

24. Milk production efficiency of sheep and goats fed different forage qualities and concentrate levels (Effizienz der Milchproduktion von Schafen und Ziegen in Abhängigkeit von Grundfutterqualität und Kraftfutterniveau). L. Gruber*, F. Ringdorfer and Elisabeth Pöckl – Irdning (Austria)

Introduction: In Austria, sheep and goat husbandry is a promising branch due to (1) its effect on preservation of cultural landscape and (2) its role in human nutrition in case of cow milk allergies.

Material and methods: Three-factorial experiment: Impact of species/breed (S/B), forage quality (F) and concentrate level (C) on production traits of female sheep and goats during total lambing intervals. **Experimental animals:** Austrian Mountain Sheep (AMS), East-Friesian Milk Sheep (EMS) and German Dairy Goats (GDG). **Forage quality:** Two cutting frequencies ($2 \times$ in F 2, $3 \times$ in F 3) in alpine permanent grassland (56.8% dOM in F 2 and 59.8% dOM in F 3). **Concentrate levels:** 5, 25 or 50% of DMI (N = 235 total lactations, 100 for AMS, 67 for EMS, 68 for GDG), using 25, 26 and 24 different dams per species/breed. Change of concentrate level after each lactation (Latin square design).

Results and conclusion: The main results for the whole lambing interval (LI) regarding the breed/species \times concentrate interaction are presented in the table:

Breed/Species	AMS			EMS			GDG			RSD	P values		
	C 05	C 25	C 50	C 05	C 25	C 50	C 05	C 25	C 50		S/B	C	S/B \times C
Concentrate level													
Live weight, kg	74.4	77.0	83.1	66.2	67.0	72.6	54.7	54.6	58.5	7.7	0.000	0.000	0.590
DM intake, g/d	1856	2023	2221	1885	1961	2197	1863	1992	2267	272	0.842	0.000	0.864
Concentrate, % of DMI	7.7	20.9	36.8	6.0	19.7	38.2	7.0	22.8	38.7	3.6	0.044	0.000	0.077
ME intake, MJ/d	15.85	18.46	21.77	16.00	17.74	21.53	15.84	18.17	22.20	2.55	0.737	0.000	0.857
ME intake, kJ/kg LW ^x	631	715	799	691	758	866	789	913	1055	102	0.000	0.000	0.119
Milk fat content, %	6.27	6.07	5.82	5.08	4.98	4.76	2.88	2.83	3.09	0.60	0.000	0.167	0.054
Milk protein content, %	5.25	5.60	5.71	4.82	4.98	5.08	2.84	2.88	2.99	0.35	0.000	0.000	0.120
Milk lactose content, %	4.86	4.92	4.99	4.97	4.94	4.99	4.47	4.41	4.46	0.14	0.000	0.025	0.080
Actual milk yield, g/d	855	943	1150	794	970	1301	1402	1946	2736	319	0.000	0.000	0.000
Milk energy yield, MJ/d	3.77	4.14	5.01	3.08	3.72	4.92	3.68	5.12	7.54	1.05	0.000	0.000	0.000
Actual milk yield, g/kg LW ^x	35.1	38.1	44.2	35.3	42.6	53.5	71.7	100.4	134.7	14.5	0.000	0.000	0.000
Milk energy yield, kJ/kg LW ^x	153.4	166.1	191.5	137.3	164.0	202.7	188.6	264.5	372.0	48.4	0.000	0.000	0.000
Actual milk yield, kg/LI	119.7	137.4	171.4	149.3	218.2	316.1	335.0	472.7	668.8	74.8	0.000	0.000	0.000
Milk energy yield, MJ/LI	528	605	748	578	834	1194	879	1242	1844	242	0.000	0.000	0.000
Actual milk yield, kg/year	185.6	197.1	256.7	148.1	217.1	316.9	333.3	483.9	686.8	88.2	0.000	0.000	0.000
Milk energy yield, MJ/year	813	862	1118	574	831	1199	874	1271	1894	306	0.000	0.000	0.000
MJ ME per kg milk (lactation)	19.78	23.20	24.05	21.07	21.14	19.98	11.97	10.21	9.30	4.34	0.000	0.706	0.001
MJ ME per MJ LE (lactation)	4.43	5.21	5.50	5.43	5.42	5.21	4.54	3.90	3.40	0.96	0.000	0.655	0.000
MJ ME per kg milk (LI)	39.26	37.62	34.28	45.06	34.43	26.12	17.96	13.84	12.04	12.26	0.000	0.000	0.043
MJ ME per MJ LE (LI)	8.70	8.44	7.82	11.61	8.71	6.81	6.82	5.29	4.40	2.63	0.000	0.000	0.005

DM intake (DMI) is similar among species/breeds at all concentrate levels. However when relating DMI to metabolic LW (LW^x), DMI of AMS is lowest and that of GDG is highest, and this is more distinct at high concentrate levels. Actual milk yield (per day) is by far highest with dairy goats, both Mountain and Milk Sheep being similar. Goats are superior especially at high concentrate proportions. Relating milk yield to LW^x, additionally points up the milk production potential of this breed. Superiority is not as high when considering production of milk constituents or energy (LE), since milk content of goats is lower. Considering milk production per year shows, that AMS yield slightly more actual milk and LE than EMS on a low concentrate diet, whereas EMS are superior on high concentrate diets. Goats yielded by far most milk per year, but not to the same degree in terms of LE. Regarding food conversion, goats are more effective than sheep in terms of ME expenditure per milk energy, since their maintenance requirement is relatively lower due to their higher feed intake capacity. In order to evaluate the effective energy cost for milk production, the different length of dry period must be considered additionally, Milk Sheep showing extended dry periods and therefore an unfavourable food conversion when offered low concentrate diets.

* Agricultural Research and Education Centre, AREC Raumberg-Gumpenstein, Institute for Livestock Research, A-8952 Irdning, 0043 3682 22451 260, leonhard.gruber@raumberg-gumpenstein.at