

Section 6



Managing your Grass

by Michael O'Donovan, Mary McEvoy



Introduction

Grazed grass is, and will continue to be, the cheapest animal feed for milk production in Ireland. Your land's ability to produce grass is your primary competitive advantage over other EU dairy farmers. To optimise profitability, producers must maximise the proportion of grazed grass in their cows' diet.

- ① What are the key factors in relation to grassland management?
- ② How should I manage spring swards?
- ③ How should I manage mid-season swards?
- ④ How should I manage autumn swards?
- ⑤ Which grassland management tools are available to me?
- ⑥ How should I manage reseeding?

Managing your Grass

① What are the key factors in relation to grassland management?

Key performance indicator



A grazing season of 300+ days will maximise your profitability and competitiveness

- Grass budgeting is an essential tool in achieving a 300 day grazing season.
- Increase farm profitability by increasing the proportion of grazed grass in the dairy cow's diet.
- Graze paddocks to a low post grazing height in early spring to condition swards for subsequent grazing rotations.
- On/off grazing is one strategy to increase the proportion of grazed grass in the cow's diet during periods of wet weather.

Key fact



Increasing the proportion of grazed grass in the diet of a dairy cow by 10% reduces costs of production by 2.5 cent/litre (2011)

How to



Maximise the proportion of grazed grass in your herd's diet

1. Extend the grazing season in early spring and late autumn

- Close paddocks from 5-10 October.
- Close the farm in rotation.
- Target 60% of paddocks closed by 1-7 November.
- Don't regraze closed paddocks.
- Target a closing farm cover of 550kg DM/ha.
- Use on/off grazing during periods of challenging weather.

2. Ensure your cows' calving pattern is matched to the start of the grass growing season

- Begin calving at the onset of grass growth. Typically this should result in most calves being born between 10 February and 1 March (six weeks before 'magic day').
- Target an opening farm cover of 600-700kg DM/ha.

- Use the Teagasc spring rotation planner and stick to daily area allocations as planned.

- Graze 30% in February, 66% by 17 March and target 100% grazed by 6 April (adjust these dates for later turnout regions).

3. Match your stocking rate to the growth potential of your swards

- Ensure perennial ryegrass dominates all swards.
- Target farm DM production of 14/15t DM/ha.
- Stock the farm to its grass growth capability. e.g. 5t grass dry matter consumed per cow, grass yield 14t/ha = 2.8 cows/ha.

4. Maximise the productivity of your swards through improving soil fertility

- Soil sample one fifth of the farm each year. If there has been no sampling for many years consider getting the whole farm sampled.
- Apply P, K and lime as recommended.

5. Maximise the productivity of your swards through timely re-seeding

- Reseed in spring if possible.
- Target a 60-day turnaround time from seeding to first grazing.
- Ensure that recommended list varieties are used.
- Use a post-emergence spray at the two-leaf regrowth stage.
- Graze the sward for the first time at 600-700 kg DM/ha.

6. Make use of farm grass cover measurement and grass budgeting.

- Feed concentrates/high quality silage when short of grass.

7. Ensure that farm infrastructure is sufficient to fully utilise the grass grown.

8. Feed concentrates/high quality baled silage when short of grass.

Key performance indicator



You must be able to estimate herbage mass in each individual paddock on the farm and use this information to achieve both short daily and medium term (weekly and monthly) targets that are critical to the success of the system. Such skills can be learned from advisors, through farm discussion groups and through practice and self-training. (See also end of this chapter).

Table 1. Target pasture covers for a spring calving herd stocked at 2.5 LU/ha.

Month	Stocking rate (on grazing area) (LU/ha)	Growth (kg DM/day)	Target average farm cover (kg DM/ha)	Target cover per cow (kg DM/cow)	Event
Feb 15	2.5	9.0	661	264	Cows out to grass by day
Mar 15	2.6	37.6	880	342	Cows out full-time
May 10	4.2	88.2	800	190	Supply exceeds demand
From June to August, farm cover should be maintained at 150-170kg DM per cow					
Aug 15	2.5	65.0	775	310	
Sept 1	2.5	51.0	1100	440	
Sept 15	2.5	37.1	1125	450	Peak cover achieved
Oct 1	2.5	30.0	1075	430	
Oct 15	2.5	26.8	950	380	First paddock closed
Nov 1	2.5	15.0	700	280	Supplement introduced
Nov 15	2.5	8.5	600	240	
Nov 22	2.5	2.7	550	220	House by day and night



Managing your Grass

② How should I manage spring swards?

Early spring grass is extremely digestible and high in crude protein. To capitalise on the benefits of grazed grass, dairy cows should be turned out to pasture directly after calving, ground conditions permitting. The main objectives of spring grazing management are (1) to increase the proportion of grazed grass in the diet of the dairy cow and (2) to condition swards for subsequent grazing rotations.

How to

Ensure maximum grass intake in spring

- Farm cover at turnout should be approximately 600-700kg DM/ha, depending on mean calving date – an earlier calving date equates to higher animal demand and the need for a higher opening cover.
- Aim to offer 0.8–1.0 tonne grass DM/cow from turnout until the end of the first rotation – this is achievable on farms where animals are turned out early.
- Grazed grass and concentrate can be the sole feeds with such a system. This allows grass silage to be completely removed from the diet post-calving.
- During the first grazing rotation a daily herbage allowance of 10–13kg DM/cow/day with 2-4kg DM of concentrate should be offered, this achieves the twin objectives of achieving a high milk solids yield while maintaining sward quality.
- From early April onwards (i.e. second rotation) daily herbage allowance must be increased in line with herd requirements to achieve high animal production performance.

How to

Ensure first-rotation swards are able to yield well in subsequent rotations

- The available grass supply should be budgeted so that the first grazing rotation finishes between 4-10 April.
- Post-grazing height should be maintained at 3.5-4cm during the first rotation to ensure pasture quality is high during subsequent rotations.
- Early grazed swards (Feb/Mar) have similar grass growth potential as later grazed swards (Apr), but are capable of sustaining higher milk solid yields and grass intake in subsequent grazing rotations due to higher sward quality.
- Excessive pasture damage should be avoided.

How to

Manage grazing during wet weather

- Use on/off grazing.
- Allow cows two three-hour grazing periods post-milking and after grazing move cows to stand-off area (without feed).
- Silage supplementation is not necessary.
- Provide sufficient grass allowance during wet periods.

Alternatives

- Allowing cows to graze by day and then return to housing at night.

Recent research carried out in Teagasc Moorepark has shown that animals adjust their grazing behaviour – grazing more when they have limited access to grass so milk production is not reduced.

3 How should I manage mid-season swards?

Mid-season sward management

The primary objective during the main grazing season is to maximise animal performance from an all-grass diet while at the same time maintaining pasture quality. In general, from late April onwards, grass supply is not restricted on farms. Improvement of pasture quality offers the potential to achieve further increases in animal performance from pasture.

How to

Maintain high quality in the mid-season period

- Rotation length should be approximately 18-21 days.
- Cows should be offered an all-grass diet.
- Target pre-grazing yields between 1,300 -1,600kg DM/ha with high leaf content.
- Graze to 4-4.5cm post-grazing sward height.
- Remove grass surpluses as round bale silage (see chapter on high quality bales).
- Keep topping to a minimum as it is very labour intensive and delays pasture regrowth. On average one round of topping, to a height of <4.5 cm, should suffice from mid-May to late June. If you are new to pasture management, consult with an adviser if you are unsure when topping should be carried out.
- Mid-season pasture quality can be improved by alternating paddocks that have been grazed with those that have been harvested for first and second cut silage.

Key performance indicator

Use later heading grass cultivars

Later heading cultivars are one of the main tools to produce milk efficiently during the main grazing season and maintain high sward quality.

Key facts

The influence of grass quality on intake and performance

- For each one-unit increase in organic matter digestibility (OMD), grass dry matter intake (GDMI) is increased by 0.20kg.
- A one-unit OMD increase will allow an increase of 0.24kg milk/cow/day.
- Green leaf content is directly related to grass digestibility. A 5.5% change in leaf content is equal to a one-unit change in digestibility.
- Poorly managed swards can fall to 60% leaf during the reproductive (stemmy) period.
- Well grazed swards (grazed to 4.0 – 4.5cm) will contain high (80%+) leaf levels in the mid-grazing horizon (4 to 10cm). This is the grazing horizon which has greatest influence on the grass intake achieved by the dairy cow.



Managing your Grass

Rule of thumb

Target grazing grass covers of 1,300-1,600kg DM/ha and a rotation length of 18-21 days is a good rule of thumb to maintain grass quality and cow performance in the May to July period.

How to

Top paddocks

Generally on farms topping is carried out from the middle of May onwards.

- Top to 4.5cm (removing the tall grass from dung pats).
- Swards mechanically topped to 4.0-4.5cm will support higher milk yields (up to 2 kg/cow/day).
- Removing surplus grass (paddocks >1,800kg DM/ha) as round bale silage will reduce the need for pasture topping.

Table 2. Expected milk production performance from well-managed pasture through lactation.

Month	Milk Yield (kg/cow/day)	Milk Fat (%)	Protein (%)	Milk Solids*
February	18.3	4.54	3.48	1.47
March	25.4	4.41	3.27	1.95
April	26.9	4.03	3.36	1.98
May	25.0	3.88	3.39	1.82
June	22.0	3.90	3.38	1.60
July	20.4	3.91	3.48	1.51
August	18.8	4.05	3.59	1.44
September	17.3	4.28	3.75	1.40
October	15.2	4.56	3.97	1.30
November	11.2	4.95	4.21	1.03
December	8.6	4.89	3.90	0.80

Herd mean calving date 24 February

* Total kg milk solids per day.

Key Target

Milk yields of 25kg/day and 3.40% protein can be achieved with daily grass allowances of 17–19kg DM/cow while grazing to 4.0-4.5cm during the May/July period.

4 How should I manage autumn swards?

Autumn grassland management largely determines the supply of grass available for grazing during the following spring and as a result the grazing season actually begins in autumn.

The two main objectives of autumn grazing management are (1) to maximise the proportion of grazed grass in the diet of the dairy cow, and (2) to finish the grazing season with the desired farm grass cover, ensuring sufficient grass for early turnout the next spring. Grassland budgeting is essential to ensure that these objectives are achieved. Usually from mid-August onwards, the entire farm is available for grazing. Building up grass covers to prolong the grazing season into the October/November period is necessary on dairy farms in order to maintain animals at grass in late autumn, when cow demand outstrips grass growth/supply.

How to

Manage autumn pastures

- Build average farm covers by increasing rotation length to more than 35 days from mid-September. Options for building grass covers include: increasing supply (N supply, more growing area) and reducing demand (reducing stocking rate, introducing bale silage, concentrates).
- Highest average farm cover should be achieved in mid to late September at which point a farm cover of up to 1,125kg DM/ha is achievable.
- Last rotation should commence on 5-10 October – every paddock grazed from this date onwards should be closed i.e. not grazed again.



How to

Manage autumn closing

- Every day delay in closing from 15 October reduces spring grass supply by 15kg DM/ha.
- In more northerly regions closing may begin earlier to compensate for lower subsequent autumn and early spring growth.
- Target post-grazing residuals of 4.0cm during the last rotation to encourage winter tillering.
- Do not regraze paddocks unless the farm is well above the closing cover target.
- Be flexible - graze the lower grass covers in wet weather (this also applies during wet weather in early spring).
- Close some drier paddocks earlier to allow early spring grazing.
- Close at least 60-65% of the farm by the end of the first week of November.

Key performance indicator

Closing cover target is 550kg DM/ha for farms stocked at 2.5 cows/ha in late November

In situations where grass supply is limiting or pasture quality is extremely poor, supplementation of autumn pasture may be an option.

How to

Decide whether to supplement at grass

- This decision must take into account milk quota limitations, supplement price and level of grass supply on the farm.
- The target for grazing herds should be to graze day and night up to the time of ceasing grazing in late November. Where this is not possible, supplementation is an alternative.
- In studies carried out at Teagasc Moorepark, no milk production benefit was observed when low or moderate levels of good quality grass silage (72% DMD) were added to the diet of the late lactation dairy cow (mid-September to late-November).

- Supplementing cows at grass with beet pulp-based concentrates during the same period resulted in a good milk yield response at a low (1-2kg) level of feeding (1.0kg milk/kg concentrate DM) and a moderate milk yield response at a higher level (3-4 kg) of concentrate feeding (0.72kg/kg DM).

5 Which grassland management tools are available to me?

Key grassland management tools

Spring rotation planner

The spring rotation planner is used to divide the farm up into weekly portions and can help take the guess work out of planning the first grazing rotation.

Data needed:

- date you want to turn out your animals
- date when you think you are growing enough grass to supply all the grass you need (i.e. supply = demand; magic day).

The spring rotation planner will not tell you if you are feeding the cows enough grass – you will have to gauge this by walking your paddocks and assessing the level of grass supply.

The spring rotation planner is a simple tool and if used properly it ensures that:

- sufficient grass is grazed early enough to allow time for regrowth for the second rotation.
- A wedge-shaped grass supply is created, ensuring a continuous grass supply during the 2nd rotation.

Managing your Grass

Rule of thumb

Dry farms

- Turnout in early to mid-February
- 30% of the farm grazed by 1 March
- 66% of the farm grazed by 17 March
- 100% of the farm grazed by 1-5 April

Heavy farms

- Use the above percentages, but operate approximately one week later

Pasture wedge

What is the grass wedge?

During the mid-season period the farm must be walked at least once a week and farm cover details collated. The information must then be used to make critical decisions about the quantity of feed available to the herd.

The 'pasture wedge' is a simple method used to interpret this data. A profile of the paddocks DM/ha from highest to lowest is set out on a graph. The pasture wedge visually illustrates the breakdown of the pre-grazing yield distribution on the farm. A line is superimposed onto the graph calculated from the intended herd demand, rotation length and grazing residual.

Figure 1 represents a farm which is on target with its pre-grazing yield profile, as the paddocks have a stepped profile and are almost all on the pre-grazing target line. Figure 2 shows the opposite situation, with all pre-grazing yields below target; this farm is in a deficit grass supply. Decisions will have to be made on how to overcome the deficit of grass.

Figure 1. Grass supply normal, pre-grazing cover on target line

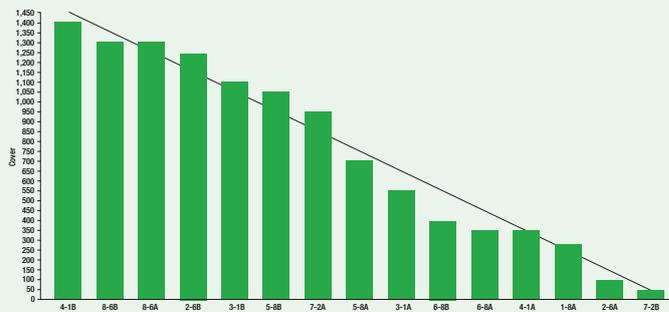
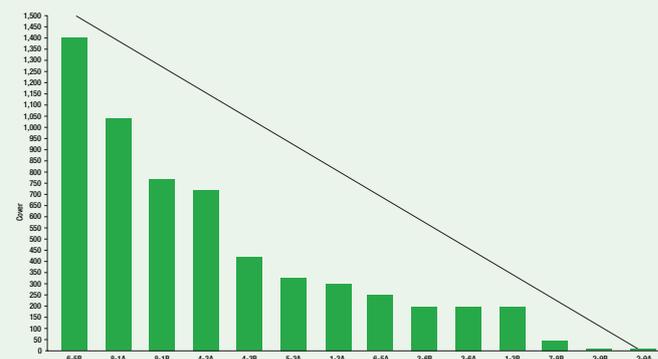


Figure 2. Grass supply in deficit, pre-grazing cover well below target line



Continuous measurement of farm cover and reaction to prevailing grass growth and weather conditions needs to be applied. The key process is using the data captured to make the right decisions. Using farm cover, kg DM/cow and 'pasture wedge' technology, grazing decisions are more easily made.

Key fact



Controlling mid-season pre-grazing yields, converting high quality grass into milk solids adds €150/ha profit.

60:40 Autumn rotation plan

The autumn rotation planner is a tool to help extend the grazing season into late autumn and if followed, will ensure that paddocks are set up correctly for grazing the following spring. The 60:40 plan is based on having proportions of the farm closed by certain dates. These dates will vary slightly across the country and depend on soil type and the amount of grass that is likely to grow over the winter months.

The objectives of the autumn rotation planner are:

- to keep grass in the diet of the dairy cow for as long as possible.
- to set up paddocks for grazing the following spring.

The simple rule is:

Dry Farms

- Start closing 10 October.
- 60% of the farm grazed by 1st week of November.
- Remaining 40% grazed by 1 December.

REMEMBER: Once a paddock is closed, it should not be regrazed.

Example

Below is an example for a 20ha farm where closing starts on 10 October and housing date is 1 December.



Table 3: Area available for grazing each week

Farm size	20ha	
Closing start date	10 October	
	60%	40%
Date	Date 60% is grazed 3rd November	Date all cows housed 1st December
	Number of days from start to 60% date	Number of days from 60% date to housing date
Number of days	24 (a)	28 (c)
	(0.6 X total area)	(0.4 X total area)
Hectares to be grazed	12 (b)	8 (d)
	(b ÷ a) x 7	(d ÷ c) x 7
Hectares per week	3.5	2

How to



Measuring the grass on your farm

Maintaining a constant supply of high quality green leafy grass can be easily achieved by walking paddocks weekly and measuring the amount of grass on the farm. Poor grazing management leads to fluctuation in pre-grazing yields, with problems of not enough or too much grass on the farm.

Measuring/estimating the quantity of grass in each paddock

Method 1:

The first method uses a quadrat and shears. Once you become confident at estimating the quantity of grass in the paddock you can start to estimate it by eye (eyeball) it.



- A 0.5m x 0.5m quadrat is placed in an area that is representative of the amount of grass in the paddock.
- Knock water off the grass before cutting if wet.

Managing your Grass

- The grass within the quadrat is cut to between 3.5 and 4cm.
- The following equation is used to calculate the DM yield in the paddock:

$$\text{Weight of grass (kg)} \times \text{grass DM\%} \times 40,000 = \text{kg DM/ha in the paddock}$$

Example:

Grass cut within the quadrat weighs 200g (0.200 kg) (Remember to subtract the weight of the empty bag)

Grass DM% = 16% (0.16)

0.200 kg x 0.16 x 40,000 (there are 40,000 quadrats in a hectare) = **1,280 kg DM/ha**

Guide to: Estimating Grass Dry Matter % (DM)

Weather	Grass DM%
1-2 days continuous rain	14 – 15
3-4 days continuous rain	12 – 13
Mixed sunshine and rain showers & second rotation	16 – 17
1st rotation in spring/drier weather	18 – 19
Over a week of continuous sunshine & high temperatures	20 – 21
Drought conditions	22 – 23

- DM will be higher if there is more dead (yellow) material at the base of the sward.
- DM will be lower if the sward is green and leafy.
- DM is usually two – three units higher in the afternoon than the morning.
- Refer to 'Grass watch' in the Irish Farmers Journal every week to get an idea of growth rate and DM figures in your area. Regional growth rates are also available from your local Teagasc office.

Method 2:

The second method uses the plate meter.



- Take heights across the entire paddock in a 'W' or 'X' pattern to ensure the quantity of grass in the paddock is accurately represented.
- Subtract the ideal post grazing height/residual (e.g. 4cm) from the height of the grass in the paddock.
- Multiply the figure you get by 250 as there is 250kg DM/cm.

Example:

Paddock height was 8.8cm
4cm is the desired post-grazing residual

$$(8.8\text{cm} - 4\text{cm}) \times 250\text{kg DM/cm} = 1,200\text{kg DM/ha}$$

Completing a farm cover

- Measure/estimate the quantity of grass in each paddock – DM yield
e.g. 1,400kg DM/ha.
- Multiply the DM yield of each paddock by the area of the paddock in ha
1,400 x 1.8 ha = 2,520kg DM in the whole paddock.
- Repeat this for all the paddocks on the farm.
- Sum all the paddock DM yields together.
- Sum all the paddock areas together (i.e. get total area of grazing area) in hectares.

Rule of thumb

To convert weight of grass (in grammes) to paddock cover kg/DM/ha multiply by

DM%	
12.5	5
15.0	6
17.5	7
20.0	8
22.5	9

- This can be completed on the Table below (example in the first line):

Paddock	DM yield (kg DM/ha)	Area (ha)	Total Cover
1	1400	X 1.8	= 2,520
		X	=
		X	=
		X	=
		X	=
		X	=
		X	=
		X	=
Sum the next two columns		(A)	(B)

To calculate farm cover:

- Divide the sum of the quantity of grass on the farm by the total area
e.g. $10,000\text{kg (grass on the farm)} \div 20\text{ha} = 500\text{kg DM/ha}$.

⑥ How should I manage reseeding?

RESEEDING PASTURES

Checklist

Reasons to reseed

- It is very difficult to achieve high grass yields and high animal performance in pastures which do not have a high proportion of perennial ryegrass (PRG).
- Many Irish fields have large levels of old permanent pasture and insufficient PRG in the sward.
- High PRG swards can produce three tonnes more DM/ha than old permanent pasture.
- Old permanent pastures with low levels of PRG give a 25% poorer response to nutrients than PRG swards.
- The majority of the difference in DM yield between high PRG swards and old permanent pasture swards is accounted for up to mid May.
- A low proportion of perennial ryegrass in the sward is costing dairy farmers €300/ha in loss of DM production during the growing season.
- Pastures with <65% perennial ryegrass should be reseeded.



Key facts

- High PRG swards will yield an additional 10kg of grass dry matter per kg of nitrogen used compared to old permanent pastures.
- High PRG swards allow 8% higher milk output per hectare compared to old permanent pasture.

Alternatives

Spring or autumn reseeding?

Spring reseeding

- A spring reseed will produce as much grass dry matter in the year of establishment as old permanent pasture.
- Establishing clover in a spring reseed is more reliable than autumn due to the stability of soil temperatures in late spring.
- The sward will return to production faster following spring reseeding compared to autumn reseeding.
- It is possible to 'turnaround' the sward in 60 days.

Key fact

Cultivations can begin 7–10 days after spraying off the old sward.

Reseeding cost

Reseeding is a costly but worthwhile investment – see indicative cost in Table 4. Newly reseeded swards should last for at least 8–10 years.

Table 4. Conventional method reseeding costs (estimates)

	€/acre
Spray	20
Glyphosate application pre-cultivation	16
Ploughing (30)/Till & sowing (one pass)(30)	60
Fertilizer (2 bags x 10:10:20)	37
Fertilizer spreading	10
Levelling	10
Rolling	10
Grass seed	50
Total Costs (excl. sprays)	213
(ex-post emergence sprays – depends on what farmers choose to use)	€526/Ha
Post emergence herbicide sprays (examples)	
Alistell – (1.5litre/ac -€30)	30
Legumex DB - (2.8litre/ac - €18)	18
Spraying	10

Managing your Grass

How to

Choose varieties

- Combine three to four varieties of differing traits to obtain good seasonal DM production (spring/autumn) and high sward density.
- In a silage mix, high overall DM production and density are the key targets. Silage mixes should not be used where swards are used mainly for grazing.
- A small range in heading dates (e.g. 7-10 days) is preferable to shortening the heading period. All varieties will head, however some have a greater tendency to head and continue to re-head, which is not desirable in a grazing sward.
- There are two recommended lists available in Ireland, from DAFM and AFBI www.agriculture.gov.ie, afbini.gov.uk.
- There is little to be gained from sowing less than 3kg of individual varieties within seed mixes.

Clover

- Clover should be incorporated into grazing swards, as it can reduce fertilizer costs mid-season, and left out of swards designed for intensive silage harvests. At stocking rates below two livestock units/ha clover has a major role to play.
- Small leaf varieties are lower yielding, but more persistent than large leaf varieties and vice versa, while medium-leaf varieties are intermediate in terms of yield and persistency.
- In grazing swards, small and medium leaf clover varieties are recommended in combination with late heading perennial ryegrass varieties.
- Take care with the larger leafed clovers as their aggressive growth habit dominates swards over time. Varieties with high yield potential and good grazing persistence at both high and low nitrogen levels should be used.

How to

Create a grass seed mixture

- No single grass variety has all the desired agronomic traits and a grass seed mix can address this. Within the first 11 months after sowing, the cultivar hierarchy will be established.
- Only grass cultivars which have been tested on recommended lists (DAFM or AFBI) should be used in mixes.
- Ensure spring and autumn production, mid-season DM production is consistent across varieties and a more flattened grass supply is advantageous (more grass in spring and autumn and less surplus mid-season).
- Ensure sward quality – better than the average value.
- Choose varieties with a narrow range of heading dates.
- Adequate ground cover is a major requirement on wetter soils.

Key points

- 3-4 varieties in a mix.
- Sow 14–15kg per acre/(36kg/ha).
- Post-emergence spray is crucial.

Grazing specific mixtures

- 33% tetraploid.
- Late heading.
- Select varieties with high spring growth to extend the grazing season.
- Medium or large leaf clovers have a role at low stocking rates.

Silage ground

- Increase tetraploids to 40%.
- Choose intermediate heading varieties.
- Avoid clover on silage ground.