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The milk yield by Cinisara cows in different management systems: 2. Effect of season of production

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Introduction Cinisara is a Sicilian autochthonous breed of dairy cow. Qualitative characteristics of milk yield are influenced by composition of pasture and its changes over the seasons (Di Grigoli *et al.*, 2000). The grazing resource is characterized by notable variability, even in adjacent areas, because of different environmental conditions, such as aspect, the nature of soil and altitude. The aim of this research is to study the effect of season of production on qualitative characteristics of Cinisara cow milk in farms located at different altitudes.

Materials and methods The study was carried out from August 2001 to November 2002, in three farms, near Trapani on 116 cows, 98 pluriparous (P) and 18 primiparous (p). The pastures were located at three different altitudes: plain (P), at 280, hill (C), at 750, and mountain (M), at 1000 m a.s.l. Manual milking was performed with the calf present that ingested approximately 0.25 of the milk yield. A description of the feeding system is given by Giosuè *et al.* (2005). Measurements were made of daily bulk milk yield and its quality through the analysis of individual and bulked milk samples collected every month. Experimental data were analysed using a factorial model that considered the effect of season of production, farm, lactation number, stage of lactation and the interaction between season of production and farm.

Results The pattern of calving of cows was autumn 55.2%, winter 13.8%, spring 19.0%, and summer 12.1%. The winter and the spring were the seasons most favourable for milk production. On farm P the milk daily yield in summer was higher than on the other farms, as a result of the management system. The quality of milk was very variable, differing among farms, and over the seasons on the same farm. On farm P the milk protein content was higher probably because lucerne hay was given. In winter the content of urea in milk was high in all farms probably leading to an excess of protein in the diet. On the P and M farms the casein index (CI) was high in winter (Table 1).

Table 1 Daily mean milk yield, chemical, physical and other measurements on mass milk samples

Season	Farm	Milk yield (kg/d)	Fat (%)	Protein (%)	Lactose (%)	SCC	Urea	CI (%)	CBTUF ^c *% _{ml}	R	K ₂₀	A ₃₀
Autumn	P	7.9	3.82 ^{ABa}	3.78	4.95	654 ^B	29.3	75.3	344 ^a	17.0	2.1	40.7
	C	7.1	3.52 ^{Aa}	3.66	4.93	1606 ^A	20.5	74.0	174 ^b	20.6	2.8	32.5
	M	7.1	4.15 ^{Bb}	3.70	4.87	244 ^B	14.6	77.3	130 ^b	15.4	2.7	37.6
Winter	P	11.5 ^{ab}	3.75 ^{Aa}	3.77 ^b	5.13	420 ^B	30.5	77.9	362	12.4	3.1	55.1
	C	11.7 ^a	3.32 ^{Ab}	3.52 ^a	4.97	1124 ^A	35.5	77.1	286	14.0	2.0	49.3
	M	10.2 ^b	4.31 ^{Bc}	3.72 ^b	5.13	549 ^B	31.4	77.9	143	12.8	2.4	53.5
Spring	P	11.3 ^b	3.97	3.62	5.07	427 ^B	25.7	76.4	150	15.1	2.3	50.5
	C	9.5 ^a	3.68	3.48	4.98	1616 ^A	28.0	77.4	152	14.8	2.1	47.0
	M	10.9 ^b	3.71	3.60	5.07	892 ^B	24.9	76.8	210	15.6	2.5	49.7
Summer	P	10.3 ^a	3.46	3.48 ^A	4.95 ^a	793 ^B	27.7	74.4	289 ^a	12.0	2.7	51.1 ^a
	C	8.1 ^b	3.40	3.30 ^{AB}	5.23 ^b	1625 ^A	15.1	75.2	109 ^b	12.2	2.1	45.2 ^{ab}
	M	8.6 ^b	3.28	3.20 ^B	5.05 ^{ab}	507 ^B	12.2	77.5	--	9.8	1.9	36.6 ^b

Within a column A and B refers to values significantly different at $P \leq 0.01$ and a, b and c at $P \leq 0.05$.

Conclusions The management system and altitude are the factors of immense variability. The present system of production leads to great heterogeneity over the year. The standardization of production is difficult even as niche product.

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