

Optimising stocking rate and calving date in grass-based production systems

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Summary

- Stocking rate is the main driver of productivity in grass-based systems and should be matched to the grass growth capability of the farm.
- Calving date will affect the length of lactation and the requirement for supplementation and mean calving date for most Irish dairy farms should be in the range of 15th February to the 2nd March depending on farm characteristics.
- Highly stocked compact calving herds may benefit from delaying calving to reduce supplementation requirements.

Introduction

Within grass-based dairy production systems, achieving high levels of milk production from grazed grass with minimal supplementation occurs when the appropriate mean calving date and distribution of calving is achieved in conjunction with the optimum stocking rate ((cows/ha); SR) to align feed supply to herd demand. Careful consideration needs to be given to the appropriate SR and calving date (CD) for individual farms as changes to one or both will have implications on the productivity and profitability of the farm.

Stocking rate

Stocking rate is acknowledged as the main driver of productivity in grazing systems. The ideal SR should balance the available feed supply (grass grown plus supplements used) and overall herd demand (number of cows needed to eat the grass grown). Therefore, the overall SR of a farm should be closely aligned to the individual farms grass growth capability. Stocking rate will vary from farm to farm depending on soil type, grass growth, milking platform area, if there are other animals grazing on the milking platform, outside blocks of land available for silage making and the amount of supplement fed/bought in. In Table 1, the optimum SR for farms that produce different amounts of grass and feed different amounts of supplement are defined. For example, if a farm can grow 10 t DM/ha of grass on average and the system involves feeding 0.5 t supplement DM/cow, the SR should be 1.8 cows/ha. In comparison, a farm capable of growing 16 t DM/ha and feeding 0.5 t concentrate DM/cow should be stocked at 3.0 cows/ha.

Calving date

Calving date is an important factor in grass-based milk production systems and influences both milk production and the requirement for supplementation at grazing. In general, the herd should be calved as early as possible, provided that it can be fed adequately from a predominantly grazed grass diet during lactation. Research in Moorepark has shown (across three SR) that delaying calving by 15 days in spring (i.e. the 15th February vs. the 2nd of March) results in less concentrate and silage being fed during lactation to the late calving treatments compared to the early calving treatments (Table 2). Lactation length was reduced but there was no difference in total milk yield (or milk solids yield), as daily milk yield was higher for the late calving treatments. Delaying calving led to reduced grass utilisation as insufficient numbers of animals were available to meet spring grazing targets (particularly achieving 30% area grazed in February).

Table 1. Stocking rate (cows/ha) that optimises profit on farms growing different amounts of grass and feeding different amounts of supplement/cow

t supplement DM/cow	Grass grown, t DM/ha			
	10	12	14	16
0.00	1.5	2.0	2.3	2.6
0.50	1.8	2.2	2.5	3.0
1.00	2.0	2.4	2.9	3.2

Table 2. Effect of calving date on milk production variables¹

	Early calving	Late calving
Mean calving date	15 th February	2 nd March
Concentrate fed (kg DM/cow)	425	376
Silage fed (kg DM/cow)	200	137
Milk yield (kg/cow/day)	18.7	19.9
Milk yield (kg/cow)	5,452	5,514
Milk solids (kg/cow)	430	431
Lactation length	291	277

¹Each calving date was assessed at 2.5, 2.9 and 3.3 cows/ha

Stocking rate and calving date interaction

In the research presented above there was no interaction between CD and SR for any of the milk production variables examined. However, in recent years, some farmers have chosen to delay calving because of higher SR and more compact calving patterns. This may suit highly stocked farms with very compact calving patterns as it will shorten the interval to magic day and reduce the requirement for supplementation in spring but will also shorten lactation length.

Conclusions

While there is no ideal SR or mean calving date that will be appropriate to every farm (due to differences in soil type, grass growth rates etc.), a SR that matches the grass growth capability of the farm and a mean calving date of 15th February to 2nd March appears to be generally appropriate for most Irish dairy farms. Therefore, the start of calving should be approximately 50–60 days before magic day to ensure that cows are fed a predominantly grass-based diet with minimal levels of supplementation.