Winter Feeding & Management

Wednesday, 06th December, 11am

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Topics:

Options for farmers experiencing fodder shortages

Feeding the winter milk herd

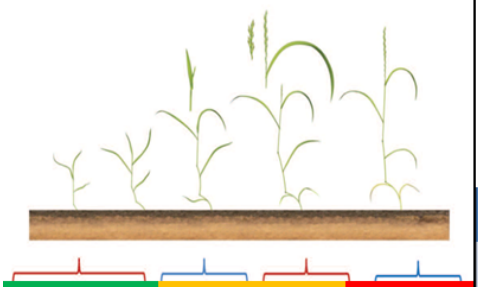
Labour & organisation on winter milk herds

Optimum cow type

Silage quality analysis from Arrabawn suppliers in 2017

Feeding the Winter Milk Herd

Forage Quality- Key to Success



74+ DMD 0.85+UFL	68-72 DMD 0.75-0.80 UFL	<68 DMD <0.75 UFL

- Sward management
- Sward quality
- Soil fertility/ fertiliser
- Energy Yield/ha
- High DMD

Concentrate Specification

- Feed concentrate to complement silage
  - Energy
  - Protein
  - Fibre
  - Vitamins + minerals

	'HE'18%	Premium 18%
Ingredient	Barley, beet pulp, soya meal, Maize, Distillers, Rapeseed, Mol, fat, mins+ vits	Barley, soya meal, soya hulls, M. gluten pollard, sunflower, molasses, maize, mins+vits
Feed value (kg fed)	0.97 UFL 114 PDIE	0.89 UFL 112 PDIE
Cost/t	€254	€240
Cost/UFL	€0.26	€0.27

Diet formulation

- Max Forage DMI
- Balance PDI/UFL
- Energy limiting
- PDIE/PDIN ratio
- Forage NDF fibre

Requirements for 600 kg cow at 4.1%F and 3.4% P

Milk/d	25kg	30kg	35kg
UFL /d	17.2	19.4	21.6
PDI g/d	1675	1930	2238
UFL/kg DM	0.90	0.94	0.97
PDI/kg DM	90	94	98
DMI (Kg)	19.1	20.7	22.5

Fodder shortages

- Calculate feed available: Pit = L x H x W (feet)
- Divide by 50, equals tonnes of fresh silage
- Average bales weighs 0.65 t

Do this every month!

Silage t/Month req.
1.6 t/ dairy cow
1.3 t/1-2 year old
0.7 t/0-1 year old

- Fodder stretchers? Cow still needs a minimum of 1% BW as forage; i.e. 600 kg cow needs 6 kg DM per day of forage
- 1 kg of meal replaces 5-7 kg fresh silage. Strategy will only save silage if it is restricted though!

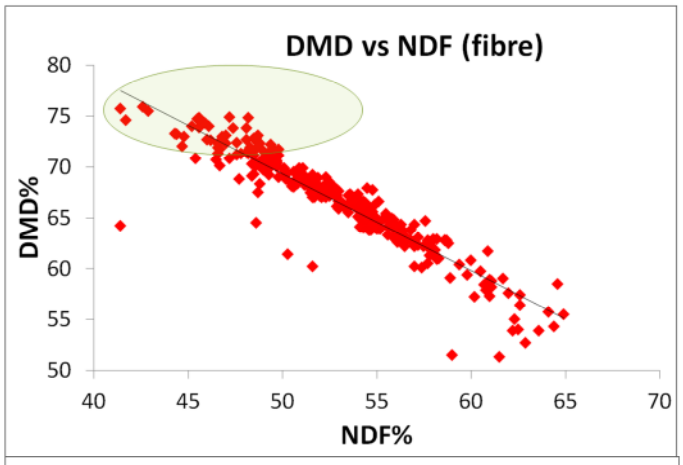
- Buy in bales?? Beware of poor quality! Will affect performance
- Group cows based on BCS and feed restricted silage to cows >3.5 BCS if high quality (>73%DMD)

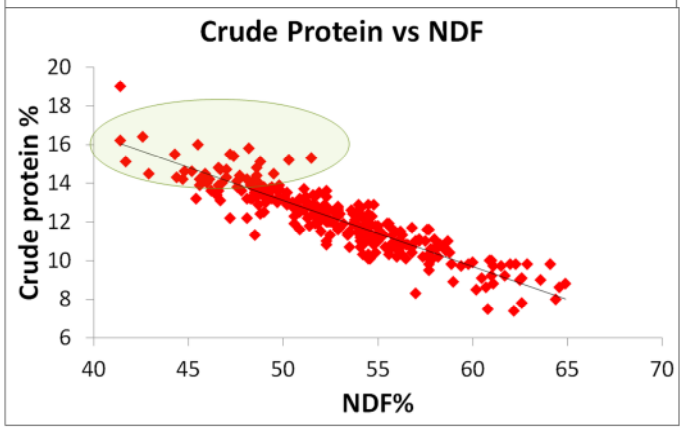
- Sell cull cows now. Store beef cattle? Empty cows?
- Complete a grass walk now to get a closing cover.
- Have a buffer of 2-3 weeks from your average turnout date in spring

Sean's Silage 2017

	1st cut	2nd cut
DM %	33.9	21.1
DMD %	74.6	69.1
CP %	15.1	13.2
UFL	0.82	0.76
NDF %	41.7	48.4

Silage quality





Shaded circles are the target - Everyone in liquid milk should be inside those circles!!

298 silage samples from Arrabawn farms in 2017

- Huge variation in quality
- Average DMD = **66.6%,** but the top 10% = **73.6%**
- Need to avoid stemmy, high fibre (NDF) silage to boost performance

How does Sean achieve good quality silage?

- Cutting date = early (aim before 15th May)
- First cut is better quality: aim for 70% of total in 1st cut
- Reseeding & soil fertility
- Graze out paddocks well before lockup
- Fertiliser out late March - early April
- Slurry – 2,600 Gal/acre in January

From late May onwards, each days delay in cutting reduces DMD by 0.5%

Optimum Cow Type – Winter Milk Herds

Optimum cow type

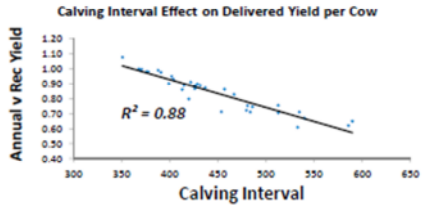
Cows that go back in calf?

Cows that produce milk?

Milk with a high value?

Cows that stay in the herd?

Expected annual yield



Herd Calving Interval	305d Milk Yield	Expected Annual Yield
440	9202	7674
410	9202	8199
380	9202	8723

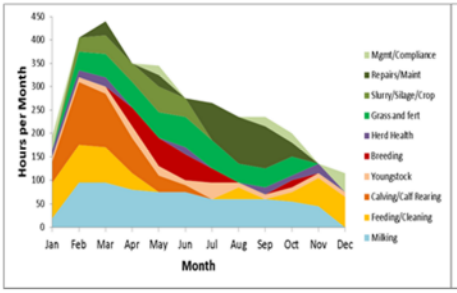
Seans's Herd Ranked on EBI

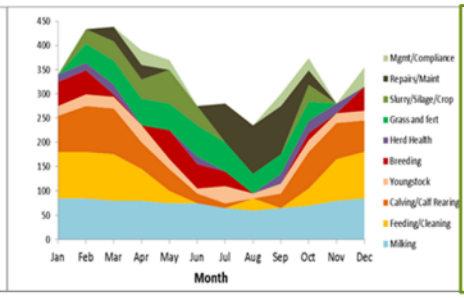
	High	Q2	Q3	Low
EBI	€25	-€12	-€36	-€69
Milk Index	7.5	0	-10	-17
Fert Index	-3	-22	-29	-54
Milk kg	***71***	***43***	***61***	***93***
PD Pro %	-0.01	-0.02	-0.05	-0.08
Milk Solids kg	1.29	1.20	1.18	1.17
Milk kg	16.5	15.2	15.5	15.3
Fat %	4.53	4.57	4.26	4.4
Pro %	3.31	3.34	3.25	3.18
Milk value	€5.23	€4.85	€4.78	€4.69
Cent per litre	32.8	33	31.5	31.3
Diff per 100 cows	-	-€13,873	-€16,425	-€19,710

Genetics and Fertility

Fert Sub Index	Hi	Lo
Metritis Score Wk3	1.1	2.3
% Cycling Day 42	82	22
Sub Rate	83	72
Preg. Rate 1st AI	55	33
Embryo Mortality	2	13
22,000 winter milk cows		
Surv. 4th Lactation	0.64	0.29
M Days to 4th Lact.	1108	1452

Labour on winter milk herds





Sean's farm:

- Handling facilities are high quality and yard well laid out
- Contractors used very effectively
- Staff & people management is excellent

Labour survey outcomes:

- Liquid milk farmers work approx. **4 extra hours** per LU per year
  - Not accounted for in paid labour costs
- No evidence of reduced spring peak – "busy all the time"
- Longer total working week – 5 hours on average
- Limiting factor for future expansion?
- Flexibility to use labour saving practices?
- Milking times & interval should be well structured

Dairy Farm Labour audit

	Average	Top 5%
Hours per week	66	55
Avg. finish time	7:01pm	6:01pm
Contractor – Slurry	36%	55%
OAD calf feeding	28%	58%
Heifers calved 2 y/o	54%	98%

Take home messages:

- Workload on farms is predictable – organisation is key
- Audit your own time input – develop a plan to fill gaps
- Labour saving: Practices more important than Devices

Arrabawn Silage Sampling 2017

Arrabawn has undertaken an extensive analysis of silage quality and mineral status over the last few months. Over 300 samples of silage have been taken from suppliers across the co-ops catchment area, and some of the results have been highlighted on the board presented above on silage quality.

The overall average DMD was 66.6%, but importantly there was huge variation with some samples as low as 55% DMD and a few testing over 75% DMD. The results show that on many farms there is still major scope for improvement and achieving good quality silage is a key means to improving milk yield without feeding extra concentrates. A spring milk herd that has 250-300 grazing days within a year can expect to feed the equivalent of 2-3 high quality bales per cow to the milking herd at the shoulders of the year. These systems may be able to make enough surplus bales during the grazing season to achieve this yield, and then use slightly lower quality pit silage in the dry period. However, liquid milk farmers should be feeding 73-74% DMD silage to their herd in winter, so for these farms, high quality silage is crucial. Looking at the results below, this does not appear to be achieved on many farms.

Silage quality data from 300 silage samples collected from Arrabawn suppliers in 2017

	Total Average	Top 10% Ave	Bottom 10% Ave	Minimum	Maximum
DM (%)	28.4	29.1	30.5	16.0	67.2
pH	4.3	4.2	4.4	3.5	5.4
CP (%)	**12.1**	**14.6**	9.2	7.4	19.0
NDF (%)	52.9	46.3	61.0	41.4	64.9
DMD (%)	**66.6**	**73.6**	**57.1**	**51.3**	**75.9**
ME (MJ/kg DM)	9.5	10.6	8.0	7.1	11.0
ASH (%)	8.1	8.3	7.5	5.4	12.8
Ammonia N (%)	5.1	5.8	3.9	1.1	18.8

Cutting date

We did not have a cutting date for every sample but it was evident that many of the samples with a high DMD (over 73%) were either cut in early-mid May, or were taken out of the grazing rotation as surplus bales at various stages during the summer. Cutting date is probably the most important single factor in achieving high quality pit silage. However there will be a slight trade-off in yield if cutting very early. The table below from Teagasc shows the expected average yield of fresh grass prior to cutting for first cut silage. Actual silage yields and quality will be a little lower than this on average, but it still gives a good picture of the trade-off between yield and quality.

Table1. Grass[1] yield and digestibility

Harvest date	1 May	8 May	15 May	22 May	29 May	5 June	12 June	19 June	26 June	3 July
Yield (t DM/ha)	2.92	3.99	4.98	5.96	6.79	7.82	8.48	8.93	9.50	9.83
DMD%	79.9	77.9	77.5	76.6	74.6	69.2	67.9	64.3	63.5	58.2

[1]Silage yields and digestibilities (DMD) will be lower than these values

Many people will delay cutting to "bulk up" their first cut yield but if we leave it too late, then the DMD will decline. What is often overlooked is that the second cut yield will usually be higher on a field where the first cut was taken off early.

Here on Sean's farm, this is something he does very well using contractors – slurry for the second cut is applied immediately after the first cut in taken in May and within 7-8 weeks (in early-mid July) the second cut is harvested. Sean's second cut DMD was 69.1%, but the yields were good enough to add bulk to his winter fodder supplies despite the more moderate level of quality. Still, there is a pit of first cut silage (74.6% DMD) on hand that was cut on May 9th that is used for the winter milk herd to fuel high milk yields.

Many farmers will have received their silage quality report but there is often little information on how to interpret many of the lesser used parameters, which are still important. The table on the following pages gives a description of the various quality parameters and should help to interpret your test results.

Mineral content of silage from 68 silage samples from Arrabawn suppliers in 2017

Element	Total Average	Max. value	Min. Value	Recommended level
Phosphorus %	0.35	0.52	0.17	0.45
Potassium %	1.66	2.76	0.71	0.7
Magnesium %	0.15	0.26	0.08	0.4
Calcium %	0.49	0.81	0.17	0.9
Sulphur %	0.15	0.23	0.09	0.2
Sodium %	0.30	0.78	0.04	*0.2
Manganese mg/kg	123	463	36	45
Molybdenum mg/kg	0.77	2.58	0.00	0.5-3.5
Copper mg/kg	8.08	27.08	3.99	15
Zinc mg/kg	39.8	188.5	10.4	55
Iron mg/kg	342	1089	50	20-300
Cobalt mg/kg	0.19	0.60	0.05	10
Selenium mg/kg	0.20	0.87	0.02	0.3
Iodine mg/kg	0.23	1.03	0.06	*0.5

*dry cow iodine requirement is 0.33 mg/kg
*dry cow sodium requirement is 0.50 mg/kg

The table above gives the average of 68 samples of silage from Arrabawn suppliers that have been analysed so far for mineral and trace element status. Again there was a huge level of variation in the samples. With minerals, there is not really a "good" or "bad" figure as such, instead we want to just correct any imbalances that show up in the analysis that may affect performance. Some information to help farmers on the correct levels of some important minerals are outlined below:

Calcium: Average value 0.49% of DM. Tends to increase with sward maturity.

Phosphorus: Silage P content associated with soil P status and P fertilizer strategy. Forage P content of 0.35% to 0.40% optimal

Potassium (K): Essential for good DM yield, but high forage K (>2.4%) is a major risk for milk fever. Highest with early cutting, leafy grass and heavy cattle slurry applications. Reserve some low K silage for feeding to late gestation cows. Direct K toxicity is extremely unlikely under natural conditions

Magnesium: Important for milk fever prevention in dairy cows. Supplement diet based on forage Mg content. Always deficient in silage so needs to be supplied in mineral mix or concentrate so that cow consumes 0.4% DMI as Mg.

Sulphur: Optimum S content of dairy and beef diets is 0.2%. Apply fertilizer S at 1:10 ratio to N

Sodium (Na): Low Na forages (0.24%) may have reduce feed intakes. Apply Na fertilizer in spring, supplement diets with salt based on animal requirements

Silage Analysis – Key measures of quality explained

Parameter	Why it's important	What the analysis says
Dry Matter	Important determinant of intake and preservation values. Most silage analysis parameters are expressed on a DM basis.	Range 15-45%. Optimum for intake is 28-32%. Low values can result in low pH, poor intake. Reduced aerobic stability at very high values
Dry Matter Digestibility (DMD)	The key measure of quality. Determines intake and energy values per kg DM. Low if cutting is delayed beyond heading date, and/or dead material present in base of sward. D value is a similar measure used in some analyses.	Values of 74+ suitable for high performance animals. DMD below 66 is sub-maintenance feed for most classes of stock. Silage at 68-70 DMD adequate for dry cows requiring little body condition gain . To convert D value: DMD = (D Value – 7.32)/0.84.
Net Energy (UFL/UFV or Metabolizable Energy (ME)	Directly linked to DMD value. Increased energy values boost animal performance and reduce cost of supplementation	Predicted from DMD and fibre fractions. Top quality silage can be >0.90 UFL, but values close to 0.70 are more common. Value drops quite quickly for each day delay in cutting after grass heading date.
Neutral Detergent Fibre (NDF)	A measure of forage fibre, NDF affects the intake potential and 'fill-effect' of silage. Strongly influenced by growth stage at cutting.	Lower is better for high intake and performance. Typical value is 50- 55% for stemmy June silage. Highest quality requires NDF <44%.
Crude Protein (CP)	Measures Nitrogen as an indicator of true protein content. Gives no information on the quality of protein. Typical values range 9-15%.	Usually higher in leafy/higher DMD silage, but this can vary. High CP in silage tends to be rapidly degradable, leading to poor utilisation if diet energy is lacking. CP <10% may impede rumen microbial growth.
Feed Protein (PDIN and PDIE)	PDI measures the true feed protein value to the animal based on available energy (PDIE) and Nitrogen (PDIN) content.	Quality silage will have high PDIE (>75g/kg) due to better energy content, with a good balance of PDIN (3-5 units higher). Low PDI values indicate that extra protein supplementation is essential.
FiM Intake Value (g DMI /kg $W0^{0.75}$) (Dairy cows)	Dry matter intake potential is a major limiting factor for performance. FiM is un-supplemented silage intake potential, expressed per kg metabolic liveweight	High DM, DMD, and good preservation contribute to better FiM intake values. Silage DMI on 0-3kg concentrate can be estimated by dividing FiM value by 8 (for Hol/Fr cows) or 9 (for Jersey/Crossbred cows)
Ash	High ash indicates soil contamination, may affect trace mineral absorption. Feed quality per kg DM reduced.	Carry out mineral analysis if ash is >8% - adjust supplementation . Take steps to reduce soil contamination in cutting in wet conditions.
pH	A primary indicator of preservation quality and fermentation efficiency, pH measures acidity of the final silage product. Very acidic (low pH) silage has poor feed intake and rumen stability. High pH in wet silage indicates poor preservation- ammonia is usually high in this case leading to poor intakes	Target pH depends on DM content of the ensiled crop. A pH of 3.8 to 4.2 indicates good preservation at <28% DM. Dry/wilted crops (>28% DM) can be well preserved at pH up to 4.5. Wet silage with pH values of > 4.2 are generally poorly preserved. Where silage pH is <3.6, adjust diets to ensure correct rumen pH
Lactic Acid	High lactic acid content results in clean, sweet smelling silage with good stability and intake characteristics. Low values result in foul smelling material with poor feed quality.	Average value is 7.5% of DM. Lactic acid at 8-10% of DM, and >75% of total acids, means excellent preservation. Dry silage can be well-preserved at 1-2% of DM lower. Values below 5% mean poor quality.
Volatile fatty acids (VFAs)	Acetic, butyric and propionic acid. These are unfavourable end-products of silage fermentation.	Lower figures are better. Total VFAs (as % of DM) should be less than 2% and lower than total lactic acid content
Potential Acid Load (PAL)	Measures the risk of acidosis. PAL estimates rumen acid load when silage is fed, comprising i) the acid present in the silage and ii) acid produced when the silage is fermented in the rumen.	Values below 900 indicate moderate to low risk of acidosis. Silage at PAL 900-1100 fed as the sole feed should not cause issues but caution advised if using high concentrate feeds– replace starch with digestible fibre. Silage at PAL >1100 may require rumen buffers
Rumen stability value (RSV)	RSV is calculated from acid content and silage NDF. It estimates the potential effect of the silage on rumen pH.	Low RSV (<200) indicates risk of rumen acidosis– may need to adjust starch levels and add buffers. Silage RSV increases with higher NDF, however too much fibre reduced intake overall. Target 220-300 RSV
Ammonia	Ammonia (NH_3) results from protein breakdown during preservation, reducing feed quality and palatability. High nitrate in grass at ensiling contributes to elevated ammonia.	Values of less than 8-10% show good fermentation with little protein breakdown. Silage ammonia levels above 15% indicate poor preservation and will likely result in feed refusals

How many cows do I need to calf down in Autumn to fill my liquid milk quota?

This question pops up regularly amongst liquid milk farmers. The two key months where there is a trough in milk supply are December & January. In an ideal scenario, the spring herd will have a tight calving pattern and a high 6-week calving rate.

Let's take an example of this ideal scenario. A farm with 100 cows calving in spring and a liquid quota of 1000 L/day (30,000 L/month), needs to ensure that he has enough cows in the parlour in December & January to fill the quota, but not exceed it by too much.

- If there was no late lactation spring calvers supplying milk in December & January, the amount of autumn cows needed to calf would simply be the daily liquid quota divided by the daily herd average yield/cow in December & January.
- In the above example, this would be 1000 divided by 26 (an achievable average yield from fresh autumn calvers in December & January). This equals 39 autumn calving cows.
- However, this does not account for late lactation cows which stay in the herd.
- For a farm with 100 cows calving in spring, a good 6 week calving rate would reasonably see 12 cows calving in April-May. Ten of these cows might be milked on in December & January, as a reasonable estimate. These cows will have an average yield of about 12 litres at this stage. So in this example, that's approx. 120 litres of the liquid quota in December & January filled by late lactation spring cows. Any cull cows milked on should be added to this total, maybe reaching about 150 L in total from approx. 14 cows.
- Therefore, the amount of milk needed from fresh autumn calvers reduces to 1000-150 = 850 litres per day. 850 divided by 26 = **33 cows**.

In this example, a farmer with 100 spring calvers, and a liquid quota of 1000 L/day (30,000 L/month), needs to calve down **33 cows** in autumn to fill his liquid quota.

The example also shows the negative side of carrying too many late spring cows through to fill the quota. It costs the same amount to feed all cows milking in winter, regardless of calving date, yet the 33 autumn calvers will fill 85% of the quota, while we need 14 more late spring calvers & cull cows to fill the last 15%.

It's also important to remember that every extra litre over the quota in winter is paid at manufacturing level. The message is that we should not fill our liquid quota with too many stale cows from the spring herd as their feeding costs are the same but they yield about half, and so feed costs per litre of milk from these cows are twice as high.