

UCD Lyons Systems Herd Annual Report for 2019

Project Title: Development of a Sustainable High-Output Grass-Based Spring Milk Production System

Rationale: It is widely recognised that grass-based systems will predominate in Ireland. However, grazing systems that have been developed to utilise large quantities of grazed grass have in the main been based on low output per cow. In this scenario, high levels of profitability are possible through avid cost control and comparatively high stocking rates for grazing systems. There are now reasons to consider the development of grazing systems that are based on high output per cow. These reasons include (i) concerns about increasing dairy cow numbers and environmental emissions, (ii) facilitating farm expansion for land limited and fragmented farms, (iii) lack of available skilled labour on farms and (iv) lack of infrastructure on farms to deal with expanding animal numbers.

Given the significant costs associated with expansion and the fact that many farmers are operating on a land-bank that is limiting the expansion of their business, a higher input – higher output spring calving grazing system may offer an opportunity to grow the dairy business. Such a system might facilitate the successful expansion of the farm business without the need to buy or rent extra land, to buy stock, to acquire extra labour or to provide extra cow facilities. The focus in such a system is on maximising milk/milk solids output from the existing land holding which involves high output from individual cows. This will occur most efficiently through maximising the use of grazed grass/home grown forage in the system and the strategic use of supplementation thereafter.

Project objectives:

- To develop a profitable high input high output grass-based spring milk production system
- To incorporate the most recent advances in grassland management for dairy farms into a high-output system
- Use a type of dairy cow that has good genetic indices for both milk production and fertility
- Employ the best practices from nutrition research and dairy cow husbandry
- Incorporate nutritional studies into a high input high output system
- To incorporate management technologies and system attributes that enhance the sustainability and economic viability of dairy production

2019:

- Continued focus on high EBI, high output spring calving herd
- High versus lower crude protein % in the concentrate to evaluate nitrogen use efficiency**
- 60 spring calving cows
- **Treatment 1**= 30 cows offered high CP concentrate throughout lactation (18%)
- **Treatment 2**= 30 cows offered high CP concentrate (18%) for first and last grazing rotations and lower CP% concentrate (14%) for all other rotations

****Results of the 2019 crude protein study are pending**

Description of the project:

The targets for the system are presented in Table 1. The average genetic merit of the herd in January 2019 is presented in Table 2. In the January 2019 evaluation, the overall herd EBI was within the top 1% nationally, with Milk SI (sub-index) in the top 1% and herd fertility SI in the top 10%. Cows calved from the 29th of January to the 11th of April 2019. The feed budget is on calculated on a days in milk basis (Table 3).

Table 1: Targets for the system

Parameter	Target
Stocking rate on milking platform	3.4 LU/ha
Stocking rate whole farm	2.4 LU/ha
Milk yield kg/cow	7,500-8,000
Milk solids kg/cow	625
6-Week in calf rate	75%
Concentrate (kg/cow/year)	1,500
% diet as grazed grass	>51
% diet as grazed grass and grass silage	>75

Table 2: Genetic merit of the herd (January 2019 evaluations)

EBI	Milk	Fertility	Calving	Beef	Maint.	Health	Mgt
177	66	63	42	-9	6	5	4
Milk kg	Fat kg	Prot. Kg	Fat %	Prot. %	Calv int.	Surv %	
131	12	8.9	0.11	0.07	-3	2	

Table 3: Feed budget for 2019

Days in milk	0-20	20-60	60-120	120-180	180-240	240-270	270-305	306-365	Total annual DMI (Est)	Total annual DMI (Actual)
Silage DM	5	0	0	0	0	5	15	8.5	1.3t	1.7t
Grass DM	10	15	15	15	14	7.5	7.5	0	3.5t	3.5t
Concentrate	8	8	7.5	3.5	3	3	3	-	1.5t fresh	1.5t fresh

Measurements taken:

- Cows are milked twice daily at 0700 h and 1500 h and daily milk yield is recorded through the milking parlour
- Cows are milk recorded weekly by Progressive Genetics
- Cow body condition score is recorded every two weeks
- Cow body weight is recorded twice daily as the cows leave the milking parlour
- Grass measurements on a daily basis for growth/quality/nutritional assessment
- Estimates of herbage intakes were measured on one occasion in autumn: 25th to 30th August 2019
- Fertility parameters

Results:

Table 4: Herd Performance 2019

Parameter	Target	2019
Average lactation days	305	305
Yield/cow (305d)	7,500	7,541
Milk solids/cow (305d)	625	597
Yield/cow (actual)	7,500	7,381
Milk solids/cow (actual)	625	586
Milk solids/ha MP (actual)	2,125	1940
Milk solids/ha Whole Farm (actual)	1,500	1386

Table 5: 2019 Grass production data

Grass Production Parameter	2019
Total grass grown (t/ha)	14.53
Total number of grazings	9.6 (6-12)
Closing cover (kg DM/ha)	594 (2 nd Dec)
Stocking rate on MP	3.31
Nitrogen (kg N/ha)	250
Phosphorus (kg P/ha)	10
Potassium (kg K/ha)	120
Turnout by day	4 th Feb
Turnout full time	10 th Feb
Housed by night	20 th Oct
Full time housing	5 th Nov
Total days at grass	263
Silage (bales) on MP (t/ha)	1.98
Herbage utilized t/ha	13.5
Grazed grass utilized t/ha	11.6
Grazed grass utilized t/cow	3.5
Milk from forage (kg)	4,381

Breeding 2019:

The breeding season totalled 11 weeks; commenced on Monday 29th of April and finished on the 15th July. In total 20 cows repeated, and of those 20, 7 repeated for a third serve. All cows were submitted within 26 days.

Breeding was all by A.I. and was carried out twice daily. Bulls used across the herd were: FR4513 (Ballygown Albert), FR2460 (Nextgen PHC Eimer 557), FR2298 (Olcastletown Ronaldo), FR4600 (Clorane Dandyman), FR4481 (Monabrogue Ebony), OTS (Ballintosig Ring O), FR4378 (Monamore Riptide), FR5085 (Lars-Acres Super Nerd), FR4379 (Ballydehob Adam), FR2035 (Crefogue Spider), and FR4187 (Westcoast Persus).

The weighted EBI averages of these bulls are as follows:

EBI €	Milk S.I.	Fert S.I.	Calv €	Beef €	Maint €	Mmgt €	Hlth €	Milk kg	F kg	P kg	F%	P%
282	107	106	55	-7	3	8	10	235	18.2	15.4	0.15	0.13

These bulls were selected based on high milk production and components, while maintaining high fertility. Eleven bulls were selected to increase bull team reliability. Heat detection was conducted using Moo Monitors, scratch cards and crayons.

Breeding Results 2019:

Table 6: Percentage of cows submitted and pregnant by breeding season week

	% of cows submitted (numbers)	% of cows in-calf (numbers)
Week 1	41% (23/56)	65% (15/23)
Week 2	84% (47/56)	62.5% (15/24)
Week 3	95% (53/56)	50% (3/6)
Week 4	100% (56/56)	100% (6/6)

Table 7: Conception rates

21-day Submission rate	95% (53/56)
Conception to first serve	64% (35/56)
Conception to second serve	55% (11/20)
Conception to third serve	57% (4/7)
6-week in calf rate	79% (44/56)

Pregnancy scans were done weekly, at approximately 30- and 60-days post A.I. Final 30-day scan was carried out on the 15th August, with four cows overall scanned empty. The final herd pregnancy scan was carried out on the 18th of October. It showed that there was one case of embryo mortality, resulting in an 8.9 % empty rate from the cows selected for breeding. The overall empty rate, including cows not selected for breeding, was 12.1% (7/58 cows).

Financial Simulation

In order to evaluate the profitability of the Lyons dairy system, a financial estimate of 2019 was constructed. This was a full assessment of production with labour priced at €15/hour, imputed rent (all land) at €420/ha and interest of capital at 5%. The milk output value was based on a milk base price of 30c/litre and concentrates were priced at €340/t DM.

Table 8: Lyons systems herd target and financial estimation of 2019 performance

	Target	2019
Milk output (€/cow)	2,631	2,475
Milk output (€/ha)	6,402	6,022
Variable Costs (€/cow)	968	968
Variable Costs (€/ha)	2,356	2,356
Fixed Costs excl. Land, Lab, Int (€/cow)	509	509
Fixed Costs excl. Land, Lab, Int (€/ha)	1,238	1,238
Imputed labour (€/cow)	371	371
Imputed rent and interest (€/cow)	739	739
Economic Margin incl. imputed labour, rent & int (€/cow)	393	246
Economic Margin incl. imputed labour, rent & int (€/ha)	958	600

2020 Trial

In 2019, cows were offered either a 14% or 18% crude protein (CP) concentrate from the second grazing rotation to the final grazing rotation to evaluate if reducing concentrate CP has an effect on milk production, fertility and nitrogen use efficiency of cows. Our preliminary results indicate negligible differences in milk production and fertility between the groups while nitrogen use efficiency results are currently being calculated.

In 2020, the experiment will look at three differing concentrate CP and also the use of all native ingredients in the concentrate. Dietary treatments are shown below. An 18% CP concentrate will be provided for first and last rotations, with the lower CP offered throughout the main grazing season (April-early October). This research could lead to increased farm profitability due to lower feed costs and improved sustainability of the Irish dairy industry.

- Continued focus on high EBI, high output spring calving herd
- 60 spring calving cows
- **Treatment 1**= 20 cows offered 14% CP concentrate throughout main grazing season
- **Treatment 2**= 20 cows offered 12% CP concentrate with native ingredients throughout main grazing season
- **Treatment 3**= 20 cows offered a 12% CP concentrate with non-native ingredients throughout main grazing season

Table 9: Genetic merit of the herd (January 2020 evaluation)

EBI	Milk	Fertility	Calving	Beef	Maint.	Health	Mgt
206	69	87	43	-9	8	5	3
Milk kg	Fat kg	Prot. Kg	Fat %	Prot. %	Calv int.	Surv %	
140	13	9	0.14	0.08	-4.1	2.9	

Research Team:

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