



Where is the dairy stocking rate sweet spot?

Higher milk output doesn't always translate into additional profits if stocking rates aren't matched by a farm's grass-growing capacity

Stuart Childs
Teagasc Moorepark

Nora O'Donovan
Teagasc Dairygold Joint Programme
Monitor Farm Advisor

Adrian O'Callaghan
Teagasc Mallow

Donal Patton
Teagasc Ballyhaise

In January 2015 at the Irish Grassland Association Conference, Prof. John Roche asked the audience: "Post quota: will you make money from milk or milk from money?" His data showed that while the average dairy farmer in New Zealand had increased their milk output by 40%, they were making no additional profit.

The New Zealand farmers had expanded but lost sight of what was driving profit – the ability of their land to grow grass – the most cost-effective feed source on the planet.

The law of diminishing returns shows that once the point of optimal efficiency is passed, the return from additional units of production will drop and potentially generate a negative return. So, beyond a certain point, overall profit falls.

How does this relate to stocking rate? If you take stocking rate on either the milking platform or the whole farm to beyond the optimal point, the financial return will begin to decline. This is because the emphasis begins to shift to alternative feeds to complete the feed budget for the increased number of animals.

Michael Egan and his group at Teagasc Moorepark have shown greater intake earlier in lactation than previously observed. Higher overall dry matter intake also, in the order of 19kg DM/head/day of a herd average assuming a

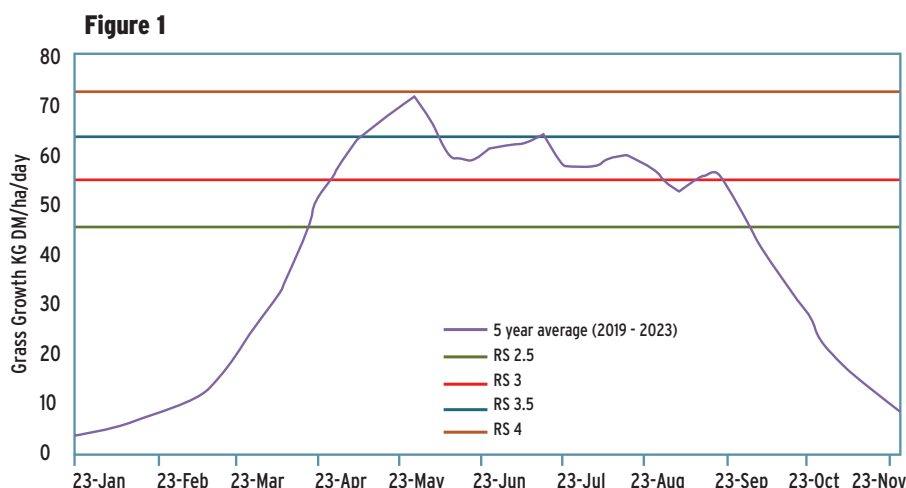
20% replacement rate. Therefore, cows need at least 19-20kg DM per head per day to be fully fed and deliver on their genetic potential.

Average national grass growth

Figure 1 shows the average grass growth figures from PastureBase Ireland for the last five years. From it you can see that while there is a peak growth of 71 kg DM/ha/day in late May, it is short-lived.

The green line which represents a stocking rate (SR) of 2.5 cows/ha intersects with the average growth curve at a growth of 46kg DM/ha/day in mid-April and stays in surplus until early October.

Depending on the layout of the farm and whether long-term silage is being taken from the block, one could argue



that this stocking rate is too low, as there is too much surplus to deal with during the main season.

Surplus of silage

More silage would have to be removed from the platform to maintain grass quality than is needed to meet the feed budget. A surplus of silage is not a bad thing, but repeatedly generating excessive surpluses is counterproductive.

The red line (SR = 3 cows/ha) meets the average growth line at 55kg DM/ha/day approximately a fortnight later than the 2.5 stocking rate and stays largely in surplus until the end of September. This surplus of growth over demand enables the farm to remove bales to manage grass quality. It also allows reseeding to ensure that sward quality is maintained.

The blue line (SR = 3.5 cows/ha) exceeds demand for approximately a month from early May to early June. There is higher demand than growth for the remainder of the year.

The orange line representing a stocking rate on the platform of 4 cows/ha is similar, with the exception that it never grows enough grass to meet demand.

Costs

How does the cost of an excessive stocking rate manifest itself? Firstly, the cost of feeding the cow increases through increased concentrate feeding to keep the loop closed in the absence of adequate grass growth during the main growing season (see Table 1 below).

Poorer milk production performance can also occur as there is an under-estimation of the intake capacity of the cow. At higher stocking rates, they have to 'make do' with less. An increase in silage in the milking diet at the shoulders of the grazing season will also occur.

The stocking rate on the platform creates such a level of demand that the farm has to be almost at full tilt of growth to meet demand and in some cases will never achieve it (Orange line, Figure 1). The result is cows being fed silage as far as mid to late April when growth can surpass requirement.

Building cover

Building cover in August is a key grazing management practice. It ensures there's a wedge of grass available to be grazed when growth dips below demand again during October and early November.

As we have already outlined, the stocking rate of 2.5 cows/ha effectively builds a cover despite itself, as growth is exceeding demand. With some minor intervention, the stocking rate of three can create a wedge of grass to graze in October and November.

At a high milking platform stocking rate, it is inherently difficult to build cover and is limited by the fact that 2,000-2,200 kg DM/ha is the highest cover that can realistically be grazed well at that time of the year.

On heavier land, these heavy covers can be particularly challenging to graze. The consensus is to not let them to build to greater than 1,800 kg DM/ha. Consequently, at higher stocking rates, we either:

- Start feeding silage early to stretch the grass for as long as possible or
- Run out of grass faster and end up on silage full time sooner.

Therefore, it should be clear that at higher stocking rates:

- Silage is removed from the diet later



At higher stocking rates, cows have to 'make do' with less – an increase in silage in the milking diet at the shoulders of the milking season will also occur



in the spring;

- Silage needs to be introduced in August if cover is to be built to extend autumn grazing;
- Silage has to be introduced earlier in the autumn to stay out at grass; or cows are fulltime on silage earlier than farms that are stocked to match the growth capacity of the farm.

At higher stocking rates, it is difficult to remove poor quality paddocks during the grazing season as it may result in a deficit the following week.

Reseeding

Figure 1 shows that growth only exceeds demand for a month at a stocking rate of 3.5. Target turnaround time for reseeding is two months so it is extremely difficult to contemplate reseeding in a high stocking rate scenario.

Without reseeding, swards age and grass growth reduces over time resulting in even lower growth rates than the farm requires.

The argument is often made that there is more money coming in and this is true: turnover will be higher. But what about the costs associated with generating this extra income? These cows are marginal at best in many cases.

This is even before we look at housing capacity, slurry and soiled water storage requirements, milking parlour and bulk tank capacity and labour availability.

Cost of production

It is important to know the cost of production. This has increased in recent years as people know only too well. This cost increase has been very unforgiving where farms are highly reliant on bought in feeds.

Yes, the cost of growing grass has also increased but it is still the cheapest feed source. Matching stocking rate to your average growth rate will maximise output while minimising input cost. This is the key to maximising profit.

In summary, farmers need to know the growth capacity of their farm to set their stocking rate. What is the average level of growth that is required to meet the stocking rate that you have and can your farm consistently deliver this?

Table 1: Growth rate (kg DM/ha) required to sustain different stocking rates with varying levels of fresh weight concentrate input (assuming 20kg total DM intake per day)

| Stocking Rate (LU/ha) | Growth (kg DM/ha) Required 2kg Concentrates | Growth (kg DM/ha) Required 3kg Concentrates | Growth (kg DM/ha) Required 4kg Concentrates | Growth (kg DM/ha) Required 5kg Concentrates |
|-----------------------|---|---|---|---|
| 2.5 | 46 | 44 | 41 | 39 |
| 3 | 55 | 52 | 50 | 47 |
| 3.5 | 64 | 61 | 58 | 55 |
| 4 | 73 | 70 | 66 | 63 |



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STOCKING RATE CASE STUDY: TOM & HELEN O'CONNELL, INNISCARRA, CO CORK

We are never short of silage – it's a key objective for us to have a surplus'

THE O'CONNELLS are monitor farmers on the Teagasc Dairygold Joint Programme. The farm is run with the help of farm manager, Dan O'Mahony, and farm assistant, Lucien T Cotoara, plus relief milkers. In 2023, they milked 322 cows on a milking platform of 91ha (SR 3.54 cows/ha). This year, they have added a further six hectares to the milking platform.

With that now reseeded and available for grazing, the 320 cows have access to a milking platform of 97ha which is a stocking rate of 3.3 cows/ha. Total farmed area is now



Helen & Tom O'Connell with Dan O'Mahony and Stuart Childs.

197ha and the whole farm stocking rate is 2.3 LU/ha. Herd EBI is €248 with genetic potential for protein at 3.93% and fat at 4.84%. Last year the herd delivered 488kg of milk solids at 3.82% protein and 4.79% fat from 1,217 kg of meal. This was down from 521kg in 2022 at 3.83% protein and 4.68% fat

from 1,457kgs of meal

The farm has changed in recent years from being driven by high levels of perennial ryegrass (PRG) swards grown on allowed chemical nitrogen allowances to 65% grass clover swards with the balance still receiving their maximum allowed

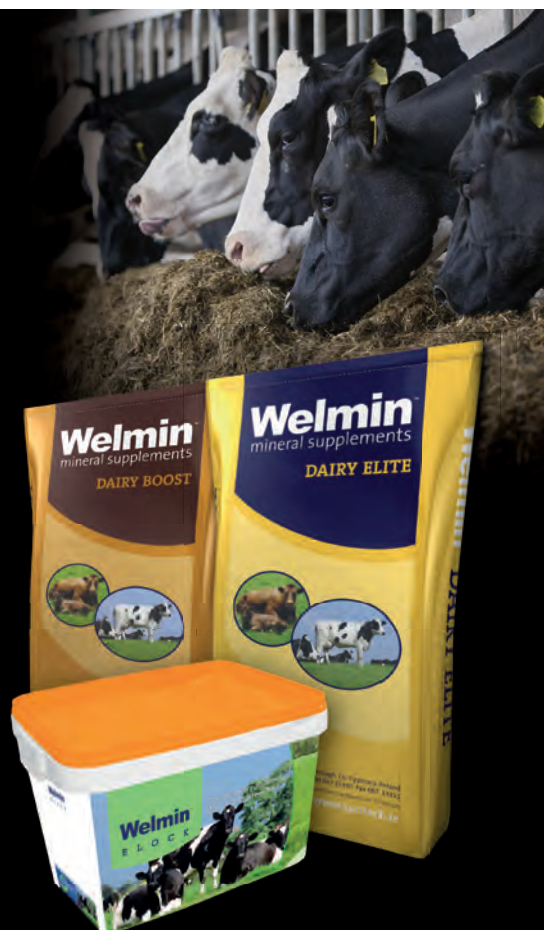
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chemical nitrogen.

Tom and Daniel measure their grass cover very regularly throughout the year and are well positioned to know that the reduction in growth experienced on the farm is not down to this change. Grass clover swards on the farm are performing similarly to those that receive full rate chemical nitrogen. The farm has excellent soil fertility with 82% of the land area correct for lime, phosphorus (P) and potassium (K). The remaining 18% is deficient in a small amount of lime and 14% of the land area requires additional K. This is being worked on through 2024.

RESEEDING

Reseeding on both the grazing platform and outblocks is prioritised with at least 10% of both completed annually.

"In recent years we have found that during the summer, we come under pressure to keep the herd fed on grass and concentrate only," says Tom. "This is creating extra work at a time of year when things should be a little quieter." Spring is very busy as the farm calves 89% of the herd (five year average) in six weeks. "There are plenty of jobs to be done during the summer without the added complication of having to feed silage to cows," adds Tom.

"We decided to review our stocking rate. We are never short of silage as it is a key objective that we have surplus silage in the yard to deal with any unforeseen circumstances."

Tom's motivation to examine the stocking rate was driven from a financial performance and ease of farm management viewpoint rather than any feed deficit challenge. This was the subject of discussion at a recent monitor farmer group meeting and subsequent monitor farm walk held at the O'Connell farm in July. Figure 2 shows the demand of a high milks solids herd plotted against demand on the O'Connell farm. Total demand per hectare is significant and relative to the growth on Tom's farm is greater than can be delivered.

This is exacerbated by the emphasis that the O'Connells place on spring reseeding which removes area from the grazing platform. There are fewer hectares to grow the required grass and quality remains a critical requirement.

AI START DATE

Another factor that needs consideration is the AI start date of the heifers. "We have switched to using a very significant level of sexed semen in our breeding plan and to facilitate the synchronisation brought the AI start date of the heifers forward," says Tom. "This was to help AI technicians get the job done before the main AI season kicked off. It would also mitigate against the risk of poor conception rate, something



(back): Helen & Tom O'Connell, Stuart Childs and Dan O'Mahoney; (front) Maria, Eileen and Mairead O'Connell. Their sister Sarah is not pictured.

that hasn't actually been an issue since we started using the sexed semen."

However, an unintended consequence of this change has been a 17 day shift in the median calving date of the heifers in the herd in 2024 to January 25th. This has created a significant demand for grass right from the start of grazing in the first rotation and also means that half the heifers are hitting peak milk ahead of significant grass availability on the farm.

In summary, the observations and outcomes of the O'Connell's discussion on their stocking rate are:

- High level genetics of the herd and excellent fertility are driving grass demand in spring and throughout the grazing season. In light of this, the farm needs to reduce the demand pressure to allow for the maximum utilisation of grass. It will allow reseeding to take place as normal without undue impact on the grazing platform demand.
- Outblocks must be managed to

deliver the very high quality silage needed to supplement the milking herd early in the year and late in the season. And, if necessary (although hopefully this will not be the case in future), through the main grazing season.

– Calving pattern is excellent but the start date has moved earlier indirectly in recent years. This increases grass demand early in the first rotation and delaying calving start date should be considered for future breeding seasons.

– Stocking rate will be driven by the grass growing potential of the farm and the profitability driven by high grass utilisation on the farm.

THE OUTCOME

Despite increasing their milking platform area in 2024, the O'Connells have decided to reduce cow numbers for 2025 to 310 (milking platform SR 3.2). In this situation, even with reseeded ground out (approximately 5-6% at two different stages during the season), stocking rate in 2025 will not be greater than 3.4 cows/ha.

Tom and Dan are confident that in normal grass growing years, the farm is capable of growing 65kg+ DM/ha/day which will be sufficient to meet this demand with 2-3kg of concentrate.

The hope is to return to delivering on the herd's potential for milk solids production from a predominantly grass based diet and concentrate levels of 750-800kg.

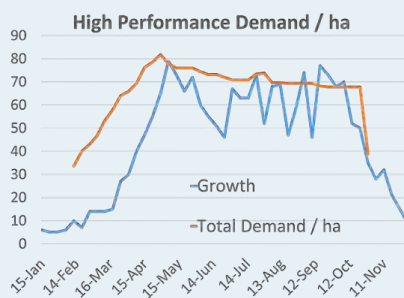


Figure 2. Total demand per hectare versus growth on the O'Connell farm.