

# Fertility and fertility management in thirteen well-established organic dairy herds in the UK

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## ABSTRACT

Milk production and breeding records, from thirteen organic dairy herds were collected between January 1997 and December 1999. Mean lactation yields in the herds ranged from 5127 kg to 7031 kg. Whilst seasonality of calving varied widely between herds, a majority of them (6/13) were autumn calving. Mean calving to first service interval was 80 days (range 68 to 97), and mean calving interval was 385 days (range 370 to 413). The mean number of services per conception was 2.3 (range 1.6 to 3.1). Overall culling rates and culling rates for fertility related problems were at 15.8% and 5.4%, respectively. A preliminary study of selected breeding periods of cows that had a subsequent calving revealed no significant differences in calving interval between high or low yielding cows or between cows with different calving month or parity.

*Key words: organic dairy production; cows; fertility*

## INTRODUCTION

Organic livestock production standards in the EU set management criteria on the use of conventional veterinary medicine and the feeding of dairy cows that may influence fertility management of organic herds. Reliance on homegrown feed and pasturage may also affect the way fertility management is planned. As seasonal milk pricing has not been introduced in organic milk market, this may further affect decisions making on fertility and reproduction in organic herds. The aim of this paper is to explore these effects and to establish some baseline data on fertility parameters in organic dairy herds in the UK.

## MATERIALS AND METHODS

Milk production and associated breeding records, from 13 well-established organic dairy herds were collected for the period January 1997 to December of 1999. The herds were based in the South of England and Wales and had an average herd size of 115 cows (range 48 to 315). Fertility details of all animals and monthly milk records (National Milk Recording Plc., UK) for each herd were collected and analysed using the Interherd™-herd management software. Data were exported and further analysed on standard database, spreadsheet and statistics

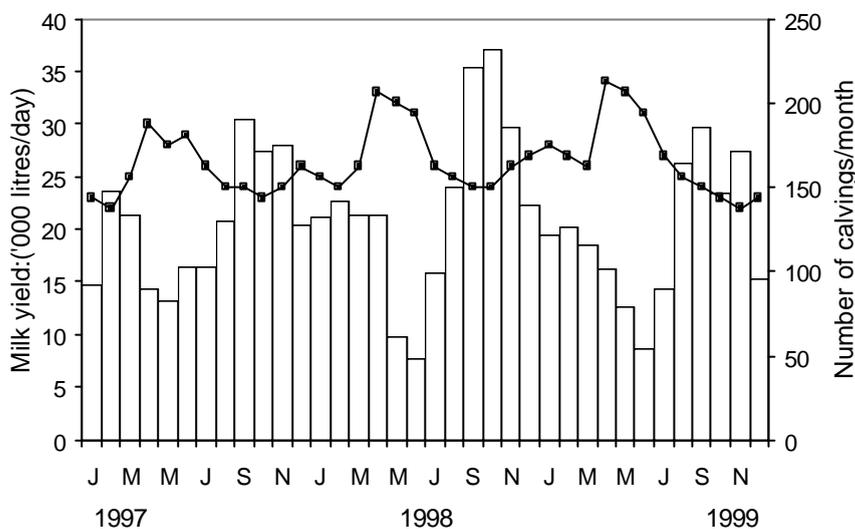
programmes. Details of fertility management and their perceived relevance to organic management and production were recorded during farmer interviews.

## RESULTS

### Fertility management

Calving patterns varied widely between the farms but the majority of cows in the 13 herds calved in the autumn (Figure 1).

Figure 1. The distribution of calving (bar) and mean daily milk production in 13 organic dairy herds (January 1996 to December 1999).



None of the farms implemented a block calving. Five of the six autumn calving herds, one of the spring calving herds and both the large herds with two calving periods had routine veterinary inspections of the herds during the breeding season. Hormonal treatments were used to treat cows with "silent heat" or poor cleansing. One of the all year around calving herds and one of the autumn calving herds did not use any veterinary assistance in fertility management but treated all cases of "poor fertility", poor cleansing or "silent heat" with homeopathy. The remaining three herds used veterinary assistance only when problems arose. There were no consistent policies amongst the herds in regard to start of service after calving or dealing with repeat breeders or cows with cystic ovaries.

### Estimates of herd fertility performance

At herd level, cumulative fertility parameters were estimated for 3,414 subsequent breeding seasons for cows calving in 1997 and 1998. This analysis included all cows, independent of their subsequent calving status, giving a true reflection of each herd's fertility performance. This data was supported with an analysis of culling levels in each herd for the same period and is presented in Table 1.

**Table 1. Average herd fertility parameters for 13 organic herds (N = number of calvings observed).**

Farm	N	Calving to 1 <sup>st</sup> service (d)	Calving interval (d)	No. services per conception	Conception rate (%)	Lactation yield (kg)	Culling rate (%)	Culling rate for fertility (%)
1	382	72	<b>370</b>	2.2	45	6389	27	10.9
2	701	72	<b>371</b>	2.4	41	5635	27	11.2
3	227	87	<b>376</b>	2.6	38	5789	19	4.4
4	187	74	<b>377</b>	2	50	6533	13	3.4
5	146	80	<b>377</b>	1.7	58	5784	14	3.1
6	106	68	<b>378</b>	2.2	46	6013	8	3.9
7	192	80	<b>379</b>	2	50	5606	10	2.3
8	299	71	<b>382</b>	2.5	39	7031	13	6
9	131	88	<b>386</b>	1.6	61	5127	15	4.1
10	357	78	<b>390</b>	3.1	32	5369	10	3.7
11	135	97	<b>404</b>	2.7	37	5141	16	8.7
12	274	92	<b>407</b>	2.4	42	5840	17	2.4
13	277	86	<b>413</b>	2.5	40	6107	15	6.5
Average	N/A	80	<b>385</b>	2.3	45	5874	16	5.4

### Fertility parameters for selected lactations

Out of a total 3,414 recorded calvings, 2,238 (68%) were followed by a subsequent calving of that animal within 550 days and contained a full service history. These breeding periods, identified as completed parities, were analysed separately to examine correlations between fertility and other cow level factors.

Whilst the mean values of fertility parameters tended to increase as yields increased, there were no statistically significant differences between four yield groups, when the breeding periods were divided into four yield groups by yield quartiles (Table 2.).

Table 2. Mean fertility parameters in four yield groups (G) based on yield quartiles with average 305-day yields (Y) (C1stS = calving to first service; CaCo = calving to conception interval; CI = calving interval).

	N	C1stS	CaCo	CI	S/C
G1 (Y = 4,470 kg)	663	77	104	386	1.6
G2 (Y = 5,594 kg)	655	80	108	389	1.6
G3 (Y = 6,552 kg)	597	81	113	394	1.7
G4 (Y = 7,766 kg)	323	77	113	394	1.7

The mean values of fertility parameters in the second parity and in parities three and above were lower than in first parity, but these differences were not statistically significant (Table 3.). There were no statistically significant differences in the fertility parameters for the 2,238 breeding periods by month of calving.

There was, however, a tendency for the autumn-winter calving groups to have shorter calving intervals and shorter calving to 1st service and calving to conception intervals, whilst the number of services per conception tended to fall during the summer months.

Table 3. Mean fertility parameters in three parity groups.

	N	C1stS	CaCo	CI	S/C
Parity 1	648	81	112	393	1.7
Parity 2	522	76	106	388	1.7
Parity 3+	1,068	77	104	386	1.6

## DISCUSSION

Existing data from Switzerland, Norway, Sweden and Germany suggest that organic dairy herds do not have more fertility related problems than conventional herds (Augstburger *et al.*; 1988, Ebbesvik, 1993; Jonsson, 1996; Krutzinna *et al.*, 1996). Whilst milk production levels in the survey herds were slightly below national averages in the UK (based on conventional, recorded herds), other milk quality indicators were similar, including the somatic cell count levels (Blanshard, 1999). Only two of the herds reported overall culling rates above 20%, and culling for fertility remained low in all survey herds. These figures are low compared with figures obtained from a larger sample of conventional UK dairy farms where overall culling was reported at 24% and culling for fertility at 9% (Kosssaibati and Esslemont, 1996). As none of the survey herds practised strict block calving and most herds had a relatively relaxed approach to calving patterns, culling for barren cows at the end of a breeding season could be expected to remain low.

Mean calving to 1<sup>st</sup> service intervals and calving intervals remained relatively low in all but two herds, compared to figures reported from conventional, recorded dairy herds nationally (C1stS 89 days, CI 396 days; Blanshard, 1999). The number of services per conception was, however, higher than that reported by Blanshard 1.7. Subsequently, the overall conception rates remained very low in the organic herds, suggesting that relaxed calving patterns encourage repeated services. Reksen *et al.* (1999) report shorter calving intervals and lower numbers of services per conception in Norwegian organic herds than in the current study, but in a survey that studied organic farms with markedly smaller herd sizes. Growing herd sizes have been associated with impaired fertility performance (O'Farrell and Harrington, 1999).

Further analysis would be needed to establish the financial impact of poor conception rates in organic herds with relatively short calving intervals and low culling rates for fertility and to examine the causes for such high number of services per conception in some herds. Data from conventional herds suggests that number of services per conception is not a significant financial loss when compared with the losses caused by prolonged calving intervals and culling for fertility (Esslemont and Peeler, 1993).

It has been argued that higher yields result in poorer fertility performance in dairy herds (O'Farrell, 1998). Whilst there was a detectable trend for poorer

performance in fertility amongst the organic cows as milk yields increased the differences were not significant. It is likely that the milk yields in the survey herds are not high enough to cause primary drop in fertility. The evidence for poorer fertility in higher yielding cows comes from high yielding cows in intensive systems, with yields causing deterioration in fertility performance well above the yields recorded in the current survey herds (Nebel and McGilliard, 1993).

Month of calving and parity did not appear to have a significant effect on fertility parameters, but this conclusion should be considered in the light of the great variation in the number of cows calving in different months and in the herd bias caused by different calving patterns and fertility management between herds. Slightly longer calving to first service and calving intervals for cows calving in summer may be a result of intentional delay in first service in order to maintain autumn calving pattern. Reksen *et al.* (1999) found that fertility performance in Norwegian organic cows was impaired in first lactation and in cows that were bred in winter rather than in summer when energy corrected milk yield performance was taken into consideration. Further modelling of current data, with additional information on feeding in the survey herds would be needed to establish, whether similar effects can be found in the UK herds.

It is concluded that fertility performance in terms of culling for fertility and mean calving intervals were better in the organic survey herds when compared with existing data from conventionally managed UK dairy herds. Good fertility performance even in the highest yielding organically managed cows suggests that early lactation energy deficit may not be a major problem in these herds, and very little evidence of such deficit was found in present data. It is also suggested that the financial impact of a high number of services per conception, as observed in the majority of the survey herds, may be insignificant as the main losses caused by poor fertility are attributable to culling and prolonged calving intervals. Further research would need to be carried out to establish the financial consequences of poor fertility in organic systems with different milk pricing and cow values. Similarly, further research is needed to establish causes for high numbers of services per conception in these herds and to establish whether this phenomenon exists in other organically managed herds.

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