Dairy Cow Management

Feed rationing and forage quality

June 2008

Forage Production

Jersey is favoured by a mild climate and the highest sunshine hours in the British Isles together with an average rainfall of approximately 900mm per annum approximately a 1/3rd of which falls in the summer months. The soils in Jersey are well structured and are easily worked. The texture of the soils ranges from sandy loam to sandy clay loam. These soils drain naturally and do not generally suffer from drought in the summer or waterlogging in the winter. The growing season in Jersey starts in late February and ends mid October with the soil temperature very rarely falling below 6°C unless there is a period of prolonged frost. The geographic and climate features in Jersey are therefore favourable for crop and forage production with yields equal to or greater than the most favoured regions of the UK.

The main forage crops grown on Jersey by dairy farmers are grass and forage maize. Grass crops are either used for grazing or for ensiling for autumn and winter feeding. Maize is grown either as a first crop or in May following the harvest of Jersey Royal potatoes and is harvested in October for ensiling again for winter and spring feeding. Jersey dairy farmers have access the most recent varieties recommended by the National Institute of Agricultural Botany (NIAB) and these are taken advantage of by the most progressive farmers on the Island. Maize silage is a very consistent crop and its energy content does not vary a great deal as long as it is harvested when the grain is ripe, the crop is very easily ensiled. Grass silage however is a very variable crop depending on the species of grass grown, its management, cutting date and the methods used to ensile the crop.

The feeding of grass silage is the basis of dairy cow rations on many dairy units in Jersey. If a below average silage is produced this will need to be balanced by increased usage of high priced concentrates. Produce a high quality well fermented silage and the cows feed intake and nutrient uptake will rise and the concentrate bill will be reduced.

Grass silage production should therefore be given a very high priority and be undertaken with attention to detail in every aspect of the process. Too often farmers believe that the quality of the silage produced begins with the cutting date and little attention is paid to the establishment and preparation of the grass fields.

The first rule to making a good silage is that a high quality product cannot be made from poor quality swards, containing low yielding, low digestible grasses which have poor fermentation characteristics ie. Annual Meadow Grass, Creeping Bent and Yorkshire Fog. Good silage starts with a well managed sward containing a balanced mixture of Perennial, Hybrid and Italian Ryegrass, the species and mix depending on the intended life of the ley. Regular pasture reseeding every 3 to 4 years will give the best results as older leys tend to wear out and newer grass varieties become available with better characteristics and higher yields.

Ryegrass leys tend to grow throughout the year in Jersey's mild climate, it is therefore wise to remember that the life of an individual grass leaf is approximately 3 weeks. Given this information it can be seen that excessive growth on grass fields in January/February will form a mat of dead material in the bottom of the sward in May when the grass is cut, this will ultimately end up in the clamp reducing overall silage quality. Grass fields should be grazed tight by youngstock or dry cows these should be removed at the latest by mid-February if an early cut is intended. Alternatively the land area intended for grass silage could be grazed once by the dairy herd before mid March and then be left to grow to the ideal stage of growth before cutting. This method of grazing cows early will reduce the total volume of first cut silage ensiled but will also save on the amount of silage needed to feed the cows over winter.

The second rule to making good silage is that it cannot be made from poorly managed soils, each field should have a soil analysis taken every 2 to 3 years. Fertiliser applications can then be based

on the indices for phosphate, potash and Magnesium and the pH can be rectified if it is below 6.0. Nitrogen applications should be based on field crop rotation and fertility. On moderately fertile soils, approximately 40 units N per vergée should be applied. This can come from either inorganic fertilisers, slurry or FYM. If only bagged fertiliser is used, then 15 units N per vergée should be applied in early March, with the remainder in late March/early April, at least 6 weeks before cutting. If an early grazing has been taken then reduce the overall N by 8 to 10 units per vergée and adjust the dates of application accordingly. Slurry and FYM should be applied no later than 8 to 10 weeks before the silage is due to be harvested, swards should have a grass height of no greater than 2", as organic manure residues may be harvested with the grass. The available nutrient value of any organic manure applied to silage fields will need to be taken into account when calculating overall fertiliser applications, excessive nitrogen will reduce grass sugar contents and have a detrimental effect on fermentation and feeding characteristics

Lastly the preparation to make good silage also involves the control of moles and the levelling and rolling fields to stop grass being contaminated by soil and affecting fermentation and feed intake. Mole hills, cow dung, slurry and FYM need to be spread evenly, this can be achieved by a set of grass harrows which will also remove dead grass from the sward, allowing it to decay. Rolling will level the field and reduce the possibility of soil being picked up and stones damaging machinery. If the above preparations are followed, and weather conditions are favourable, then cutting at the correct growth stage and ensiling under ideal conditions could markedly reduce the amount of money spent on concentrates feeds needed to balance the silage fed to the cows.

The larger more progressive dairy farmers in Jersey tend to reseed their fields regularly with better grass seed mixtures. They tend to manage and fertilise their silage fields to achieve a quality product. They have either invested in their own machinery and/or share machinery and co-operate with other large farmers and/or are first in line with the contractor to ensure their crops are cut and ensiled at the optimum growth stage .They also manage the ensiling process more efficiently all of which leads to a better quality product than those farmers using traditional methods. This means that the more progressive farmers on the Island can make high quality grass silage most years dependant on the prevailing weather.

It can be seen from the above that successful grass silage production depends a great deal on management expertise. There are no physical reasons why grass silage made in Jersey should not be equal to the best quality silages made in the UK. There are however a number of structural problems mainly effecting the smaller more traditional dairy farmers which can have a bearing on the quantity and quality of the grass silages made on the Island.

- The lack of competition in agricultural contracting leads to a queuing system being operated resulting in many silage crops being cut beyond their optimum growth stage.
- The proportion of rented land held by dairy farmers on short term leases results in a lack of regular reseeding of grass leys with the best varieties and mixes available.
- The size of fields and fragmented land holdings increases harvesting times and can result in a less efficient ensiling technique and a lower quality product.
- There is a high dependency on conserved forage because of the fragmented nature of farms and the lack of grazing land around dairy units.
- Cows tend to be highly stocked on fields around farms leading to poaching in wet soil conditions, reduced grazing opportunities resulting in cows being housed for a longer period in autumn and winter than the growing season on Jersey would otherwise dictate.
- Smaller traditional farmers tending to rely on permanent grass fields with lower quality grass species in the sward. In addition these farmers tend not to take account of modern techniques but rely on their own custom and practice.

The above structural problems are well documented in the McQueen Report (Feb 2003) Chapter 2, pages 21 to 27.

The following analysis figures were produced in conjunction with BOCM Ltd who regularly sample silage pits for dairy farmers in Jersey and the UK in order to analysis the crop and provide advice on which of their concentrate feeds would best balance the forage made on individual farms.

Grass Silage 2007

11 individual Jersey Farms	Dry Matter DM%	pH	Protein g/kg DM	Metabolisable Energy (ME)	Neutral Detergent Fibre (NDF)
1	34.53	4.22	121.05	9.23	602.37
2	30.98	4.03	146.55	9.44	593.61
3	37.43	4.38	87.85	9.09	592.52
4	46.08	4.59	145.62	9.81	524.31
5	35.36	3.88	85.69	9.55	546.95
6	32.99	3.54	105.49	8.28	605.64
7	34.94	3.92	100.00	9.16	632.51
8	**28.73**	**4.56**	**138.88**	**10.35**	**468.15**
9	17.31	4.20	188.33	9.86	471.98
10	**27.87**	**3.68**	**141.73**	**10.21**	**482.24**
11	34.09	4.01	105.02	9.43	525.08
Jersey Average	**32.76**	**4.09**	**124.20**	**9.49**	**549.58**
UK average (200 to 300 farms)	**31.44**	**4.25**	**133.90**	**9.99**	**527.00**

The table above illustrates that Jersey grass silages with a high protein and energy content (8 & 10) are better than the average UK silage. The higher dry matter and fibre levels and the slightly lower protein and energy in the average figures suggest that some silage crops in Jersey in 2007 were cut at a slightly later growth stage than those in the UK possible due to the availability of the contractor or the prevailing weather. The difference in the average analysis between Jersey & UK would be compensated by feeding the cows a slightly higher concentrate level.

Maize Silage averages 2004 – 2007

Southern England	DM%	pH	ME	Starch %	NDF
2004	32.2	4.02	10.81	30.17	365
2005	31.1	3.99	10.43	29.01	375
2006	34.9	3.90	10.80	31.90	463
2007	27.3	3.94	11.50	25.60	432
Jersey					
2004	35.1	4.10	10.50	30.50	382
2005	31.1	4.10	10.25	28.00	395
2006	39.2	3.90	10.80	30.20	493
2007	30.9	3.90	11.40	32.50	382

The above tables illustrate the consistent nutrient content of maize silage in Jersey compared to crops grown in south of England. The analysis in 2007 would suggest that the Jersey silages would feed better than the UK samples due to their higher DM and starch content.

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Dairy Cow feeding

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Dairy cow rationing is a science and is based on the energy, protein, mineral and trace elements required by the cow at each stage of her lactation and the dry period. The feed ration provided should take account of the cows need to maintain her body and the amount of milk she is producing. The more milk a cow produces the more efficiently she covers her body maintenance costs. A cow is a ruminant and therefore needs a fibre rich ration which is provided by forage crops

such as grass and maize silage, a cow cannot be fed on a concentrate ration alone as this is expensive and would lead to her rumen malfunctioning. The higher the nutrient quality of the silage the less concentrates that have to be used to balance the ration to meet the needs of the cow.

The genetic quality of the cow dictates her maximum milk yield, over feeding the cow beyond her genetic ability will result in the extra nutrients being used to put on body condition. Over fat cows are prone to metabolic problems such as milk fever, fatty liver syndrome, acetonemia and infertility which are prevalent on many Jersey dairy units because farmers are striving to maximise milk output from cows with reduced genetic qualities compared to other populations in the UK, Denmark and the USA.

An ideal calving index for a dairy cow is 365 days resulting in a cow having a calf each year of her productive life. The cow has to have a resting period between lactations of approximately 60 days (dry period) the remaining 305 days she is producing milk. Poor feeding techniques will result in reduced milk yield and/or poor fertility leading to cows not having a calf at the ideal time, extended lactations and a lower total milk output. A cows milk output is not consistent throughout her lactation it increases from calving to a peak at 6 to 8 weeks after calving and then declines gradually until she is dried off. The average dairy cow/heifer in Jersey peaks between 20 to 30 litres per day declining to 6 to 10 litres per day at the end of her lactation. Large commercially managed herds can split their herds and provide specific rations for cows at each stage of their production cycle this is difficult for small herds as they have insufficient cows at each stage of lactation.

In order to balance cow rations it is imperative that the forage crops used are of a known quality this is achieved by scientific analysis at recognised laboratories in the UK. This analysis, along with the known qualities of the concentrate feeds available, the stage of lactation of the cows and the genetic ability of the animals are entered by an experienced dairy cow nutritionalist into a computer feeding program in order to produce specific rations designed to meet the needs of the dairy cows on individual farms.

This is not the end of the process the herd manager has to weigh out the quantities of each type feed according to his herd size and mix them consistently to ensure each mouthful provides equal nutrients. He has to monitor feed intakes to ensure the cows are consuming the desired amount, if not, the ration needs adjusting to take account of its palatability. He has to provide a consistent ration on a daily basis and monitor the health and output of each cow to ensure that milk is being produced efficiently from his herd. The efficiency of this daily routine is therefore vital to the profitability of the dairy farm as any disruption will lead to a reduced income.

In general the more progressive dairy farmers in Jersey analyse their feeds, take advice on feeding rations and manage the feeding of their dairy herd more efficiently than the smaller traditional farms. These improved management practices however do not lead to milk output per cow comparable to dairy farmers using similar techniques on Jersey herds in the UK because of the lower genetic potential of the Jersey Island cow.

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Conclusion

It can be seen that dairy cow feeding is not a hit and miss affair it is based on many scientific principles, management techniques and the experience and dedication of farm staff combining to achieve maximum production from the dairy herd.

Larger commercial/more progressive dairy farmers in Jersey fully understand the above principles and are producing silages which have been analysed in laboratories alongside those produced in the UK the results of which have proved they have a comparable nutrient content. In addition the concentrate feeds used to balance dairy cow rations in Jersey are all imported from the UK. BOCM and Countrywide are the main suppliers of compound feeds in Jersey and these feeds are being manufactured in the same factory as those used by UK dairy farmers.

With the above in mind, together with the benefits of the geographical position and weather patterns in Jersey, there would seem little obstacle to Jersey dairy farmers in the Island producing rations that are equal to those being fed by their contemporaries in the UK.

The more progressive dairy farmers in Jersey have invested in modern dairy farms and equipment equal to the most efficient dairy farmers in the UK. They have strived to overcome the structural difficulties faced by other jersey dairy farmers to produce rations which are the equal of diets being fed to Jersey herds in the UK.

The frustrating thing is that these investments and management efficiencies are not resulting in the same milk output per cow in Jersey compared to the UK because the average Jersey Island dairy cow is genetically programmed to produce a lower milk yield.

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