Milk from forage on organic dairy farms

*Milk from forage (MFF) has been used as an indicator of dairy enterprise performance since the 1970s. There is considerable evidence associating MFF with good economic performance. ORC researcher **Katharine Leach** and intern **Gaëlle Feur** have been looking at the MFF performance of some organic dairy farms.*

Maximising milk from forage is an ideal that fits well with organic farming concepts, since feed self sufficiency is often regarded as a desirable goal and controlling purchased feed costs is particularly important as purchased organic feed is expensive. The ability to produce MFF reduces the dairy farm's vulnerability to fluctuations in the price and availability of purchased concentrates.

DairyCo's Milkbench+[1] consistently shows that forage utilisation contributes to profit in a wide range of dairy systems. Data from Canada show that farms with high MFF have better economic returns in the form of net income, work income per full time labour equivalent, and margin per cow.[2] The key fact is that the top 20% of farms ranked on MFF had 10% lower feeding costs than the bottom 20%. However, not all UK organic farmers take a low concentrate input approach. As Table 1 shows the amounts of concentrate fed in organic systems can be quite high. Nevertheless, good MFF levels are still being achieved.

The main influences on MFF are forage quality, type and level of concentrate feeding, stocking rate and calving pattern. Good economic returns from MFF require high forage intakes, which will only be achieved if the forage is available, palatable, well presented and (if necessary) supplemented with appropriate amounts and types of concentrate. The cheapest forage is of course grazed grass.

Calculating milk from forage

There are a number of ways of calculating MFF. The more complex ones involve measuring the energy of feed intake and recording accurately the amounts of forage and grazing accessed by the cows. However an estimate based on milk production and concentrate use is generally used.

In this case, the energy requirement of producing a litre of milk is calculated taking its fat and protein content into account and extrapolated to produce the annual energy requirement for the herd. Energy supplied by concentrate feeds for the year is calculated from the amounts fed and the feeds' metabolisable energy contents. This can account for a known number of litres of milk produced from concentrate and supplementary feed; the remainder is assumed to be MFF.

What should organic farmers aim for?

Available figures suggest that there is considerable variation in the annual rolling average of MFF on UK organic dairy farms. For example over the period 2003 to 2008, the lowest figure was 2753 l/cow in 2006 and the highest 3426 l/cow in 2004.[3] It is likely that this change over time is due to seasonal variation in forage quantity and quality, the relative cost of purchased feed and price of milk, and the changing population of farms included in the sample. Current indicative benchmark figures can be seen in recent Kingshay data (Table 1), which summarises data for 30 organic farms using the annual rolling figures for June 2012.

How can high milk from forage be achieved?

Case studies carried out last autumn by Gaëlle Feur, an intern at ORC, studying at the University of Dronten, illustrate that it is possible to achieve good returns from MFF with a variety of approaches. Table 2 outlines the relevant aspects of four farms with above average MFF.

Table 1: Annual rolling result for 30 organic herds, June 2012. Source: Kingshay

	Overall mean	*Average of best 20% on MFF*	*Average of worst 20% on MFF*
COWS IN HERD	179	197	183
MILK PRODUCTION			
Yield (l/cow)	6271	6147	6580
Yield from all forage (l/cow)	3281	4025	2287
% of total yield from forage	54	66	36
FEED			
Concentrate use (kg per cow)	1451	1049	1962
Concentrate use (kg per litre)	0.22	0.17	0.30
Concentrate price (£ per tonne)	313	291	319
Other purchased feed cost (£ per cow)	16.57	8.33	41.17
All purchased feed cost (p per litre)	7.30	4.98	10.04
MARGINS			
MOPF* (£ per cow)	1499	1583	1404
MOPF (p per litre)	24.21	25.96	21.47
Measures per hectare (n = 16)			
Stocking rate (cows/ha)	1.67		
Milk from forage (l/ha)	5421	insufficient data available	
MOPF (£ per ha)	2662		

* Margin over purchased feed

Common features of these farms include diets of mixed forages to boost forage intakes and optimise rumen function, well monitored rotational grazing, which ensures optimum quantity and quality of available herbage, and cross-breeding.

The last is common across organic herds so it is not clear how influential it is on MFF. However, all four farmers emphasised their policy is to breed for robust cows rather than milk production. The case study farms also demonstrated attention to detail in the storage and presentation of forages. They all used silage analysis to assist ration formulation.

Factors that vary between the farms include speed of grazing rotation and method of monitoring; and different calving times. The widely held view that the highest MFF will be achieved from a spring calving herd[4] is not reflected in these farms.

In general, block calving is likely to result in higher MFF due to the ease of feeding cows more efficiently when they are at a similar stage of lactation. However, other factors that may be

Table 2: Performance and management characteristics of four organic farms with above average milk from forage

Farm		*1*	*2*	*3*	*4*
Cows in herd		235	170	184	144
Yield	(l/cow)	6522	6941	7604	6747
Yield from forage	(l/cow)	4708	4404	3878	4210
% of total yield from forage	%	72	63	51	62
Concentrate use	(kg/cow)	860	1260	1808	1157
	(kg/l)	0.13	0.18	0.24	0.17
Concentrate feed cost	(p per l)	4.32	5.23	7.63	5.22
Other purchased feed cost	(p per l)	0	0	0.04	1.02
All purchased feed cost	(p per l)	4.32	5.23	7.67	6.24
Margin over purchased feed	(£/cow)	1670	1728	1822	1660
Margin over purchased feed	(p per l)	26.36	25.07	24.23	24.8
Stocking rate	(cows/ ha)	1.52	Not available	1.9	1.5
Yield from forage	(l/ha)	7143	Not available	7368	6309
Calving season		Spring & autumn	Spring & autumn	Autumn	Spring
Concentrates fed		Dairy cake, rolled barley, rape meal (protein-protected)	Dairy cake (summer), home-grown barley, home-grown beans	Dairy cake, barley, soya, rapeseed meal, sunflower, beans	Home-grown crimped barley/peas, soya
Winter feeding system		Parlour cake + TMR*	TMR*	Parlour cake + TMR*	TMR*
Forage					
Silage leys		Red clover Mixed leys inc. red clover Permanent pasture	Lucerne Mixed leys inc. sanfoin, red/white clover	3yr leys red clover/hybrid ryegrass 7-8 yr leys Ryegrass, white clover, timothy Permanent pasture	Red clover/Italian ryegrass Ryegrass, red/white clover,chicory
Grazing		Mixed leys inc. chicory Permanent pasture	Mixed leys inc. chicory Permanent pasture	Ryegrass, white clover, timothy Permanent pasture	Ryegrass, red/white clover,chicory
Wholecrop		Spring barley		Spring barley	Spring barley/peas
Grazing system		Rotational 21 days. Deferred grazing in winter	Rotational 30 days	Rotational 7 - 14 days	Rotational 21 days + strip grazing
Grazing monitoring methods		Platemeter	Platemeter	Ruler and "3-leaf system"	Grass heights "by eye"
Breeds		Cross-breeds: B/W, Ayrshire, Scandinavian Red, Jersey, Montbeliarde	British Friesian	Cross-breeds: Montbeliarde x Friesian, Some Ayrshire, Norwegian Red	Cross-breeds: Holstein, Montbeliarde, Swedish Red

* Total Mixed Ration

specific to the individual farm are also important. Table 3 shows some of the case study farmers' personal views on the secrets of success and the challenges of producing high MMF.

The wide range of MFF values illustrated in Table 1 shows that there are organic farms with considerable potential to improve performance. Within the Sustainable Organic and Low Input Dairying (SOLID) project, ORC has the opportunity to explore this further and we would like to hear from more farmers who are achieving high MFF, or who would be interested in doing so.

References

1. DairyCo (2013) Milkbench+ Report. http://www.dairyco.org.uk/resources-library/technical-information/milkbenchplus/milkbenchplus-report-2013/
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3. Waterfield, W. (2009) Financial performance, benchmarking and management of livestock and mixed organic farming. Results of Organic Research, Technical Leaflet 2. IOTA. http://www.organicadvice.org.uk/technical_leaflets.html
4. Measures, M. (2009) Report on Organic Dairy Feed Conference, Berkeley, 2009. http://www.organicadvice.org.uk/misc_docs/IOTA_Dairy_cow_conference_report_final.doc

Table 3: Comments from farmers producing above average milk from forage

Farmer	*1*	*2*	*3*	*4*
"Secrets" of success	Efficient grazing management supported by good infrastructure.	Recent improvements in grazing management – platemeter. Own staff and machinery helps forage quality.	Grazing management. Always feeding silage ad lib to milking cows.	Grazing management and grass quality. Straw yards provide manure to maintain forage production.
Challenges or limitations	Wholecrop silage could be improved. Vulnerable to drought in dry summers.	Limited grazing area due to farm layout.	Silage quality. Autumn calving herd, difficult to avoid soya supplementation.	Silage making by contractor limits flexibility and is expensive.