Finishing of lambs through the autumn: carcass and meat quality using tropical grassland

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Image: Portal EBC/ Agência Brasil

In the south of Brazil sheep production faces limitations in the autumn:

- ✓ Supply struggles to meet demand due to a low productivity level;
- ✓ Inadequate animal nutrition may directly affect the herd performance;
- ✓ Appropriate feeding system is needed to improve productivity while using tropical grassland.

Material and Methods

- ✓ Randomized blocks.

- ✓ 54 castrated lambs (Texel and Corriedale).

- ✓ Lambs in 9 paddocks (0.2 ha each) with tropical grass Aruana (*Panicum maximum*).

- ✓ The forage supply was 4% of green leaves (4 kg dry matter per 100 kg of live weight).

- ✓ Trial run for 3 months, including acclimatization period;

Photographs: Author's own private collection

Material and Methods

✓Three feeding systems:

1. Continuous grazing;

2. Continuous grazing + supplementation of 1.5% Body Weight (BW);

3. Continuous grazing + supplementation of 2.5% BW.

Supplement (DM basis): 24% soybean meal 74% corn, 1% urea and 1% minerals

(16.5% CP and 74.5% total digestible nutrients).

Photographs: Author's own private collection

Material and Methods

Hot Carcass Measurements (at slaughter):

✓ Hot carcass weight.

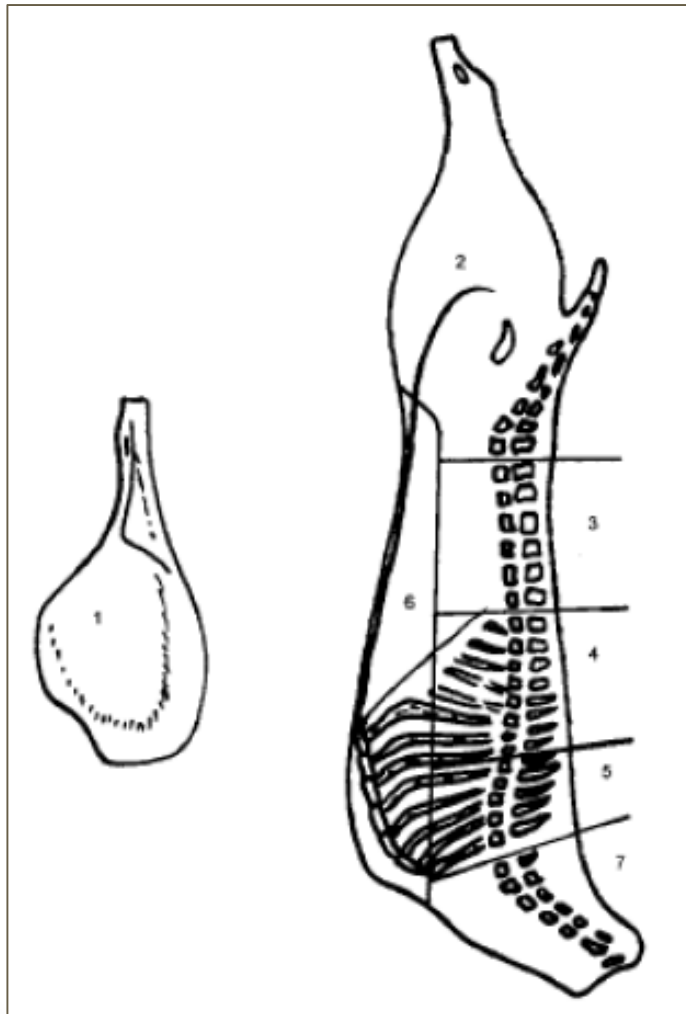✓ Hot carcass yield (HCY):

HCY = ((Hot carcass weight/Slaughter body weight)x100)

Cold Carcass Measurements (after chilling for 24 h at 4°C)

✓ Cold carcass weight.

✓ Cold carcass yield (CCY):

CCY = ((Cold carcass weight/Slaughter body weight)x100)

✓The carcasses were divided longitudinally.

Material and Methods

The left half-carcass was sectioned into seven:

1. Shoulder;
2. Leg;
3. Loin and flap – Loin section was made at 12th-13th rib;
4. Rib;
5. Anterior rib;
6. Breast;
7. Neck.

- The left shoulder was used for tissue composition analysis.

Material and Methods

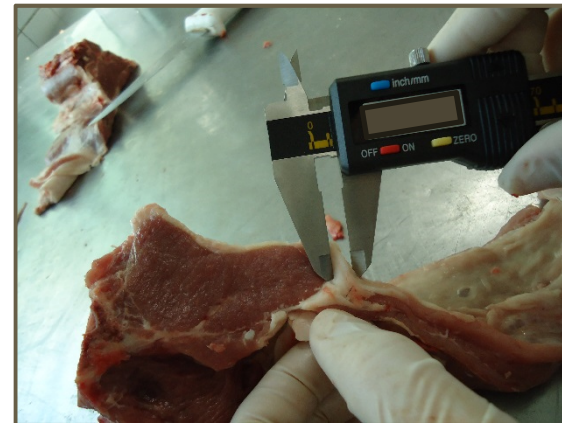✓ *Longissimus dorsi* measurements (at 12th-13th rib):

1. Weigh;

2. Area;

4. Depth

3. Width

5. Back fat thickness

Photographs: Author's own private collection

Results

Table 1 – Feeding Systems effects on *in vivo* and carcass traits.

	Feeding System[1]			SEM[2]	P
	0	1.5%	2.5%		
Slaughter Body weight, kg	29.53^b	33.41^b	38.72^a	1.52	***
Body weight gain, kg/day	0.056^c	0.101^b	0.154^a	0.01	***
Hot carcass weight , kg	11.69^c	13.99^b	17.72^a	0.89	***
Hot carcass yield, %	39.2^b	41.55^b	45.29^a	0.90	***
Cold carcass weight, kg	11.42^c	13.78^b	17.47^a	0.91	***
Cold carcass yield, %	38.22^c	40.81^b	44.58^a	0.94	***

[1]0 = No supplementation; 1.5% = supplementation of 1.5% Body Weight; 2.5% = supplementation of 2.5% BW.
[2]SEM = greatest standard error of the means.
*** *P*<.0001

Results

Table 2 – Feeding Systems effects on Brazilian commercial cuts weight.

	Feeding System[1]			SEM[2]	P
	0	1.5%	2.5%		
Neck, kg	0.460[b]	0.571[b]	0.746[a]	0.037	***
Shoulder, kg	1.106[b]	1.240[b]	1.518[a]	0.069	***
Anterior Rib, kg	0.386[b]	0.433[b]	0.583[a]	0.032	***
Rib, kg	0.476[b]	0.596[b]	0.769[a]	0.051	***
Breast, kg	0.760[b]	0.922[b]	1.200[a]	0.068	***
Loin and flap, kg	0.724[b]	0.917[b]	1.218[a]	0.082	***
Leg, kg	1.854[b]	2.214[b]	2.708[a]	0.145	***

[1]0 = No supplementation; 1.5% = supplementation of 1.5% Body Weight; 2.5% = supplementation of 2.5% BW.
[2]SEM = greatest standard error of the means.
*** $P<.0001$

Results

Table 2 – Feeding Systems effects on Brazilian commercial cuts yield.

	Feeding System[1]			SEM[2]	P
	0	1.5%	2.5%		
Neck, %	7.99	8.20	8.53	0.25	ns
Shoulder, %	19.39[a]	17.93[b]	17.41[b]	0.31	***
Anterior Rib, %	6.63	6.19	6.63	0.15	ns
Rib, %	8.14	8.40	8.64	0.26	ns
Breast, %	13.01	12.99	13.59	0.30	ns
Loin and flap, %	12.26	12.97	13.58	0.41	ns
Leg, %	32.12[a]	31.85[a]	30.71[b]	0.34	**

[1]0 = No supplementation; 1.5% = supplementation of 1.5% Body Weight; 2.5% = supplementation of 2.5% BW.
[2]SEM = greatest standard error of the means.
ns = not significant; ** *P<.0001; * *P<0.01

Results

Table 3 – Feeding Systems effects on shoulder tissue composition.

	Feeding System[1]			SEM[2]	P
	0	1.5%	2.5%		
Muscle, %	58.90	58.96	57.56	1.24	ns
Bone, %	27.99a	25.51b	24.45b	0.85	**
Fat, %	13.13b	15.58ab	17.96a	1.16	**
Muscle:Bone Ratio	2.15b	2.34ab	2.41a	0.10	*

[1]0 = No supplementation; 1.5% = supplementation of 1.5% Body Weight; 2.5% = supplementation of 2.5% BW.
[2]SEM = greatest standard error of the means.
ns = not significant; ** $P<0.01$; * $P<0.05$

Results

Table 4 – Feeding Systems effects on *Longissimus dorsi* muscle.

Longissimus dorsi	Feeding System[1]			SEM[2]	*P*
	0	**1.5%**	**2.5%**		
Weight, g	158.30[b]	206.66[b]	272.73[a]	19.4	***
Maximum width, mm	51.20[b]	53.95[ab]	58.07[a]	2.02	*
Depth, mm	25.37[b]	29.31[ab]	32.99[a]	1.57	***
Area, cm^2	11.06[b]	12.94[ab]	15.26[a]	1.06	**
Back fat thickness, mm	2.11[b]	3.18[a]	4.46[a]	0.04	***

[1]0 = No supplementation; 1.5% = supplementation of 1.5% Body Weight; 2.5% = supplementation of 2.5% BW.
[2]SEM = greatest standard error of the means.
*** *P<.0001*; ** *P<0.01*; * *P<0.05*

Results

Table 5 – Feeding Systems effects on pH drop at *Longissimus* muscle.

pH time[2]	Feeding System[1]			SEM[3]	*P*
	0	**1.5%**	**2.5%**		
pH 0	7.14	7.14	7.16	0.03	ns
pH 45 min	7.03	7.00	7.00	0.02	ns
pH 24 h	5.85	5.81	6.09	0.12	ns

[1]0 = No supplementation; 1.5% = supplementation of 1.5% Body Weight; 2.5% = supplementation of 2.5% BW.
[2]pH0 = after slaughter; pH 45 minutes after slaughter; pH 24 hours after slaughter.
[3]SEM = greatest standard error of the means.
ns = not significant.

Conclusions

✓ The feeding system with supplementation of 2.5% of the body weight while using tropical grass Aruana improved lamb performance, carcass traits and loin muscle quality.

✓ For extensive systems using tropical grass Aruana the supplementation can provide carcass with better quality through the autumn in order to supply this demand.