



Grass Challenge

for dairy farmers

Challenge Note 2C - Maintaining Grass Supply and Quality

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1. How to Manage the Grass Supply?

- a) Applying fertiliser nitrogen at the appropriate rate and time.
- b) Adjust the stocking rate to match the grass growth pattern.
- c) Ensure that grass cover targets are met.

a) Applying fertiliser N at the appropriate rate and time

Table 1: *Categories of annual fertiliser nitrogen application*

Annual fertiliser nitrogen applications	Average usage (kg N per ha)
Low	< 150
Medium	150 - 250
High	> 250

Many dairy farms in Northern Ireland run an intensive grazing system with an average nitrogen usage of up to 350kg N per ha whilst beef and sheep farms have a more extensive system with nitrogen usage of up to 200 kg nitrogen per ha.



Table 2: Factors to consider in deciding the level of fertiliser nitrogen application

Factors to consider	Explanation
Type of land	Wet, hilly and/or steep fields will not be as responsive to high N applications.
Type of stock	A lower N application per ha should be applied where lower financial return enterprises such as dairy heifer replacement and beef enterprises are grazed.
Production system	Low input and output farming systems will have a lower usage of fertiliser nitrogen per ha.
Cost of fertiliser vs conacre	If conacre price is high then it will be more economical to spread a higher level of nitrogen.
Cost of fertiliser vs concentrated feeds	A partial budget should be carried out to compare partially substituting grass and silage with extra purchased concentrates.
Growth of enterprise	To grow the enterprise, a higher level of fertiliser nitrogen can be used to increase the stocking density if additional land is not available.

The grass growth response to fertiliser nitrogen at different rates

Grass growth response:

- 15 - 25kg DM / ha per kg nitrogen up to 350kg Nitrogen per ha;
- 5 - 15kg DM / ha per kg nitrogen from 350 - 450kg Nitrogen per ha.

The average grass growth response per kg fertiliser nitrogen is 15kg of grass dry matter, which has a similar feeding value to 18kg of concentrates, provided other factors are not limiting.

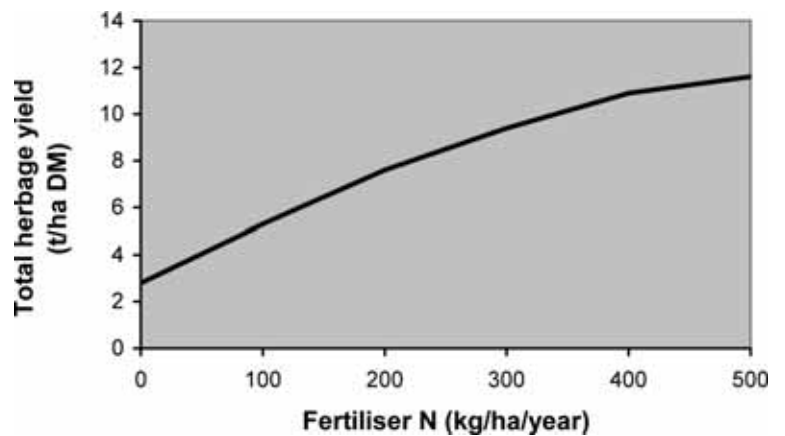


Figure 1: Effect of increasing fertiliser N application on grass swards

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Seasonal grass growth response to fertiliser N.

Table 3: *Growth response to fertiliser N*

Time of N application	Grass growth response (kg DM / kg N)
March / Mid-April	8 – 15
Mid-April - Late June	15 – 25
July / August	10 - 15
September	5 - 10

Source: ARINI

- Nitrogen rates are normally reduced towards the end of the season because of poorer growing conditions and a higher risk of leaching.
- In cool moist conditions, urea and CAN (calcium ammonium nitrate) will produce similar results. However under dry conditions N applied as CAN is twice as effective as N applied as urea.
- Urea should not be used under dry and bright conditions.
- Don't sow any fertiliser if the ground is waterlogged.
- Look for three days of dry weather before sowing.

Planning the timing and rate of fertiliser N application

The higher the stocking rate for a farm the more forage is required therefore the higher the fertiliser application rate.

Table 5: *Fertiliser application plan for a dairy herd stocked at 2.3 LU/ha*

Application Date	Kg of Fertiliser N/ha on Perennial Ryegrass Sward
After 1 st graze (Apr)	35 (2.5 bags CAN)
After 2 nd graze (May)	35 (2.5 bags CAN)
After 3 rd graze (May)	35 (2.5 bags CAN)
After 4 th graze (Jun)	35 (2.5 bags CAN)
After 5 th graze (Jul)	35 (2.5 bags CAN)
After 6 th graze (Aug)	35 (2.5 bags CAN)
After 7 th graze (Sep)	35 (2.5 bags CAN)
	Total: 245kg N /ha

Table 4 shows fertiliser application rates required depending on the annual farm-stocking rate.

Table 4: *Fertiliser nitrogen requirements to maintain stocking rates for grazing livestock*

Stocking Rate (ce/ha)	Nitrogen Requirements (kg/ha)
1.4	70
1.5	90
1.6	110
1.7	130
1.8	150
1.9	170
2.0	190
2.1	210
2.2	230
2.3	250
2.4	270
2.5	290

(Source: *Farm Business Data 2004*)

Fertiliser application must be planned to ensure the correct amount and type of fertiliser is applied to ensure the maximum grass growth response per ha is achieved. Application plans will have to be modified to take into consideration the variability of the weather. Table 5 shows an example of a fertiliser application plan for a dairy herd stocked at 2.3 LU/hectare.



b) Adjust the stocking rate to match the grass growth pattern

Since the grass growth rate is variable throughout the growing season the grass supply must be balanced with the demand by adjusting the grazing stocking rate in line with the grass growth rate.

Table 6: *Grazing stocking rates for dairy cows (cows/ha)*

	Calving season	
	Autumn / Winter	Winter / Spring
Mar	3.0	3.0
Apr/May	6.0	4.5
Jun	5.5	5.5
Jul	5.0	5.0
Aug	3.5	3.5
Sept	2.5	3.0

c) Ensure that grass cover targets are met

A weekly grass budget can be used to identify whether there is a grass surplus or shortage on the grazing area. Table 7 shows targets for average grass covers and pre and post-grazing covers throughout the grazing season.

Table 7: *Grazing management targets (kgDM/ha)*

Month	Average cover	Pre-grazing cover	Post-grazing cover
Mar	1900	2300	1700
Apr	2000	2900	1700
May	2300	3700	1700
Jun	2600	3700	1700
Jul	2600	3700	1700
Aug	2800	3900	1700
Sep	3000	3900	1700
Oct	2500	3300	1700

Grass surpluses

If a grass surplus has been identified then the grass supply must be reduced by one of the following methods:

1. Decreasing the total grazing area / rotation length for example, cut a paddock for big bale silage;
2. Increasing the stock numbers on the grazing area for example, introduce dry stock to follow cows;
3. Reducing the fertiliser rate.

Grass shortages

If a grass shortage has been identified, then using the following methods can increase the grass supply:

1. Increase the rotation length for example, buffer feeding;
2. Decreasing the stock numbers on the grazing area for example, sell or house dry stock;
3. Increasing the fertiliser rate (weather permitting);
4. Increase the grazing area by introducing silage ground into the rotation.

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2. Why Manage the Grass Quality?

- Milk output from grass improves with increasing grass quality. See Table 8.

Table 8: *Effect of spring grazing severity on sward quality and milk yields in autumn*

	Spring Grass	Autumn Grass	
		Tightly grazed in spring	Under-grazed in spring
Proportion of leaf (%)	70	65	40
Proportion of stem (%)	30	35	60
Milk yield (litres/day)	24.8	15.5	10.2

Source: ARINI

Why does the grass quality decrease as the season progresses?

- The proportion of stem to leaf ratio increases as the grass turns from its vegetative to its reproductive growth stage in mid summer.
- The amount of dead and decaying material increases as the season progresses, especially if the sward is not periodically harvested or grazed tightly.
- The amount of grass spoiled due to dung and urine increases as the season progresses.

How do I manage the quality of grass?

- Ensure grazing management targets are met.
- Have a flexible silage and grazing area.

3. Meeting Grazing Management Targets

If the grass cover before grazing exceeds the target (generally 3700kg DM/ha) – either mow the grass before grazing or consider removing the field from the grazing area by harvesting for silage provided the average grass cover meets targets.

If grass cover after grazing exceeds the target (1700kg DM/ha) – The field / paddock must be topped and or a leader-follower system implemented.

a) Topping

- Swards that have post-grazing covers above 1800kg DM/ha should be topped to 5-6cm.
- In dry weather some farmers mow grass before grazing to encourage stock to eat heavier grass covers.
- Avoid having to top high post-grazing covers as toppings can smother and kill the grass beneath which will reduce the density of the sward. If this has to be done use dry stock to eat the toppings.
- Swards may have to be topped from mid May to July.
- Avoid topping too many consecutive paddocks as this can lead to a grass shortage in hot dry weather as grass growth rates are reduced.

b) Leader-follower system

- This system allows dairy cows to maximise their daily grass dry matter intakes and using other dry cattle to reduce the post-grazing cover to the target.
- Main disadvantage of system is the extra labour involved in moving stock.



Integration of silage and grazing areas

This system is when part of the dairy cow grazing area is harvested for 1st or 2nd cut silage or both cuts of silage and then grazed the remainder of the season.

The benefits of using this system are:

- Reduces the proportion of dead and stem material in the sward;
- Reduces the amount of grass spoilage due to dung and urine;
- Helps thicken silage swards;
- Zero grazing also produces the benefits as listed above. However the expense of this system in terms of labour, machinery, slurry storage and disposal may outweigh the benefits;
- Gives good control over grass supply.

Grazing sequence

Swards should be walked regularly as the grazing sequence will vary for each rotation.

Factors affecting growth on paddocks during the rotation:

- Sward quality;
- Soil fertility;
- Treatment at previous grazing for example, poaching, was the sward topped;
- Was there heavy rain after the fertiliser application.

4. Extending the Grazing Season

Why extend the grazing season?

- To improve milk quality.
- To reduce the milk production cost by increasing the proportion of grazed grass in the cow's diet.
- To make management of grass quality easier throughout the season.
- To reduce the reliance on more expensive forages such as grass silage.
- To reduce the cost of slurry storage and spreading.

Does it pay to extend the grazing season?

- An increased milk yield of up to two litres per cow per day under good management.
- Improvements in milk protein.
- Savings of silage of up to 2kg DM per cow per day.
- 80p/cow/day for a spring calving herd.

Note: The overall economic benefit depends on each individual farmers circumstances, milk production system and objectives. The cost of other feeds relative to grass and the weather conditions will also be important.



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How do I extend the grazing season?

- a) Budget to determine the grazing area required, grazing hours and turnout date / housing date.
- b) For autumn grazing build up a grass reserve from early August by grazing silage regrowths after the 2nd cut silage and letting a grass reserve build up on the main grazing area.
- c) For autumn grazing, increase the rotation length and decrease the grazing stocking rate to approximately 50 days and three cows per ha respectively by early October. Aim to start the last rotation by the end of September with an average grass cover of 3000kg DM/ha.
- d) For autumn grazing, fields fertilised with 35kg fertiliser nitrogen per ha on 1st September can produce covers of 3000kg DM/ha by mid to late October (6-7 weeks).
- e) In autumn, once average grass covers fall to 1900-2100kg DM/ha grazing should cease. Grass covers should not be more than 2000 -2200kg DM/ha for any field at the end of the season.
- f) For spring grazing, aim to follow on from the 50 - 60 day autumn rotation by grazing those paddocks or fields at the start of the rotation. Those grazed at the start of the rotation should be first grazed the following spring but check the grass cover and ground conditions.
- g) For early spring grazing in March, 50 - 60kg N/ha (40 - 48 units/acre) could be applied within the first three weeks of February. Urea should be used in preference to CAN as it is less likely to be leached.
- h) Plan the grazing system and divide off large fields using temporary fences. Use a back fence if ground conditions are wet to minimise poaching. Graze fields from back to front allowing cows to walk over ungrazed grass or use temporary cow paths. See Figure 2.
- i) Put cows out to grass with an appetite by giving cows no silage for two-three hours in the morning.
- j) If weather or ground conditions are poor, graze for two-three hours only or remove when cows stop eating. If necessary house for two-three days until conditions improve.
- k) Ensure cows have access to water if grazing for longer than two-three hours and offer fresh silage to cows on return from grazing.
- l) If the target stocking rates cannot be met in early or late season, split the herd giving grazing priority to those cows in early lactation.
- m) Make maximum use of outlying ground for dry stock.
- n) Avoid letting dead material build up in swards when grass covers are being increased for the autumn.

Note: If the silage area is to be grazed it should be at the start of the rotation and grazed first in the spring.

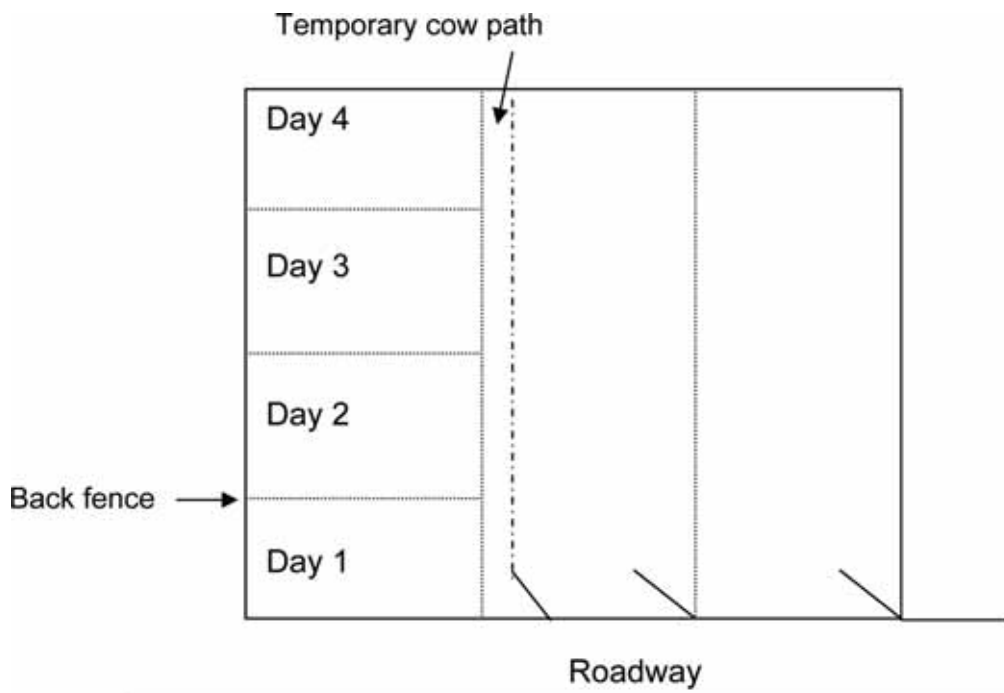


Figure 2: *Grazing system plan, multiple gateways and good roadways help keep cows clean and limit poaching.*

Summary:

- Manage the grass supply by applying appropriate levels of fertiliser and altering stocking rates;
- Graze swards tightly in the spring to maintain mid season grass quality;
- Aspects of extended grazing management can be used on all dairy farms.