1, L2) throughout — L4 reached 38.04 kg vs 33.98 kg in L2 at 7 months — confirming heterosis effects.

Yeast supplementation: L1 ADG rose from 92.97 to 153.44 g/day after yeast-modified diet, demonstrating effective compensatory growth in twin Tsigai lambs.

Conclusions

Yeast supplementation

The modified yeast-supplemented diet markedly improved ADG in twin Tsigai lambs (92.97 → 153.44 g/day), demonstrating that targeted nutritional strategies can compensate for growth deficits in lower-potential animals.

Practical implication

Integrating genetic selection with tailored nutritional management is essential for optimizing lamb growth and productivity in sheep production systems.

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