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Production of sheep and goat milk depending on forage quality, concentrate level and breed

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Introduction

- Sheep and goat milk production as a promising branch in agricultural industry

- Quality of forage and amount of concentrate supplementation are two major factors influencing animal productivity and economic rentability

Material and methods - Animals

- German Dairy Goat (DG)

  East Friesian Milk Sheep (EFMS)

  Austrian Mountain Sheep (AMS)

Material and methods - feeding

Two forage qualities
(hay from grassland cut twice or three times)

Three levels of concentrate supplementation
(5 %, 25 %, and 50 % of DMI)

Experimental design

- Experimental period: 4 years
- 18 animals per breed
- 6 different treatments – 3 animals per breed per group
- 4 (DG, EFMS), respective up to 8 (AMS) lactations

Allocation of the animals to the concentrate levels according to a latin square design

concentrate / forage	lactation	C 05	C 25	C 55
2-cut hay	2nd	Animal Nr. 1,2,3	Animal Nr. 4,5,6	Animal Nr. 7,8,9
	3rd	Animal Nr. 7,8,9	Animal Nr. 1,2,3	Animal Nr. 4,5,6
	4th	Animal Nr. 4,5,6	Animal Nr. 7,8,9	Animal Nr. 1,2,3
	5th	Animal Nr. 1,4,7	Animal Nr. 2,5,6	Animal Nr. 3,6,9
3-cut hay	2nd	Animal Nr. 10,11,12	Animal Nr. 13,14,15	Animal Nr. 16,17,18
	3rd	Animal Nr. 16,17,18	Animal Nr. 10,11,12	Animal Nr. 13,14,15
	4th	Animal Nr. 13,14,15	Animal Nr. 16,17,18	Animal Nr. 10,11,12
	5th	Animal Nr. 10,13,16	Animal Nr. 11,14,17	Animal Nr. 12,15,18

Material and methods - Data recording

- Individual feed intake
- Individual milk yield
- Milk contents (fat, protein, lactose)
- Live weight
- Digestibility trial with whethers to establish digestibility of hay and concentrate

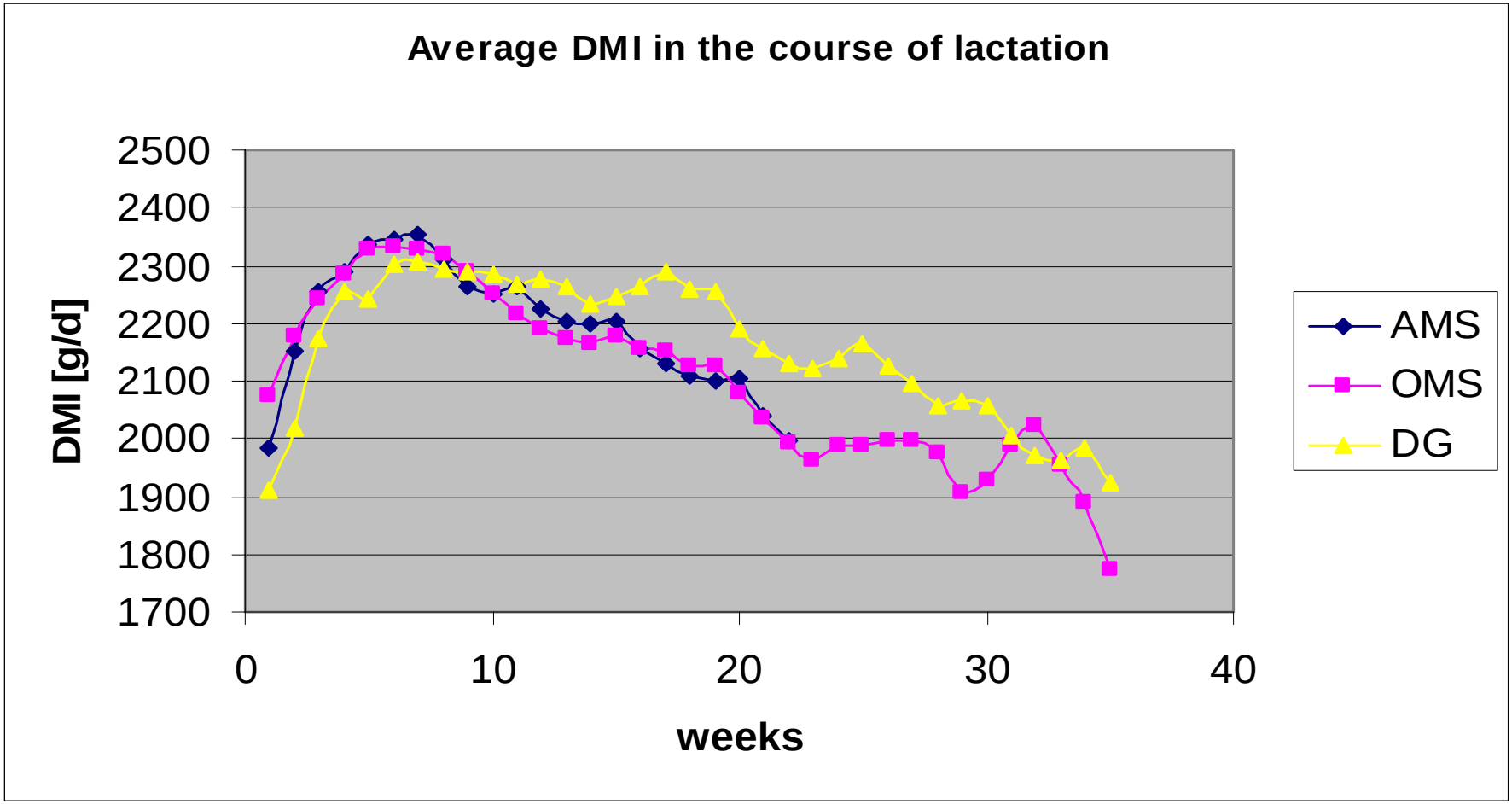
Nutrient content of experimental feeds

		2-cut hay	3-cut hay	concentrate
Dry matter	g/kg FM	926 ± 13	927 ± 13	914 ± 9
OMD	%	56.8 ± 2.5	59.8 ± 2.1	87.0
CP	g/kg DM	**118** ± 9	**127** ± 16	**171** ± 11
CL	g/kg DM	16 ± 2	17 ± 2	20 ± 3
N free extracts	g/kg DM	479 ± 16	488 ± 16	645 ± 15
NDF	g/kg DM	479 ± 16	488 ± 16	645 ± 15
CA	g/kg DM	61 ± 7	63 ± 6	87 ± 4
ME content	MJ/kg DM	**7.98 ±** .34	**8.41 ±** 0.32	**12.30 ±** 0.06

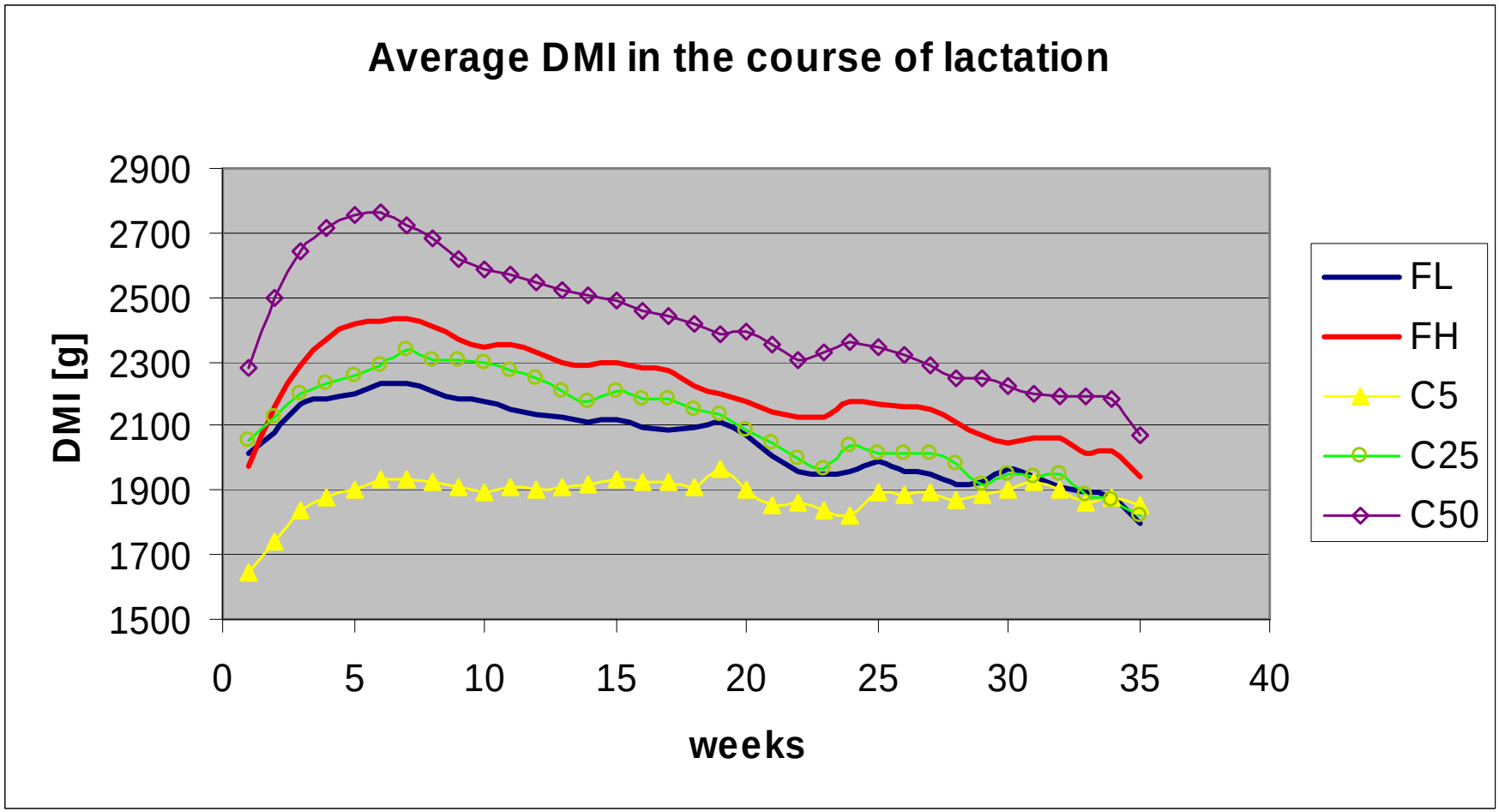
Feed and nutrient intake during lactation

		Breed			Forage		Concentrate level		
		AMS	EFMS	DG	2 cuts	3 cuts	C5	C25	C50
forage	g/d	1555	1478	1524	1453^{a}	1585^{b}	1761^{a}	1546^{b}	1250^{c}
concentrate	g/d	648	637	635	630	650	120^{a}	590^{b}	1210^{c}
total	g/kg $LW^{0.75}$	86.9^{a}	91.5^{b}	109.2^{c}	94.0^{a}	97.7^{b}	85.9^{a}	96.5^{b}	105.2^{c}
ME	kJ/kg $LW^{0.75}$	820^{a}	866^{b}	1028^{c}	878^{a}	932^{b}	731^{a}	904^{b}	1080^{c}
CP	g/d	309	295	297	288^{a}	313^{b}	240^{a}	295^{b}	366^{c}
NDF	g/kg LW	14.45^{a}	15.58^{b}	19.77^{c}	16.51	16.68	17.84^{a}	17.01^{b}	14.95^{c}

DMI in the course of lactation dependent on breed



DMI in the course of lactation dependent on forage quality and concentrate administration



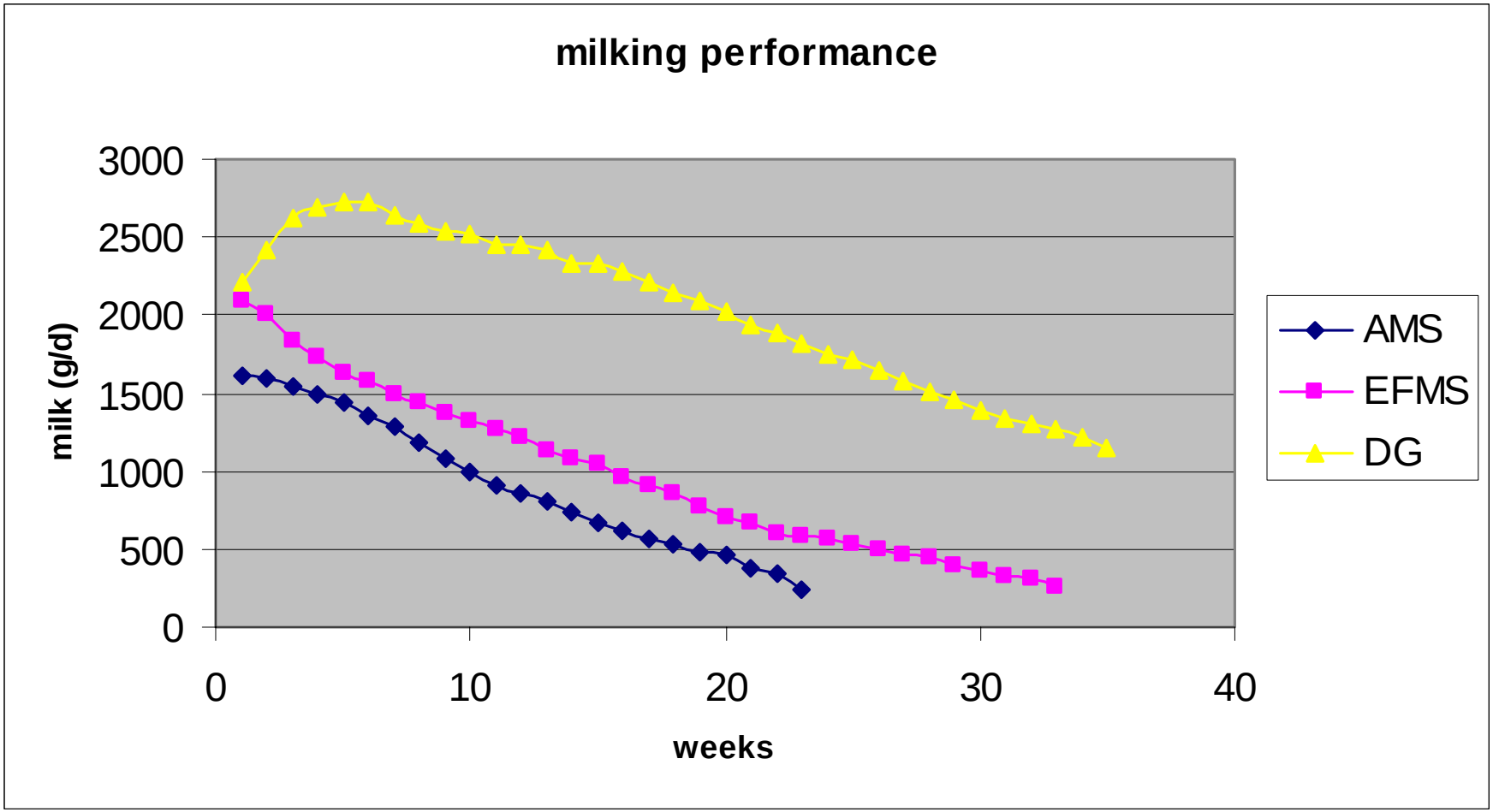
Daily milk yield (g) as influenced by breed and feeding

	F L	F H	C 5	C 25	C 50
AMS	900	1065	855	943	1150
EFMS	889	1154	794	970	1301
DG	1865	2191	1402	1946	2736

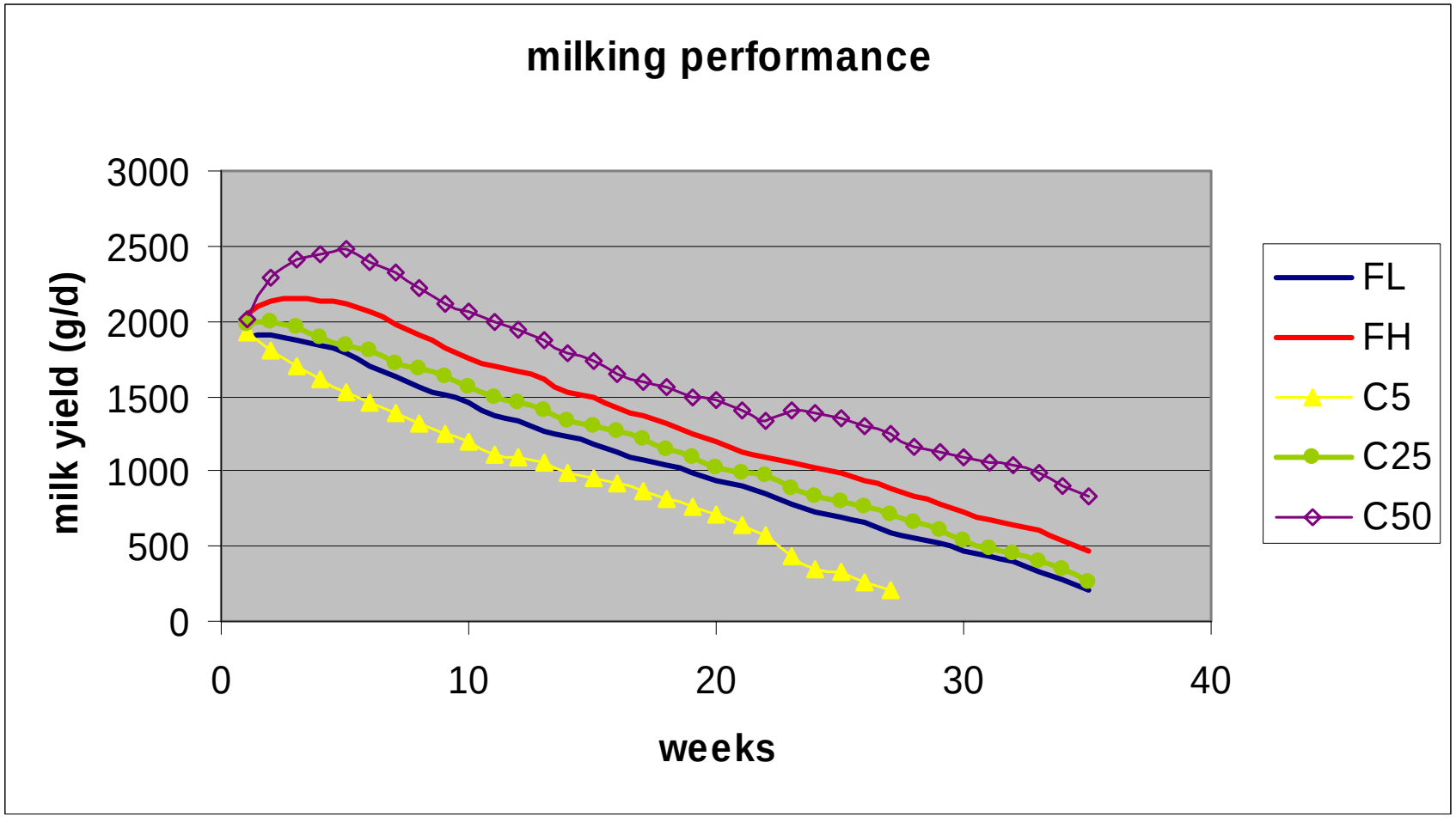
Milk fat an protein as influenced by breed and feeding

		F L	F H	C 5	C 25	C 50
fat (%)	AMS	5.9	6.2	6.3	6.1	5.8
	EFMS	5.1	4.8	5.1	5.0	4.8
	DG	2.9	2.9	2.9	2.8	3.1
(%) protein	AMS	5.5	5.6	5.2	5.6	5.7
	EFMS	5.0	4.9	4.8	5.0	5.1
	DG	2.9	2.9	2.8	2.9	3.0

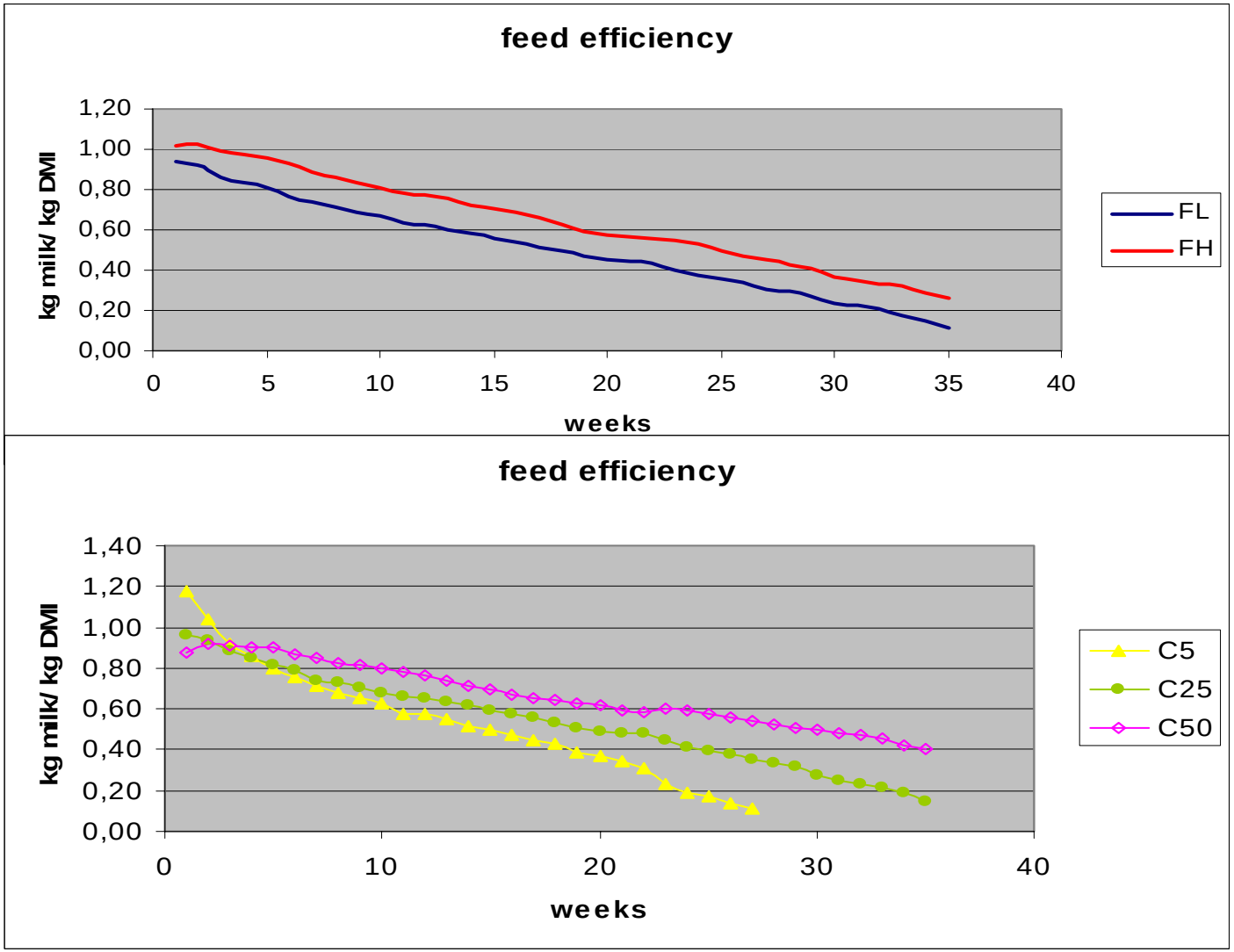
Milking performance in the course of lactation dependent on breed



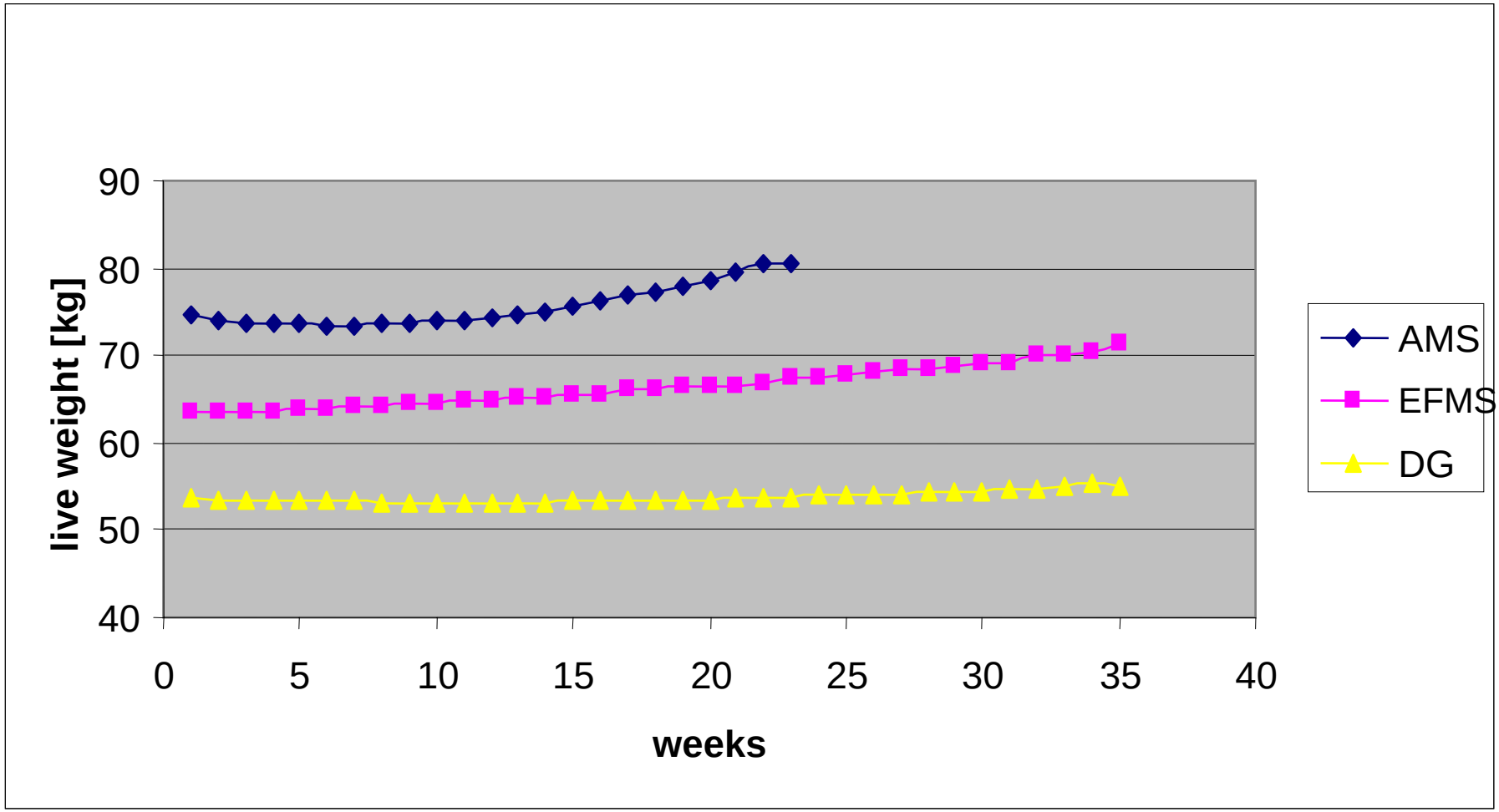
Milking performance in the course of lactation dependent on forage quality and concentrate level



Feed efficiency in the course of lactation dependent on forage quality and concentrate level



Development of live weight in the course of lactation dependent on breed



Conclusions

- In milk production businesses, feeding forage of high quality to small ruminants is of great importance
- High concentrate levels make good economic sense solely with animals of high milk production potential
- Dairy goats are superior to sheep in the conversion of feed to milk

Thank you for your attention