

# MULTI CUT SILAGE – IMPROVING THE DIGESTIBILITY AND MILK FROM FORAGE

MAY 2020

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## 1.0 Background:

The dairy industry is moving forward to more sustainable and efficient production while continuing to increase yields and specific components. However, with variable milk price and high concentrate costs there is increasing focus on milk yield attained from forage. Therefore, the concept of multi-cut silage and clamp management is becoming a popular option for farmers in the United Kingdom. Extra milk yield gained by changing to a multi-cut system often outweighs the added contractor costs. Two clamps of 1,000t of fresh weight silage, one at 11.5ME and one at 10.5ME, amount to 300,000MJ energy difference which is equivalent to 60,000 litres of milk.

## 2.0 Introduction:

A key benefit of a younger cut grass is increased digestibility due to the crop having more leaf and less stem. This provides more metabolizable energy for milk production. Also, the protein content is likely to be higher, producing a more digestible forage that will not spend as long in the rumen. Therefore, cows can eat more of the silage, which allows forage intakes to improve. Additionally, the grass being harvested at a more uniform growth stage when cut earlier results in less variability within the clamp and, therefore, in the daily ration. Although there is a higher cost for harvesting the silage due to increased tractor work, producing a higher quality forage will increase milk yield, paying back over and above the increased harvest costs.

The aim of the project was to monitor the quality of the silage (D value) made with more cuts and the effect on milk yields and general health from the previous years.

## 3.0 Method:

The concept of multi-cut involves the careful monitoring of grass growth during the silage period to attain four or more cuts through the season. This ensures a younger, leafier grass is harvested and ensiled which achieves the highest dry matter, metabolizable energy and digestibility value figures as possible. At New Dairy, a multi-cut system was adopted in 2017, but insufficient carry-over forage stock meant it was difficult to make the most out of the system as ration was regularly supplemented with bought-in concentrates. Richard Gibb, a specialist in forage production guided the Edwards family on how to make the most out of a multi-cut system. First cut is aimed to be harvested from mid-April and then in 4-5-week intervals.

The early and main cuts were to be targeted at the milking cows, with the late cut targeted at dry stock. Silage analysis taken for all cuts will be compared to previous years' analysis, especially looking at digestibility value, metabolizable energy, dry matter and crude protein figures. Milk production quality and quantity were compared with previous years' data

through milk cheque figures and collars on each cow. New Dairy already used For Farmers Dairy Herd Costings to track the herd's performance month on month, which was used to help calculate the benefits of a multi-cut system. An important aspect of the project was to calculate and compare the cost of producing silage with concentrate feed, which was calculated in terms of per DM and MJ.

## 4.0 Results:

### 4.1 Forage quality

#### 4.1.a 2018 Results

With harsh (drought) weather conditions in 2018, three cuts of silage were taken on early ground and two cuts on heavier ground. The first cut was taken mid-April. Soil moisture levels were low due to the extremely hot weather which caused burn off and grass regrowth was poor. Due to these conditions, the decision was made to bale third cut silage on the late heavy ground to reduce harvest costs. A fourth cut of silage was also taken at the end of August.

The first multi-cut silage was sent for analysis prior to feeding and gave the results seen in Table 1 below.

<i>Constituent</i>	<b>New Dairy 2018 - first cut</b>	<b>AHDB range</b>	<b>AHDB target figures</b>
<i>Digestibility Value (D value)</i>	72	55-75	>68
<i>Metabolizable Energy (ME)</i>	11.6	8.8-12	>11
<i>Crude Protein (CP)</i>	167	100 - 200	150-175
<i>Dry Matter (DM)</i>	41.8		

*Table 1. 2018 first cut silage analysis compared to AHDB targets.*

Feeding the first cut silage in early June 2018 increased milk yield of the high yielders from 30 litres per cow per day to 32 litres per cow per day. This was a result of a large proportion of high-quality silage being introduced into the diet. Additionally, manure consistency, body condition, milk components and most importantly fertility all improved since the addition of the first cut silage in the ration was made. Due to the high quality of the silage New Dairy was able to make a significant saving per month on feed costs by removing 1.5kg of concentrate blend from the ration per cow while continuing to improve milk yields.

#### 4.1.b 2019 Results

Hugo from New Dairy aimed for 75% digestibility in 2019. The weather and growing conditions in 2019 allowed for more regular cuts and a cut was taken every month, with 70-75%

digestibility. Rather than conserve all this grass as silage the Edwards' used two double chop foragers to feed the grass straight to the cows with the grass silage or on top of the total mixed ration.

The first cut in 2019 was also split into three separate events based on soil and sward type. The earliest harvested grass, 185 acres, was cut on 12 April followed by 142 acres cut on 18 April. The third part of first cut was taken on 3 May from 140 acres of permanent pasture off heavy land. Every effort was made to cut these fields at 4-5-week intervals for silage from then on. This had to be managed alongside some zero grazing and cow grazing. The first four cuts on some fields all went into clamp silage with a fifth cut going into bales in August. At the end of 2019 harvesting season, the farm produced 1,086 DM tonnes of clamp silage and 1,013 DM tonnes of bale silage. The clamp silage averaged 1.070 tonnes of DM/acre harvested and the baled silage averaged 1.470 tonnes of DM/acre harvested. All cuts and bales averages of New Dairy are seen in Table 2.

Constituent	New Dairy 2019 - all cuts average	New Dairy 2019 - all bales average	AHDB target figures
<i>Digestibility Value (D Value)</i>	72	67	>68
<i>Metabolizable Energy (ME)</i>	11.5	10.87	>11
<i>Crude Protein grams/kg DM</i>	145	168	150 -175
<i>Dry Matter (DM) %</i>	31.9	40.15	

Table 2. New Dairy 2019 average silage analysis compared to AHDB targets

#### 4.1.c Forage Cost of Production

With improvements made to the silage quality, not only did this provide a consistent milk yield, it made a large difference in feed production cost. In Table 3, we can see the actual recorded costs of production for the 2018 and 2019 grass harvest and are compared to purchased feed costs.

	Year	Cost/ tonne DM	Cost per MJ
<i>Clamp Grass Silage</i>	2018	£108	£0.95
	2019	£106	£0.92
<i>Big Bale Grass Silage</i>	2018	£114	£1.06
	2019	£103	£0.95
<i>Purchased Blend</i>	2018	£257	£2.01
	2019	£252	£1.97



*Table 3. Recorded costs of production for the 2018 and 2019 grass harvest are compared to purchased feed costs.*

Clamp management was excellent in both years with dry matter average 36% in 2018 and 31.9% in 2019. All the grass silages were all stable with no signs of secondary fermentation or aerobic spoilage. One of the benefits of cutting smaller crops of grass is that wilting the grass to optimal dry matters is made easier, with cost per tonne of DM being approximately half the cost of energy from concentrates.

## 4.2 Dairy Costings

### 4.2.a Monthly comparison - June 2018 and 2019

On monthly comparison, results for June 2018 and June 2019 show that there were more cows in the milking herd and that yield per cow was up by 1 litre per cow to 33 litres per day in June 2019. Yield from all forage per cow was up by 78% to 12 litres per day in June 2019 compared with June 2018 and concentrate use was down on a per-cow (12%) and per-litre (15%) basis. All purchased feed cost per litre were down 16% at 7.64ppl. Margins over purchased feed were up 18% for the herd, up 17% per cow and up 12% per litre.

Data	Difference between June 2018 and June 2019
Yield per cow	+1 litre per cow (total of 33 litres per day)
Yield from forage per cow	+78% (total of 12 litres per day)
Concentrate use per cow	-12%
Concentrate use per litre	-15%
Purchased feed cost per litre	-16% (7.64ppl)
Margins over purchased feed for the herd	+18%
Margins over purchased feed per cow	+17%
Margins over purchased feed per litre	+12%

### 4.2.b Annual comparison - 2018 to 2019

The drought had an effect on all dairy farmers in 2018 as annual comparison between 2018 to 2019 weren't as positive - showing that whilst yield per cow was up 3%, yield from all forage per cow was down 2%. However, concentrate use per cow and litre was also down, 3% and 6% respectively and margin over purchased feed was positive for the herd, per cow and per litre – 10%, 8% and 4% respectively. Whilst milk from forage per hectare remained unchanged year on year, margin over purchased feed per hectare was up 10% to £3,297 per ha.

### 4.2.c Annual Comparison - 2019 to 2020

March 2019 to March 2020 demonstrated better improvements and indicated that the Edwards family was making progress with the multi-cut silage. Cow numbers were virtually unchanged but milk yield/cow was up 1% or 84 litres. Milk fats and protein content remained



very similar, with the milk price down by 0.19p/litre. The big improvements were in feed efficiency with total concentrate usage down 16% or 666 kgs/cow/annum. Milk from forage had increased 1,408 litres to 2,867 litres with total concentrate cost/litre down by 1.57p to 8.04p. At a constant milk price, the margin over purchased feed/cow increased by £178/cow/year. These impressive results satisfy Hugo's ambition of £140,000 margin over purchased feed/month, but the target 0.25 kgs/litre concentrates per litre was missed by 0.1kg. However, there is still potential to reduce purchased feed costs and maintain milk yield, health and fertility as revealed from and using monthly data.

Table 4 looks at the proportions of different forages fed at different periods in the year, and its effect on milk production.

Period	% Forage in TMR		Average Litres/cow/day	Feed Rate kgs/litre	Litres Milk from Forage
March 19 - May 19	Clamp Silage	40	33.7	0.34	7
	Maize Silage	22			
	Whole Crop Silage	4			
	Bale Silage	6			
	Zero Grazing	28			
June 19 - August 19	Grass Clamp Silage	66	33.5	0.28	13
	Maize Silage	24			
	Whole Crop Silage	10			
Oct 19 - March 20	Grass Clamp Silage	36	31.5	0.33	8
	Maize Silage	27			
	Whole Crop Silage	24			
	Bale Silage	13			

Table 4. Impact of TMR on milk production from March 2019 to March 2020.

The most profitable strategy is clearly seen when the cows get 66% of the TMR as high D Value clamp grass silage through June - August 2019. A similar effect was seen in 2018. If this feeding strategy could be maintained for 12 months this could reduce the concentrate feed costs by 0.9p/litre down to 7.05p versus the current annual average 8.04p resulting in a saving of £66,000. The data also suggests a higher milk yield is achievable if more high-quality grass silage can be made and fed to the milking cows in the October to March period.

## 5.0 Conclusion

This project has had a positive impact on the farm income at New Dairy. Margin over purchased feed and yield per cow have improved and the farm is producing more, higher quality forage – either as fresh grass or ensiled. Since the project started in April 2018 to the end of March 2020, milk yield, milk fats and protein levels are virtually unchanged. However, milk yield from forage per cow has increased by 1,240 litres, from 1,627 - 2,867 litres or 76%. The financial benefits are total concentrate cost per litre reduced by 1.5/litre.

This represents a reduction of 755kg less concentrate feed/cow/annum or a financial saving of £109,771.00 per annum of concentrate feed costs.

For Hugo and Ross Edwards, they've reached their achievement of reducing feed costs by practically reducing the amount of concentrates purchased without having to compromise milk production and cow health.



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