

Feeding tips when forage is short

If you have counted up what you have and you know you are short of fodder start “spinning it out” at housing and don’t delay. You can substitute silage with other fodder and concentrates if you achieve the minimum fibre for animal health

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Individual situations will vary depending on what feed you have available, animals in the yard, feeding facilities, and options for purchased feed, etc. So while this Q and A aims to cover the majority of situations; for tailored advice contact your local Teagasc advisor.

Q What does an animal need to eat in the winter?

Feed requirements are described in terms of UFL (energy), PDI (protein) and NDF (fibre). The values in Table 2 are useful to build and compare diets. A key point is that diets made up of different ingredients will deliver similar performance if the same UFL, PDI and NDF values are met. So you can choose feeds based on availability and price per unit of feed value.

Q How do I make best use of limited fodder supplies?

Table 1: Effect of supplementing dry cows, with or without silage restriction, on silage budgets and cow body condition score over a 10-week dry period

	Silage ad-lib	Silage plus 3.5kg meal	Restricted silage plus 3.5kg meal
Silage dry matter intake	12-13	11.4	8.0
Concentrate kg as fed	0	3.5	3.5
Total energy (UFL) intake	9.1	11.9	9.3
Total protein (PDI g) intake	790	1075	865
Net UFL balance (10wk dry period)	107	298	120
BCS at calving (2.75 at dry off)	3.25	> 4.0	3.25
Silage saved kg DM per cow	-	38	252
Total fresh silage (bales per 100 cows)	-	17	115

*70 DMD grass silage at 12% CP

A For spring-calving dairy herds, the primary demand for silage will be for dry cows in late pregnancy. Depending on turnout date and calving pattern, milking cows in early lactation may need high-quality silage.

Tables 4 and 5 outline some example diets for herds with silage deficits of 30% to 40%.

Q If I feed more concentrates, will cows automatically eat less silage?

Replacing silage with concentrates is a viable option to fill moderate gaps (forage deficit of circa 25%) where forage costs are high (e.g. straw prices exceed €25 per 4x4 bale for feeding)

When animals are fed supplements with silage, there is usually a decline in forage intake compared to feeding the same silage ad-lib as the sole feed. In practise, the reduction in voluntary silage intake is relatively small, i.e. the animal mostly eats the supplement as well as silage.

In the case of dry dairy cows eating 10-12kg DM of moderate quality silage plus 3-4kg meal, there will likely

be a substitution rate of less than 0.2kg silage per kilo of meal offered.

Where silage intake is not restricted, the forage-sparing effect of meal-feeding is less than 5% of total winter forage requirement. Furthermore, cows can gain body condition potentially resulting in more metabolic health problems at calving.

Restricting access to silage and balancing with the correct level of meal can return forage savings of 25-30%, while meeting targets for body condition score at calving. So restricting daily silage allowance must form part of the feeding plan.

Q In practice, how should I feed a restricted level of silage plus meal to dry cows?

A 3-4kg concentrate feeding rate can be used to reduce daily silage feeding by 20-25%. For example, where 12 silage blocks per day would usually be fed ad-lib to dry cows, this would be reduced to around nine silage blocks per day to the same cow numbers, with meal to balance.

- Test pit silage and bales to establish dry matter, DMD and protein content.



When animals are fed supplements with silage, there is usually a decline in forage intake compared to feeding the same silage ad-lib as the sole feed.

Do this before the start of winter feeding and again in early January.

- Weigh a sample of silage blocks/bales once per month. Use this information in conjunction with DM test results to estimate and adjust daily silage allowances.

- Offer fresh silage daily, keeping to a fixed schedule, if possible.

- Where feeds are handled/fed separately, feed out silage to dry cows in the evening. This will be eaten by early next morning. Offer 3-4kg meal per cow as a mid-morning feed.

Provide a token amount of straw or hay (if available) along the barrier after meal feeding (a half round straw bale or one-third hay bale for 100 cows). This is not required from a feed fibre point of view, but will help satisfy cows with higher intake capacity until evening silage feeding.

- Allow 700mm barrier space per cow (seven cows per standard bay) when feeding restricted silage to minimise bullying.

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Table 2: Total daily intake targets for different classes of dairy stock

Energy	UFL	Notes
Cows		
Maintenance	5.5 to 6.0 approx	Depending on weight
Pregnancy	Add 0.8, 1.6 and 2.4 UFL/day in seventh, eighth and ninth month of gestation	
Milk	0.43 per kg milk	Depending on fat %
Weight gain (1kg)	4.5	50kg = 1 BCS unit
Weight loss (1kg)	3.5	Restrict deficit to max 0.5kg (1.7 UFL) per day
Yearling heifers		
Target gain 0.5kg /day	4.1	250kg FR type heifers
Target gain 0.8kg /day	4.7	
Protein	PDI	Notes
Cows		
Maintenance	420 to 460	Depending on weight
Pregnancy	Add 70, 140, and 210g/day in seventh, eighth and ninth month of gestation	
Milk	48 to 52g per kg milk	Depending on protein %
Fibre (minimum)	NDF	
Dry cows	45-55%	Too low fibre may result in excess BCS gain
Milking cows	Min 32-36%	75% from forage.
Youngstock	36 to 40%	Too low risk acidosis
		Heifers will eat 0.75 to max 1.0% of lwt as NDF

Aim to balance PDIN/PDIE values and PDI/UFL ratio

Table 3: Guideline daily total feed intake requirements for dairy stock

	DM intake	UFL	PDI	Fibre	NDF
Dry in-calf cows					
Thin at dry off (2.5)	11-12	8.5 to 9	660		
On target at dry-off (2.75+)	10-12	7.5	640	45-55	
In-calf heifers	9-10	7.5	640		
Milking cows					
Late lactation (15 litres)	14-16	13.0	1,220	38-40	
Early lactation indoors (29 litres)	19-21	18.5	1,890	32-34	
Yearling heifers					
Target gain 0.5kg /day	6.0	4.1	420	36-40	
Target gain 0.8kg /day		4.7	460		

Table 4: Example dry cow diets to meet requirements¹ using hay, straw and limited silage (8-10 week dry period)

	Straw 6.0 kg DM	Hay 6.0 kg DM	Lo-Silage 3.5 kg DM
Dry cow diet			
kg as fed			
Grass silage 68 ² DMD			
Barley straw	3.0	-	3.0
Hay	-	3.5	-
Barley/gluten mix	2.5	1.5	2.0
Hulls/pulp/PKE	-	-	2.5
Soya bean meal	0.75	0.5	0.75
Total diet³			
UFL	8.7	8.8	8.7
PDI	840	850	860
Extra ⁴ cost per day €	€0.62	€0.54	€0.61

¹Assuming 0.25 BCS units gain required, daily energy intake 8.7 UFL and adequate PDI (650-800g)
²For higher silage quality (70-72 DMD), reduce barley/gluten mix by 0.5kg per cow per day
³Optimal diet cost will depend on price and availability of feeds and so will vary between farms
⁴Compared to 11kg silage at €0.165 per kg DM, based on straw at €0.205 per kg, hay at €0.18 per kg
⁵Supplement all diets with high-quality dry cow minerals

Table 5: Milking cow diets to meet requirements¹ using limited silage (60% of grass silage available)

	Straw, pulp + brewers	Indoor diet ² Maize/whole crop	Fodder beet + straw	Grass Early spring
kg DM				
Grass silage 703 DMD	7.5	7.5	7.5	6.0
Spring grass	-	-	-	6.0
Maize/whole crop	-	3.5	-	-
kg as fed				
Hi Energy 18 parlour nut	8.0	7.5	7.5	5.0 4
Soya bean meal	-	0.5	0.5	-
Fodder Beet	-	-	9.0	-
Beet pulp (hulls)	2.5	2.0	2.5	2.5
Brewer's grains	8.0	-	-	-
Straw	1.5	-	1.5	-
Total diet				
UFL	18.5	18.5	18.8	18.3
PDI	1890	1905	1890	1840

¹Assuming 29 litres of milk per day, balanced for NDF to exceed 34% with adequate NDF from forage
²Optimal diet will depend on price and availability of feeds and so will vary between farms
³Adjust parlour concentrate depending on silage quality
⁴Ration crude protein can be reduced to 14-16% when grass is included in the diet

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Q What can I do if I have a forage deficit greater than 25%?

A You will need to buy silage or if not available good quality straw or hay to meet fibre requirements. Some practical guidelines on straw and hay feeding:

- Dry dairy cows can be fed up to 4kg straw per day plus meal to balance energy and protein, replacing up to 70% of daily silage requirement.
- High-straw diets will deliver similar performance to all-silage diets for dry cows, provided that total UFL and PDI levels are balanced correctly (Table 1).

- Chopping the straw will reduce feed sorting and wastage, particularly for milking cows on mixed diets. Optimal chop length is 30mm to 50mm. If chopping is not feasible, feed "long form" to dry cows with bales rolled out along the feed barrier.

- Where more than 2.5kg of straw is included in dry cow diets, have soya bean meal in the diet to guarantee adequate protein for late stage foetal growth and improved colostrum quality.

- Straw tends to have relatively low macro-mineral content, particularly K (potassium). This can help prevent milk fever in dry cows. However, some sources (e.g. oat straw) may have high K values, so feed the correct mineral and check the diet's mineral profile if in doubt.

- Yearling heifers will eat 1% of their liveweight as fibre. Including 1kg straw plus concentrate can replace approximately 40% of their daily silage requirement. Balance for energy and protein.

- Where silage is limited for milking cows, including 1kg of chopped straw helps to meet their minimum fibre requirement of 32% NDF (25% from forage).

- Grass hay will do the same job as straw but has higher UFL/PDI and lower fibre value. A rule of thumb is that 1kg of good-quality hay is equivalent to 0.5kg straw plus 0.4kg of a maize gluten/barley mix. Products such as alfalfa hay have similar UFL but higher protein compared to grass hay. Particle lengths of more than 30mm is required for fibre function.

Q Concentrate ingredients – which to choose?

A Value is determined by UFL and PDI content (Table 6). As said earlier, rations with differing ingredients will perform quite similarly if the total energy and protein values are equal.

Where forage is in short supply, include high-fibre ingredients to reduce the risk of digestive upsets. These

Table 6: Value of concentrate ingredients relative to barley (€210/t) and soya bean meal (€360/t)

	Value €/t	UFL	PDI	Comment
Barley	210	1.16	103	
Soya bean meal	360	1.18	269	
Maize meal	230	1.22	120	Useful in high-performance diets
Maize gluten	217	1.04	125	Moderate energy and protein
Distillers	245	1.16	135	
Rapeseed meal	240	1.05	150	
Citrus pulp	200	1.14	91	Not a fibre source, low in P, high energy
Beet pulp	210	1.14	110	Hi fibre and energy, excellent fodder stretcher
Hulls	200	1.02	107	Excellent fibre source, moderate energy
Palm kernel	210	0.94	131	Very hi-fibre, fodder stretcher, poor palatability
Oats	185	1.03	84	Moderate energy ingredient
Wheat	215	1.16	106	High energy feed, acidosis risk
Molasses	135	1.0	68	75% DM product, cereal replacement, no fibre

Table 7: Value of common other feeds relative to barley (€210/t) and soya bean meal (€360/t)

	Value €/t	UFL	PDI	Max ¹ kg as fed	Comment
Brewers	58	0.90	181	8-10 (2kg DM)	Good fibre levels
Fodder beet	45	1.12	88	8-10 (2kg MD)	High energy, low protein, low fibre
Potatoes	51	1.20	103	6-8 (2kg DM)	To replace cereals, no fibre value
Maize silage	55	0.80	68	-	Assuming 30% DM
Barley straw	87	0.44	40	3-4kg	4x4 bales have feed value of €14
Good hay	130	0.68	70	-	4x4 bales have feed value of €34

¹To dairy cows in a limited silage situation

ingredients tend to be lower in energy than cereals but have good NDF profiles. Where deficits are 25% or less, products such as cereals, gluten and distillers can be used to fill a 3-4kg intake gap.

The feed values of forages and wet feeds are shown in Table 7. You may need to buy some forage to meet minimum fibre needs. However, if extra fibre is not required and forage costs are much higher than the values in the table, concentrate options may offer best value to fill deficits.

Q Are other fodder stretcher feeds available?

A There are numerous products being marketed as fodder stretcher feeds. Some will represent value, others may have limited use. The key questions when valuing these feeds are:

- What is the dry matter content?

Feeds must always be valued on a dry matter basis

- What is the energy and protein content? This can be difficult to find out.
- What is the NDF value? Remember, feeds with NDF content less than 30% of DM, and/or particle size of <30mm, have limited, to no, value as fibre sources.

By-product feeds from the food industry, such as bread, confectionery etc, can carry a high risk of acidosis due to their high sugar content. These can replace concentrates but not forage. Consult your Teagasc advisor/nutritionist before purchasing and feeding any novel feeds, particularly where fodder is in short supply.

Q If I switch her to a more concentrate-based diet, will her performance suffer?

A If she has similar total energy and protein intake, and the diet has enough fibre, then performance should be approximately the same.

Q Does the cow's feed requirement change over the winter?

A Naturally as the cow's pregnancy progresses, her requirements grow, but the balance of protein, energy and fibre needed does not change over the winter.

The dry cow group will have the biggest total demand (tonnes) for silage but moderate DMD material should be fine. The best-quality silage should be kept for cows in early lactation, i.e. when they have started milking. Of course, grazed grass is even better than silage.

Key messages

- Most dairy herds are facing a significant winter feeding challenge.
- Market options are limited so early action to stretch forage will be vital.
- A range of feeding solutions can be used to meet herd requirements.
- Finally, consider reducing demand (i.e. early culling) where forage deficits exceed 50%.