

Section 6



Managing your Grass

by Eddie O’Riordan



Introduction

The phenomenal grass growth that can be achieved in Ireland is our key competitive advantage over most other EU beef producers. When managed correctly, grass is a comparatively cheap, very nutritious feed for all types of cattle. With good grassland management farmers can minimize their animals’ lifetime consumption of expensive silage and meals while achieving the same levels of animal performance. Greater profit will result.

- ① How do I maximise the proportion of grazed grass in my animals’ diet?
- ② How should grass be managed in spring?
- ③ How should grass be managed in mid-season?
- ④ How should grass be managed in autumn?
- ⑤ Which grassland management tools are available to help achieve high performance from pasture?
- ⑥ How should I manage reseeding?

Managing your Grass

① How do I maximise the proportion of grazed grass in my animals' diet?

Extend the grazing season in early spring and late autumn

- Turn animals out early, to an adequate grass supply, to achieve a long grazing season and increase total animal liveweight gain from pasture.
- Have a planned autumn closing date for paddocks.
- Close the farm in rotation from mid – late October onwards.
- Target about two-thirds of paddocks closed by early November.
- Do not regrazed closed paddocks, if yield is below 700kg DM/ha.
- Target a closing farm cover of 500kg DM/ha.
- Consider housing some animals during periods of poor weather.

For Suckler herds match calving pattern to the start of the grass growing season

- Begin calving at the onset of grass growth.
- Target an opening farm cover of 600–700kg DM/ha (depending on stocking rates) and graze the whole farm during the first grazing cycle.
- Use the Teagasc spring rotation planner and stick to daily area allocations as planned.
- Aim to have the silage areas grazed by April 4 – 6. Then move stock to the grazing area.

Match your stocking rate to the growth potential of your swards

- Perennial ryegrass dominated swards will produce the highest grass yields.
- You must have enough stock for a field's grass growth. (match supply and demand).
- Don't waste grass.
- Use rotational grazing, strip grazing or block grazing. This will help you improve grass utilisation.

Maximise the productivity of your swards by 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.
- Consider reseeding poor performing paddocks.
- Only use varieties on the recommended list.
- Graze the newly re-seeded sward for the first time before it reaches 1,000kg DM/ha.

Use farm grass cover measurement and grass budgeting, throughout the year

- Consider housing stock in very wet conditions if soil damage is taking place and grass utilization is poor.
- Graze-out paddocks to a low post grazing height in early spring. This will maximize grass utilization and 'condition' swards to produce more grass during subsequent grazing rotations, while also improving sward quality.

Key skill



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 which are critical to the success of the grazing system. These skills can be learned from advisors, through farm discussion groups and through practice and self-training.

Key Target



Aim for a grazing season of at least 220 days

Key Fact



A days grazing always costs less than indoor feeding.

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

Month	Growth (kg DM/day)	Target average farm cover (kg DM/ha)	Event
Mar 15	15	600-700	Cattle out full-time
May 10	80	700-800	Expect supply to exceed demand
Aug 15	65.0	700-800	
Sept 1	51.0	1,100-1,200	
Sept 15	37.1	1,200	Peak cover achieved
Oct 1	30.0	1,000	
Oct 15	26.8	900	Start to close paddocks for winter
Nov 1	15.0	700	Consider housing finishing cattle
Nov 15	8.5	650	
Nov 22	2.7	600	House by day and night



Managing your Grass

② How should grass be managed in spring?

Spring grass is an ideal cattle feed - highly digestible and high in protein. To make the most of grazed grass in spring, cattle should be turned out to pasture as soon as grass supply is adequate, ground conditions permitting.

Key objectives:

- (1) Increase the proportion of grazed grass in the diet of the beef animal,
- (2) Shorten the winter,
- (3) reduce costs, and
- (4) 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. If you have a high stocking rate this will result in higher animal demand and the need for a higher opening cover.
- Getting turn-out dates and pasture covers matched is critical on beef farms as the majority of units are not set up to easily move cattle in and out (often there is no internal road system) and once animals are out the farm needs to be self sufficient in grazed grass
- Plan to have silage paddocks grazed by April 6th, at the latest.
- Early grazing of silage swards has only a very small effect on subsequent yield (a reduction of 3-5%), but improves the quality of the silage.
- Aim to have grazed grass as the only feed after turn-out.
- During the first grazing rotation animals should be offered a daily grass allowance of 2% of the animals' body weight. This will ensure good weight gain while maintaining sward quality.

- From early April onwards (when the herd graze the grazing block and stocking rates may increase) total daily herbage allowance must be increased in line with cattle numbers to ensure animals continue to have 2% of their body weight in grass available.

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 in the silage area before 6th April.
- Post-grazing height should be maintained at 4-5cm during the first rotation to ensure pasture is well utilised and that quality is high during subsequent rotations.
- Lighter stock (e.g. yearlings) do less damage in poorer weather.

How to

Manage grazing during wet weather

- In continuous difficult grazing conditions, house some animals, particularly, heavy stock.
- Provide sufficient grass allowance during wet periods.
- While serious poaching must be avoided, a mild one-off poaching has only a short term effect on sward productivity.

How to


With spring grass, aim to:

- Get good live weight gain in stock (greater than 1.2kg/day)
- Get body condition increased in cows
- Feed no supplements (other than where necessary to carry magnesium for critical stock).

③ How should grass be managed in mid-season?

The objective during the main grazing season is to maximise animal performance from an all-grass diet. In general, from late April onwards, grass supply is not restricted on farms. In many cases the difficulty is with grass surplus and under-utilisation of herbage, leading to pasture with less than ideal quality. Maintaining high pasture quality is the most cost effective way of achieving good animal performance.

How to Maintain high grass quality in mid-season.



- Keep rotation length to 18-21 days.
- Cattle should be on an all-grass diet.
- Target pre-grazing yields between 1,500- max 2,000kg DM/ha with high leaf content.
- Graze to 4-5cm post-grazing sward height. If there is a grass surplus remove it as round bale silage.
- Surplus grass exists when pre-grazing yields exceed 2,000 kg DM/ha and when grass growth exceeds herd demand and rotation length goes beyond 25 days (in good growth periods).

Key Fact



The influence of grass quality on intake and performance

- The more green leaf content that is present in the sward the higher the digestibility (feed quality).
- Poorly managed swards can have a lot of poor quality stem which reduces animal performance.
- Well grazed swards (grazed to approx 5cm) will contain high (80%+) leaf levels in the mid-grazing horizon (5-10cm). This is the grazing layer which has the greatest influence on the grass intake achieved by the grazing livestock

Topping paddocks

- Generally topping is carried out from the middle of May onwards.
- Top to under 5cm (removing the tall grass from dung pats).
- Removing surplus grass (paddocks with more than 2,000 kg DM/ha) as round bale silage will reduce the need for pasture topping.
- On well managed cattle and sheep farms topping may not be necessary.

④ How should grass be managed in autumn?

Managing Grass: Autumn

- In autumn grass growth cannot keep up with herd demand (growth is slowing and animals are bigger) and pasture supply decreases. Building up grass supply from late July is important.
- The two main objectives of autumn grazing management are:
 - (1) to maximise the proportion of grazed grass in the animal diet and
 - (2) to finish the grazing season with the desired farm grass cover ensuring there will be sufficient grass for early turnout the following 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 October/November is necessary in order to maintain animals at grass in late autumn.
- Late-autumn grassland management largely determines the supply of grass available for grazing during the following spring and planning for the next grazing season actually begins in autumn.

Managing your Grass

Manage autumn pastures

- Build up average farm covers by increasing rotation length from 20-25 days in July to more than 35 days in mid September.
- Once the entire farm is available for grazing (after second cut silage) in early August, grass supply will increase on the farm. Some pre grazing yields will exceed 2,500 kg/DM/ha (some reaching 3,000 kg/DM/ha). This provides the opportunity to both save on fertiliser (N) usage and build up a supply of grass for autumn grazing.
- Highest average farm cover should be achieved in mid to late September at which point a farm cover of more than 1,200 DM/ha is achievable and necessary.
- Last rotation should commence in mid-late October -every paddock grazed from this date onwards should be closed (i.e. not grazed again) if covers on the paddock are less than 700 kg/DM/ha or the rotation is less than 21 days.

How to

Manage autumn closing

- Uncontrolled grazing and delaying autumn closing will reduce spring grass growth.
- Target post-grazing height of less than 5cm during the last rotation to encourage winter tillering, if ground conditions allow.
- Do not regrazed closed paddocks.
- Be flexible – graze the lower grass covers in wet weather.
- Close some of the drier-soil paddocks earlier to allow early spring grazing.
- Aim to have all of the farm closed by late November. House the heaviest animals first.

Key performance indicator

Closing cover target is 500 kg DM/ha in late November



How to

Decide whether to feed concentrate supplements at grass



Sucklers: Creep feed the suckled calf with concentrates. Feed weanlings for 3-4 weeks pre-weaning (up to 1kg/head/day).

Heavy cattle: Cattle planned for winter finishing (a 4-5 month winter) will not show an economic response to supplements at grass.

Supplement dairy beef weanlings from late September onwards (1.5 kg meal head/day).

5 Which grassland management tools are available to help achieve high performance from pasture?

Key grassland management tools

Spring Rotation Planner

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

Data needed

- Estimated date for start of grass growth.
- Date you want to turn out your animals.
- Date when you think you are going to be growing enough grass to supply all the grass you need (i.e. supply = demand).

The spring rotation planner will not tell if the herd is receiving enough grass - this must be gauged by walking the paddocks and assessing the level of grass supply.

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

- Sufficient area is grazed early enough to allow time for regrowth for the second rotation.
- A wedge-shaped grass supply (see Fig 1. and 2.) is created, ensuring a continuous grass supply during the 2nd rotation.

Managing your grass: General concepts

Rule of thumb

Dry farms

- Turnout in mid-late February
- 30% (just under a third) of the farm grazed by 1 March
- 66% (two thirds) 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-two weeks later.

How to Use the pasture wedge

During mid-season the farm must be walked at least once a week and the grass yield on each paddock or field determined. This information can then be used to make critical decisions about the quantity of feed available to the herd.

Plotting (on a graph) the yield on each field, where the fields are ranked from the highest (on the left) to the lowest (on the right) will give a picture of grass supply – and the chart will look like the steps of a stairs. This picture of sorted grass yields is called the ‘pasture wedge’ or ‘feed wedge’.



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.

If the yield in a paddock is below the line, it indicates that the yield of grass in the paddock is lower than planned. If it is above the line it indicates the yield is ahead of expectations, and if it is on the line, it is on target. If too many paddocks are under the line, forecast a grass shortage in the near future. Too many paddocks above the line forecasts a surplus (especially in a period of growth that exceeds herd demand).

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 grass deficit.

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

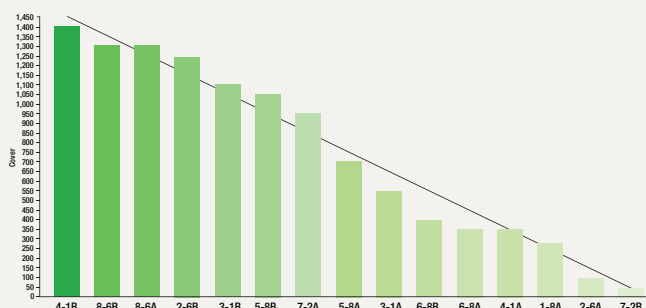
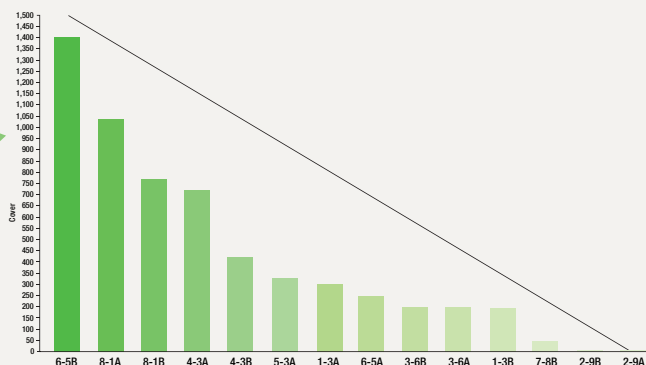


Figure 2. Grass supply in deficit, pre-grazing cover well below target line



Managing your Grass

Continuous measurement of farm cover is essential and it is important to react to prevailing grass growth and weather conditions. The key point is to use the data captured to make the right management decisions. With farm cover, herd demand and 'pasture wedge' information available grazing decisions are more easily made. On beef farms, dividing the average pasture cover by the daily herd demand, gives the "grazing days" on the farm.

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 cattle for as long as possible
- To set up paddocks for grazing the following spring.

Rule of thumb

Dry Farms

- Start closing 20 October.
- Two-thirds of the farm grazed by mid November.
- Remaining third 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.



How to

Measure 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 the 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 represents the average cover over the paddock.
- Knock water off the grass before cutting if wet.
- The grass within the quadrat is cut to between 4 - 4.5cm.
- The following equation is used to calculate the DM yield in the paddock:
- Weight of grass (kg) x grass DM% x 40,000 = kg DM/ha in the paddock.



How to

Estimate the grass on your farm

Guide to: Estimating Grass Dry Matter % (DM)

Recent 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 2-3 units higher in the afternoon than the morning.

Method 2:

The second method uses the plate meter (below right)

Calculating the pasture height.

- Record the starting meter reading, take 10-20 heights, record the final meter reading:
Height (cm) = closing reading - opening
- No of height taken x 2
- 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.

To calculate farm cover:

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



Managing your Grass

⑥ How should I manage reseeding?

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.

Key fact

- High PRG swards will yield an additional 10kg of grass dry matter per kg of nitrogen used compared to old permanent pastures.

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 2. Newly reseeded swards should last for at least 8–10 years.

Table 2. Conventional method reseeding costs (estimates)

	€/acre
Spray	22
Glyphosate application pre-cultivation	17
Ploughing (30)/Till & sowing (one pass)(30)	65
Fertiliser (2 bags x 10:10:20)	37
Fertiliser spreading	10
Levelling	10
Rolling	10
Grass seed	80-85
Post emergence herbicide sprays €10-30/acre.	

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, affini.gov.uk. Only varieties on these lists should be used.

Clover

- Clover should be incorporated into grazing swards, as it can reduce fertiliser 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 clover 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.
- 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 36 kg/ha 14-15kg per acre
- 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. (1.5 LU/ha)

Silage ground

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

Grass Cover Analysis (Indicative)

Grass
cover 50kg



Grass
cover 250kg



Grass
cover 500kg



Grass
cover 1,000kg



Grass
cover 1,500kg



Grass
cover 2,000kg



Section 6

Making Silage

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Introduction

Silage needs to provide cattle with cost-efficient energy, protein and other nutrients at critical stages of the year. This requires a high yield of grass harvested at the appropriate growth stage, and good silage-making and feed-out practices. In some cases either forage maize or whole-crop cereal silage may be worth considering.

- ① How can I produce high yields of grass for silage?
- ② How can I produce good quality grass silage?
- ③ How do I make good baled silage?
- ④ What do I need for good quality maize silage?
- ⑤ What do I need for good quality whole-crop cereal silage?
- ⑥ How do I manage feed demands?

Making Silage

① How can I produce high yields of grass for silage?

- Use swards that are dominated by perennial ryegrass. This may require a plan to reseed some fields.
- Avoid compacting soil during slurry and fertiliser spreading, silage-making and grazing.
- Ensure the P, K and pH status of the soil is adequate by providing adequate P, K and lime, based on a soil analysis at least every five years.
- For first-cut silage, apply a total of 125-150 kg nitrogen per hectare (reseeded fields should receive closer to 150 kg) from bagged fertiliser (urea or calcium ammonium nitrate) and slurry. Use lesser amounts for subsequent cuts.
- Complete rolling or chain-harrowing silage fields before the grass starts to elongate.
- Close silage fields in time to leave at least six weeks before harvesting.

Key tip

Measure grass silage yields prior to cutting.

In most cases grass silage yields are only measured or estimated once the silage has settled in the pit, generally just before winter feeding commences. This only tells us what the composite yield of silage is from all fields cut, but does not indicate the yields from individual fields.

Information from pre-cutting yield measurement.

Measuring the yield of grass in each field, or part of a field, just prior to cutting delivers a number of benefits:

1. It tells you the actual yield at cutting time in each field or part of a field.
2. It allows you to compare fields with each other.
3. You can compare yields against soil sample results for each field to gauge the impact of soil fertility on grass yield.
4. You can identify poorly performing fields. These may benefit from reseeding or soil testing.

5. You can make an early estimate of the quantity of winter feed available, and plan your subsequent cuts.

To establish grass yield follow the same process used for measuring grass covers outlined in the chapter on Managing Your Grass.

② How can I produce good quality grass silage?

How to

Achieve high digestibility

- Use swards dominated by perennial ryegrass varieties that have a narrow range in heading dates.
- Aim to harvest the crop when seed-heads are beginning to emerge from grass plants. For each one week delay in harvesting the digestibility will usually decline by 2-3 percentage units.
- Dead herbage has a very low digestibility. Therefore, in late autumn or early spring, get livestock to graze the silage swards below the height at which the mower will cut the crop at harvest time. This is to prevent the accumulation of dead or 'woody' vegetation at the butt of the crop.
- Avoid over-fertilising, especially with nitrogen, as this can cause lodging which reduces digestibility sharply.
- Prevent bad preservation (see below).
- Prevent heating or mould (see below).

For cattle not scheduled to put on much condition during winter (e.g. many spring-calving beef cows) top quality silage is not essential and it will make sense to delay harvest date until yields are higher and growth stage is more mature.

How to

Ensure good preservation

Air-tight conditions are the key requirement for the proper preservation of any crop as silage. Therefore, fast filling and perfect sealing of the silo are essential. Usually use two sheets of black 0.125 mm thick polythene, fully cover with edge-to-edge tyres, and meticulously seal by weighing down all edges.

Grass needs to contain adequate sugar if it is to undergo the required acidic fermentation and, among the grasses commonly found in permanent grassland, ryegrasses usually contain much more sugar than other grasses. Therefore, use swards dominated by perennial ryegrass.

Prevent contamination of grass by manure or soil. Spread slurry onto bare stubble or short grass, before grass growth advances too much. Ensure no soil mixes with grass during mowing or harvesting.

Apply no more than the recommended application rate of nitrogen fertiliser, taking account of nitrogen applied in slurry and any carry-over of nitrogen applied for a previous grazing. If spreading lime, apply it after the silage is harvested.

Mow the crop after the dew has dried off. If wilting, either tedd the grass to achieve full ground cover, or at least place the mown swath in wide rather than narrow rows, and don't combine rows until immediately prior to harvesting.

Leafy or clover-rich crops are usually more difficult to preserve and may require the application of a preservative (e.g. acid- or sugar-based additive) where wilting is not feasible. Remain flexible and be prepared to harvest a few days earlier or later than the expected date if prevailing weather conditions require this.

How to

Avoid heating or mould at feedout



- Fast filling and quick sealing of silos helps limit heating of grass immediately after harvesting. This usually helps delay any subsequent heating of silage during feedout.
- Ensure the polythene sheet maintains as perfect a seal as possible until opening the silo for feedout. The aim must be that there will be no mould visible on the silage surface when the silo is opened and that all silage is cold to the touch.
- Once feedout commences try to feed as many cattle as you can from a silo – this will speed up the rate at which the silage face is used and shorten the period when it is exposed to air. If necessary, feed bales of silage to some cattle until all animals are ready to feed from the silo.

- Use a shear-grab or block cutter to remove silage. This will leave a more even and undisturbed feed face that will make it more difficult for air to penetrate. Drier, stemmier or less compact silage will allow air to penetrate more easily during feedout, and may thus be more prone to heating.
- Heating is more likely during warm than cold weather. Therefore, avoiding heating can be a particular challenge when silage is fed during summer.

③ How do I make good baled silage?

The principles of producing good quality baled silage are exactly the same as for conventional silage.

- Wilt grass for about 24 hours, with a target DM content of 30%.
- Present wilted grass to the baler in rectangular, even rows. Bale slowly to produce very firm, perfectly-shaped bales, with a target of at least 200 kg DM per bale (1.2 m x 1.2 m). Don't skimp on the tie-netting.
- Within one hour of baling, wrap the bales with four layers of good quality stretch-film. If bales are intended for storage beyond the following winter, consider using six layers of plastic film.
- Transport bales to storage site immediately after wrapping. Handle the bales extremely carefully to avoid any damage to the plastic film. It is essential that the integrity of the plastic film is maintained so that no air can enter the bales.
- Fence the bales from livestock and protect from other farm animals. Carefully bait to discourage rodents and use netting or monofilament lines to protect bales from birds. Painting an eye-shaped design on bales with emulsion paint can also discourage birds.
- Regularly inspect bales for any damage to the plastic film. Immediately repair damage using suitable adhesive tape.

Bales made from grazing paddocks

Making baled silage with surplus grass from grazing paddocks helps maintain the supply and quality of grass intended for grazing. It can also produce an extremely high feed value silage that can be subsequently re-fed to grazing cattle if grass supply becomes limited, or it can be retained for feeding the following winter.

Making Silage

Important considerations for these bales are:

- Mow grass to a 6 cm stubble (to maintain the quality of grass for grazing).
- Expect to produce 6-10 bales per hectare.
- Avoid dung contamination of the grass during mowing and baling.
- Ensure an adequate wilt (ensures preservation; avoids effluent; helps retain bale shape).
- Use a slow forward speed when baling to ensure grass is densely packed in bales. This will help retain bale shape.
- Leafy bales can be quite heavy, so transport these bales straight to the storage area, and handle very gently.
- If there is a choice, feed these bales to high-performing cattle.

④ How do I make good quality maize silage?

- Good quality crops grown on suitable sites will have at least half of the crop dry matter (DM) present in the cob (versus in the stover).
- Harvest when the cobs are at 50% DM content, or when the whole crop is about 30% DM. This should produce a silage of over 25% starch (in DM).
- If the cob is at the stage for harvesting don't wait for the stover to dry out – harvest the crop straight away.
- Chop the crop using a corn cracker to ensure all grains are fully broken.
- Ensile and feedout as for grass silage.

⑤ What do I need for good quality whole-crop cereal silage?

Whole-crop cereal silage of high feed value can be made from wheat, barley or triticale. These crops should be grown as for commercial crops producing high yields of grain.

- Good quality crops will have over half the crop DM present in the grain (versus in the chaff plus straw).
- Don't harvest the crop until the grain has progressed beyond the 'milky' stage of development. Ideally, harvest it when the grain is at the 'cheddar cheese – soft dough' stage of development. At this stage the crop should be between 40-50% DM, and should produce a silage with over 25% starch (in the DM).
- Precision-chop the crop, and be careful to avoid grain loss during harvesting. Grain crackers are only required with very mature crops (crops of over 60% DM).
- Ensile and feedout as for grass silage.



Performance of finishing cattle on alternative silages.

	Maize silage	Whole-crop wheat silage	Whole-crop barley silage	Meals ad lib
Silage DM (dry matter) intake (kg/day)	6.6	7.2	7.2	1.3 (grass silage)
Total DM intake (kg/day)	9.2*	9.8*	9.8*	9.5
Liveweight gain (g/day)	1,235	1,254	1,151	1,473
Carcass gain (g/day)	781	741	736	939

* The additional dry matter intake (meals make up the extra dry matter intake over the silage intake).

⑥ How do I manage feed demands?

The typical lifetime feed budget of a beef animal includes milk, grazed grass, conserved forage (typically grass silage) and meals. Grass is the cheapest feed produced in Ireland and its utilisation must be maximised in producing beef.

How to Calculate silage stocks on the farm



Calculate the volume of silage in the pit
For example, a silage pit with measurements
28 m long x 10 m wide by 2.4 m depth
Volume = 28 x 10 x 2.4 = 672 m³

Select the conversion to tonnes of fresh weight, depending on the dry matter of the silage.

Key fact



Calculating silage stocks in store can be very imprecise

Silage Dry Matter %	Conversion Factor
18%	0.81
20%	0.77
25%	0.68
30%	0.60
35%	0.53

For example, the silage is 25% DM, therefore the conversion to be used is 0.68

Calculate the tonnes fresh weight of silage

For example, the silage pit above has 672 m³ and the dry matter is 25% at a conversion of 0.68
Therefore the tonnes fresh weight of silage is 672 x 0.68 = 457 tonne fresh weight

Weight of silage and straw bales

Forage	Description	Weight kg
Grass Silage	Chopped 25% DM	720
	Chopped 30% DM	650
	Unchopped 25% DM	660
	Unchopped 30% DM	580
Straw	Round bales 4x4	150
	Round bales 5x4	245
	Big square bales 8x4x3	400
	Big square bales 8x4x4	580
	Small square bales	12.5

Weight of Forage Maize and Whole Crop-Cereal Silage

Forage density (kg DM/m ³)		
DM%	kg DM / m ³	kg fresh / m ³
25	200	800
30	225	750
35	255	730

How to Calculate your silage requirement



	Silage Tonnes/ Month
Suckler Cows	1.2
Store / finishing cattle (500kg)	1.3
Weanling (300kg)	0.8

What to do if I am short of silage

- Buy silage, often a bad option as its overpriced and poor quality.
- Restrict access to silage and make up the shortfall with concentrates.
- Offer straw and concentrates.
- Buy alternative feeds.
- Set up the farm for a longer grazing season, reducing the demand for silage.
- Sell stock.
- In a situation where silage supply is limited, feeding a restricted quantity of silage and making up the shortfall with ration is a realistic option.

	Fresh Weight Grass Silage	Concentrate Feeding Rate kg
Suckler Cow (dry)	20 kg	2.5 – 3.5
Suckler Cow (calved)	20 kg	5 – 5.5
Stores (450kg)	18 kg	3
Weanling	10 kg	2.5
Finishing cattle	5-8 kg	Ad Lib

Key question

What is the value of forage maize?

At a concentrate price of €230 / t, good quality forage maize (30% DM, 25-30% starch) is worth €45 / t. Increase or decrease by €4-5 / t for every €20 / t change in concentrate price.

Key question

What is the value of fodder beet?

At a concentrate price of €230 / t, fodder beet (19% DM) is worth €40 / t. Increase or decrease by €4-5 / t for every €20 / t change in concentrate price.

Key Fact

The use of alternative forages and / or wet feeds in beef systems is restricted to beef finishing systems. There is no role for alternative forages such as forage maize or whole crop cereal silage for suckler cows. Likewise their role in growing weanlings is also limited.

Key question

Which classes of stock are brassica crops suited to? Brassica crops suit suckler cows, weanlings and store cattle for overwintering to reduce feed costs and especially fixed costs associated with housing. Grazing brassica crops is not suitable for young bulls or finishing steers and heifers.

How to

Feed brassica crops (kale, rape etc) in the field

Estimate the amount of fresh matter offered to the herd each day (i.e. the size of the break). Unless you have an accurate way of estimating yield, it is trial and error in allocation. Start off with a small allocation and build the allocation gradually. Don't feed brassicas as 100% of the diet. While research has shown that kale can be fed at 100% of the diet, this requires a very high level of management. Feed at least 20% of the dry matter intake as grass silage or straw.

Brassicas must be strip-grazed.

Crop breaks should be long and narrow rather than short and wide, so that cows can have access to the fresh break and trampling is kept to a minimum, hence maximizing utilization. Adapt animals gradually to brassica crops over at least one week.

Ensure that fencing is very secure as poisoning can occur if animals overgraze / gorge on the crop. Feed a good quality mineral with a high level of iodine and copper.

Crops should be grazed out before flowering as flowering brassica crops are poisonous. Aim for the final grazing of the crop before mid-march.

Feeding fodder beet and other brassica crops in frosty conditions is not recommended, so feed only when the frost has thawed.

Section 6

Concentrate Feeds

by Siobhan Kavanagh



Introduction

High production and transport costs mean that concentrates are usually far more expensive per unit of feed value than grazed grass or grass silage produced on the farm. To maximise profit, animals should achieve as much of their growth from forage, preferably grazed grass, as possible.

Nonetheless, concentrates are essential at key times in the animal's life

- ① What should I look out for in concentrate feeds?
- ② How can I ensure I'm getting value for money?
- ③ Should I consider home mixing?

Concentrate Feeds

① What should I look out for in concentrate feeds?

- In buying concentrates the nutrient content (i.e. energy, protein, minerals, fibre, starch) is more important than the individual ingredient composition. Always buy concentrates on the basis of nutrient content.

How to

Choose the concentrate mix that is Right for You



- Energy is the most limiting nutrient in beef diets - always check the energy content of the concentrate. The energy density of concentrate mixes for high levels of performance should be a minimum of 0.94 UFL / kg as fed for suckler cows and weanlings and a minimum of UFV of 0.92 / kg as fed for finishing cattle. (UFL is the unit used for suckler cows, UFV for finishing cattle)
- Check the protein content of the concentrate. Protein requirement will vary with type of animal, stage of the production cycle and the base forage being offered. Always balance the protein content of the concentrate with the protein content of the forage.
- Unless feeding minerals separately, check that minerals are included in the concentrate mix. Check that the feeding rate of the concentrate mix supplies the correct daily amount of minerals, e.g. if the label of a ration states that it should be fed at 5 kg / animal / day, it should not be fed at 10 kg / animal / day. Why? There is a risk of toxicity from oversupplying minerals.



- As a rule of thumb: beef cattle require 20 g of a general-purpose beef mineral / 100 kg LW, pre-calver minerals typically have a feeding rate of 120 g / head / day and post calver minerals have a feeding rate of 150 g per head per day.

Crude Protein (CP) % / kg fresh weight required in concentrate mixes for grass silage and ad lib meal diets for different classes of stock

Category of Animal	Grass Silage-Based Diets		
	10% CP in the Silage	14% CP in the Silage	Ad Lib meals
Weanlings (1.0 -1.5 kg feeding rate)	20%	12%	-
Weanlings (2.5 kg feeding rate)	16%	-	-
Suckler cows (dry)	-	-	-
Autumn Suckler cows (calves at foot)	18%	12%	-
Store cattle (500 kg+)	20%	12%	-
Growing bulls	18%	12%	12-13%
Finishing cattle (steers & heifers)	14%	11-12%	11-12%
Finishing bulls	11-12%	11-12%	11-12%

② How can I ensure I'm getting value for money?

- Always ask for information on the nutrient content of the concentrate, i.e. energy, protein, minerals and fibre.
- Shop around – there can be a lot of variation in price but always ensure that price differentials are not explained by variations in nutrient content, i.e. compare like with like.
- The cheapest concentrate mix (€/ tonne) may not be the best value. Consider the value of the ration based on its feeding value relative to its cost.
- High-protein concentrate mixes don't necessarily have high energy content. The energy content of a 14% CP concentrate mix could be higher than an 18% CP concentrate mix.
- Don't assume that straight ingredients are better value than concentrate mixes. Always check the price of buying straights (and home mixing), relative to buying a standard concentrate mix. Only buy from licensed suppliers.
- Calculating the relative cost of different feeds can be difficult. Teagasc has an interactive calculator on the client site www.teagasc.ie where the price of barley and soya can be entered and the relative value of different feeds is then calculated automatically

Relative values of Feeds for High / Medium Protein Diet

Relative value of feeds, generated using barley and soya, are suitable for dairy diets and other high energy high protein diets.

Please enter in the price at which you can source these two feed locally and click the **Calculate** button. This will give the relative value of a range of feeds.

Print Page					
Enter Barley Price:	<input type="text" value="0"/>	<input type="button" value="Calculate"/>	Feed Value =	<input type="text" value="0"/>	Per Unit of Protein
Enter Soya Price:	<input type="text" value="0"/>			<input type="text" value="0"/>	Per Unit of Energy

Value of FeedStuffs - Relative to Barley and Soy

	UFL (per kg DM)	DIE (per kg DM)	Value (per t DM)	DM (%)	Value (per t as fed)
Barley	1.16	103	<input type="text" value="0"/>	86.6	<input type="text" value="0"/>
Soya	1.18	269	<input type="text" value="0"/>	86.4	<input type="text" value="0"/>
Wheat	1.16	106	<input type="text" value="0"/>	86.6	<input type="text" value="0"/>
Oats	1.03	84	<input type="text" value="0"/>	87.4	<input type="text" value="0"/>
Maize	1.22	120	<input type="text" value="0"/>	86	<input type="text" value="0"/>
Unmolassed Beet Pulp	1.14	110	<input type="text" value="0"/>	88.1	<input type="text" value="0"/>
Molassed Beet Pulp	1.14	98	<input type="text" value="0"/>	88.1	<input type="text" value="0"/>
Molasses, Beet	1.03	71	<input type="text" value="0"/>	76.1	<input type="text" value="0"/>
Molasses, Cane	1	68	<input type="text" value="0"/>	73.5	<input type="text" value="0"/>
Citrus Pulp	1.14	91	<input type="text" value="0"/>	87.5	<input type="text" value="0"/>
Soya Hulls	1.05	107	<input type="text" value="0"/>	87.9	<input type="text" value="0"/>
Maize Gluten Feed	1.04	125	<input type="text" value="0"/>	86.5	<input type="text" value="0"/>
Maize Distillers Grains	1.16	134	<input type="text" value="0"/>	89	<input type="text" value="0"/>
Rapeseed Meal	1.05	151	<input type="text" value="0"/>	86.4	<input type="text" value="0"/>

Concentrate Feeds

What should I do if concentrate costs are high?

- Do a feed budget to work how much you will need and shop around for value (ensuring you bear quality in mind)
- Buy in bulk – buying rations in bags is much more expensive
- Consider high energy straights and simple mixes which are generally cheaper per unit of energy than compounds
- Feed to need only – monitor body condition of suckler cows, stores and weanlings throughout the winter to see if concentrate rate can be reduced or even stopped, especially in the second half of the winter.
- Buy grain directly from cereal farmers and add a protein balancer as required. With good silage, rolled barley plus minerals is adequate for store cattle and strong weanlings.
- Make best use of silage by having adequate feeding space, stocking rate in sheds, suitable feed barriers, good ventilation and parasite control.
- Aim for high performance on finishing cattle. Restrict high concentrate feeding to the final finishing period (80-100 days for steers and heifers and up to 200 days for bulls). With ad-lib concentrates a high rate of gain (1.5-1.8kg) live weight/day, is essential to cover daily feed costs. Highest rates of gain are achieved over a short finishing period.
- Plan for early turnout. Spring grass has a feeding value almost as high as concentrate feeds and costs less than one third of the price.
- Keep concentrate mixes simple.
- Sell cattle when fit for slaughter. Overfat animals cost significantly more to feed.

③ Should I consider home mixing?

Checklist

Factors to Consider



What is the scale of the operation?

- The feed usage on the farm must be sufficiently large to justify the additional labour and costs attached to home mixing.

What are the potential cost savings?

- Buying straight ingredients is not always cheaper than buying a balanced concentrate mix.

What storage facilities are available on the farm?

- There needs to be bird-and vermin-proof storage available on the farm.

What additional capital investment in buildings and equipment is needed?

- Investment in storage facilities can cost anything from €10-40 / t of concentrate used. This may not be cost effective.

Will the system be compliant with the feed hygiene and home mixing regulations?

What level of management skill is required?

- Buying ingredients competitively requires time and skill. The skill is in ensuring that rations are correctly balanced. The effort attached to home mixing may result in more important management jobs on the farm suffering, e.g. grassland management.

Key Risk



If using straight ingredients, it is important to check that these are correctly balanced for all nutrients, particularly minerals.

How to

Make best use of home stored cereals?





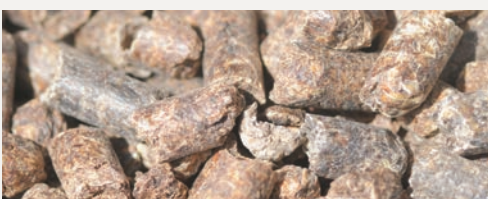
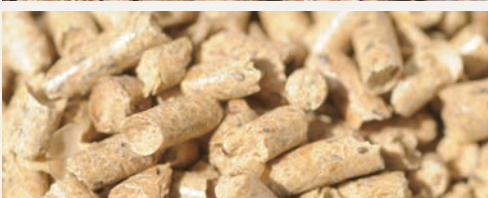



Category of Animal	Feeding Rate of Cereal* (max)	Comments
Dry cows	2-3 kg	Suitable for putting condition on dry cows fed grass silage, must be balanced for minerals; If feeding a lot of straw need to balance for protein,
Weanlings	1-3 kg	Suitable as sole concentrate where grass silage protein is greater than 16%, otherwise need to balance with protein, must be balanced for minerals
Store cattle	1-2 kg	For heavy stores there is no need for additional protein, must be balanced for minerals
Finishing cattle on grass	2-3 kg	Some concern over palatability at higher feeding rates, alternatively use 50:50 cereal:digestible fibre (e.g. hulls or pulps)
Finishing steers on grass silage	5-6 kg	No requirement for protein, must be balanced for minerals
Finishing steers on ad lib meals	5-6 kg	5-6 kg is relatively safe, higher rates possible but feeding management must be excellent to avoid digestive upsets; must be balanced for minerals

*The primary focus is on barley in this table but wheat may also be used. The risk of digestive upsets is far greater and the limits on feeding rate are more stringent. Oats can be used for dry cows, weanlings and stores. For finishing cattle, oats could replace part of the digestible fibre in the ration. In all cases, the cereal must be balanced for minerals.

Concentrate Feeds

Common ingredients (see later table for UFL/UFV values)

Energy feeds	Comments	
Barley	High-energy, high-starch, ingredient, risk of acidosis at high feeding rates, low protein (10-11% CP), low in vitamins and calcium, limit inclusion level to 6-7 kg of finishing diets, higher inclusions possible but feeding management is critical, feed rolled rather than ground.	
Wheat	High-energy high-starch ingredient, energy content similar to barley, starch is rapidly digestible, higher risk of acidosis than with barley or maize, low in vitamins and calcium, limit inclusion to 2-3 kg, unless it's caustic treated, feed rolled only.	
Maize grain	High-energy high-starch, but slowly digestible, lower risk of acidosis than with either barley or wheat, 30% of the starch is bypass, low protein (9-10%), low in calcium, there is no limit on usage but price will limit inclusion.	
Citrus pulp	By-product of pressing citrus fruits, high energy, good source of digestible fibre and sugar, useful ingredient combined with cereal and protein source, low protein (6% CP), low in phosphorus, limit inclusion to 3-4 kg but must be balanced for minerals.	
Beet pulp	By-product of sugar processing, high energy, good source of digestible fibre, useful ingredient combined with cereal and protein source, low protein (10% CP), low in phosphorus, limit inclusion in dry matter.	
Soya hulls	By-product of dehulling soyabeans, moderate energy, good source of digestible fibre, low protein (10%), useful ingredient in ad lib concentrate diets or fodder beet diets, reduces the risk of digestive upsets, limit inclusion to 2-3 kg.	
Wheat feed (Pollard)	By-product of flour manufacture, low-energy digestible-fibre source, moderate protein (16% CP), Good source of phosphorus but low in calcium and vitamins, variable quality, limit inclusion to 5-10%, depending on target energy density.	

Molasses	Moderate energy, good source of sugar, useful for binding pelleted concentrates, reducing dust and improves palatability of concentrate mixes.	
Protein Feeds		
Soyabean meal	High quality protein feed (48% CP) with high energy content, high in by-pass protein, good amino acid profile, being high in lysine but low in methionine, no limit on inclusion, limited by protein requirement and price.	
Maize distillers	By-product of alcohol distilling, moderate protein (25% CP) and high energy, high in digestible fibre and by-pass protein, high oil which can affect fibre digestibility and intake if the diet exceeds 5% fat, limit inclusion to 3.0-3.5 kg.	
Maize gluten feed	By-product of the manufacture of maize starch, moderate protein feed (20% CP) with moderate energy, variable quality, limit inclusion to 2.5-3.0 kg.	
Rapeseed meal	By-product of oil manufacture, high protein (34% CP), good source of rumen-degradable protein, moderate energy, palatability issues at high inclusion rate, limit inclusion to 2 kg.	
Palm kernel meal*	By-product of oil manufacture, moderate protein (16% CP) but protein is poor quality, low-energy feed, limit inclusion to 5-10%, depending on target energy density.	
Sunflower meal*	By-product of oil manufacture, very low energy high-fibre feed, high protein (25% CP) but protein of moderate quality, high in phosphorus, limit inclusion to 5-10%, depending on target energy density.	

*The combined maximum inclusion of these ingredients in high energy rations should not exceed 10-15%.

Concentrate Feeds

Sample concentrate mixes¹

	Energy Specification (Minerals must be added to these mixes)	Energy Sucklers, Stores Weanlings UFL	Energy Finishing Steers, heifers, bulls UFV	Crude Protein	Comments
1. General Purpose (14% CP)	Barley (33.3%), citrus pulp (33.3%), distillers grains (33.3%)	0.98	0.94	13.8%	Suitable for suckler cows post calving, weanlings, finishing cattle
2. Cereal balancer or fodder beet balancer	Rapeseed meal (45%), soya hulls (55%)	0.92	0.87	20.0%	65% cereal + 35% of this mix will generate a ration of 13.5% CP, 50% cereal + 50% of this mix will generate a ration of 16% CP; suitable for feeding with 20 kg of fodder beet to finishing cattle
3. Ad lib feeding 1	Barley (60%), distillers grains (20%), soya hulls (20%),	0.96	0.94	13.2%	High-energy ration suitable for all classes of stock and ad lib diets
4. Ad lib feeding 2	Barley (40%), maize meal (20%), distillers grains (20%), soya hulls (20%)	1.00	0.98	13.0%	Very high energy ration and slightly safer ration with maize meal included

¹Minerals must be added to all mixes

Database of feed ingredients used in beef concentrate mixes (Analysis/kg as fed)

	DM %	Suckler Cows & Weanlings	Energy	Finishing Cattle	Crude Protein %	Crude Fibre %
		UFL		UFV		
Wheat (rolled)	86.6	1.00		1.00	9.7	2.3
Barley (rolled)	86	1.00		1.00	9.7	4.1
Beans	86	1.01		1.01	24.6	7.9
Beet pulp unmolassed	88.1	1.00		0.93	8.8	18.0
Citrus pulp	87.5	1.00		0.92	6.0	11.6
Fat (vegetable)	98	2.85		2.80		
Maize grain	86	1.05		1.04	8.7	2.3
Maize distillers	89	1.03		1.00	26.6	8.9
Maize gluten feed	86.5	0.92		0.86	20.3	7.8
Molasses cane	73.5	0.74		0.76	4.5	
Oats	87.4	0.90		0.85	9.7	11.8
Palm kernel exp.	89	0.85		0.84	14.6	21.2
Peas	85.6	1.03		0.99	21.1	5.1
Wheat feed (pollard)	88.1	0.77		0.64	16.2	8.7
Rapeseed meal	86.4	0.91		0.83	33.8	11.7
Soya hulls	87.9	0.89		0.87	10.5	35.4
Soyabean meal	86.4	1.02		1.02	48.1	4.5
Sunflower meal	88.6	0.58		0.50	24.6	29.1
Urea	95	-		-	273.1	

Database of commonly used forages/wet feeds (Analysis/kg DM) Consult the Teagasc website for current relative value of feeds

	DM (%)	Crude Protein (%)	Neutral Detergent Fibre (%)	Energy (UFL)	Energy (UFV)	Calcium (%)	Phosphorus (%)
Grass (autumn)	18.6	20.7	45.0	0.95	0.95	0.69	3.50
Grass (spring)	16.4	21.0	42.0	1.06	1.03	0.69	3.50
Grass (summer)	17.2	20.5	45.0	1.01	0.98	0.69	3.50
Grass silage 64% DMD	24.0	11.5	55.0	0.71	0.66	0.69	3.50
Grass silage 68% DMD	24.0	11.5	46.1	0.76	0.71	0.69	3.50
Grass silage 72% DMD	24.0	11.5	46.1	0.81	0.77	0.69	3.50
Baled silage 64 DMD	30	11.5	55.0	0.71	0.66	0.69	3.50
Baled silage 68 DMD	30	11.5	46.1	0.76	0.71	0.69	3.50
Baled silage 72 DMD	30	11.5	46.1	0.81	0.77	0.69	3.50
Hay	85.0	9.9	66.0	0.69	0.60	0.70	2.80
Maize silage 25% starch	32.0	8.5	48.0	0.80	0.75	0.20	2.00
Whole crop cereal silage, fermented	45.0	9.0	55.0	0.80	0.75	0.20	2.40
Whole crop cereal silage, processed	75.0	14.0	55.0	0.80	0.75	0.20	2.40
Straw–barley	88.0	3.8	84.4	0.44	0.33	0.38	0.90
Sugar beet	23.2	5.0	19.5	1.15	1.17	0.28	1.70
Potatoes	20.0	10.8	13.3	1.20	1.22	0.12	2.40
Fodder beet	19.0	8.0	13.6	1.12	1.14	0.26	1.80
Kale	14.0	16.0	25.0	1.05	1.05	2.50	3.00
Rape	13.0	22	25.0	0.91	0.91	0.90	0.50

Concentrate Feeds

Grain Preservation Options

Ammonia treated grain (20% moisture content) is treated with a urea based additive (+enzymes), stored rolled or unrolled. Well sealed under plastic, Advantage of increasing the crude protein to 14-15% / kg DM.

Acid treated grain (18-28% MC) is treated with propionic acid, stored rolled or unrolled, increase acid application rate by 10-15% if rolling before storing. Where grain has a variable MC, apply the acid at the rate for the higher MC grain.

Untreated grain must be under 15% moisture content (MC) for long term storage. Store at 15-17% MC, where the heaps are kept low and there is adequate ventilation to keep the grain in good condition. No additive, roll at feedout.

Alkali treated grain (15-30% MC) is treated with sodium hydroxide. No requirement for rolling. High pH product, reducing the risk of digestive upsets in live stock.

Crimped grain (28-35% MC) is harvested 3-4 weeks before normal harvest, window for treatment can be narrow, if drying rapidly. Treat with additive and process the grain using a crimping machine. Ensile anaerobically

Key terms

UFLs (Unite forragere lait) the energy in feed and forage are expressed in UFLs.

UFV (Unite forragere viande) the energy in feed and forage are expressed in UFV's. The UFV value is used for finishing cattle

Crude protein: expressed as a percentage (%).

PDI: Protein digestible in the intestine (expressed as g/kg of dry matter), a better measure of protein as it reflects the quality of the protein.

PDIN: Measures the PDI which can be produced from the available N.

PDIE: Measures the PDI which can be produced from the available energy.

Macro minerals: The main minerals - including calcium, phosphorus, magnesium, sodium, potassium and sulphur. These are measured in g per head per day or g per kg diet DM.

Trace elements: Copper, selenium, iodine, cobalt, zinc and manganese. These are measured in mg per head per day or mg per kg diet DM.

Dry matter intake (DMI, kg DM): this is the weight (kg) of feed material consumed, excluding the moisture it contains.

Alternative Feed Sources



There are a number of alternative feed sources, co-products from the baking, confectionary, vegetable and brewing industries. These may have a role to play on some larger units but a number of factors must be considered in examining them.

- What is the variation in dry matter?
- What is the nutritive value & how variable is this?
- What particular nutrients is it high / low in, for example, starch or oils.
- What are the limits on inclusion rate?
- How much, when and where is the feed available?
Is there a consistent supply of the product available?
- How is it stored?
- What extra handling and storage facilities are needed on the farm? Are there large storage losses associated with it?
- Don't automatically assume that it will be cheaper than a purchased ration.
- Does it contain chemical residues or other banned compounds?, e.g. waste oil from chippers.

Section 6

Feeding the Suckler Cow

by Siobhan Kavanagh, Mark McGee, Liam Fitzgerald



Introduction

Suckler herds produce the majority of stock destined for beef production (though weaned animals are also sourced from dairy herds). About 80% of suckler cows calve in spring, 20% in autumn.

- ① Why does the cow's Body Condition Score matter?
- ② What are the feed requirements of the dry cow (in late pregnancy)?
- ③ What are the feed requirements of the lactating cow?
- ④ How do I manage the feed requirements of the autumn-calving suckler cow?

Feeding the Suckler Cow

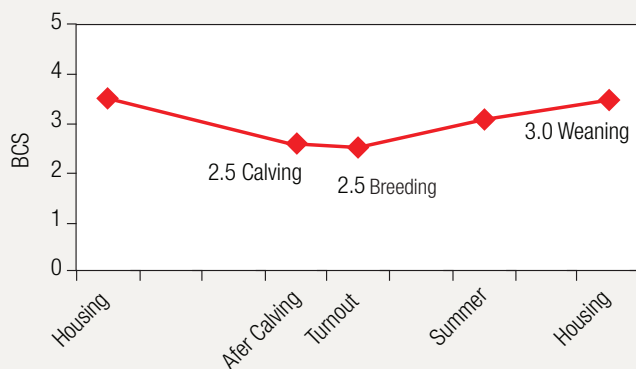
① Why does the cow's Body Condition Score matter?

Body Condition Score estimates the cover of flesh on the 'frame' of the animal. The range goes from 0 (emaciated) to 5 (grossly over-fat). Individual condition score units are usually divided into half and quarter scores. Body condition scoring provides an excellent guideline for feeding suckler cows at various stages of the production cycle (calving, weaning, housing, etc.).

Targets: Body Condition Scores

	Spring Calving	Autumn Calving
Housing	3.0-3.5	2.5-3.0
At Calving	2.5	3.0
At Turnout to pasture	2.0+	2.0
At Breeding	2.0 – 2.5	2.5

Target cow Body Condition Score (0-5) for spring calving herds



How to

Assess the Body Condition Score in suckler cows

- Handle cows for fat cover on edge of loin bones (transverse processes).
- Handle for fat cover on tail head and ribs.
- At condition score 3.0 and greater, loin bones cannot be felt so focus on the tail head and the fat cover over ribs.

Body Condition Scores on 5 point scale

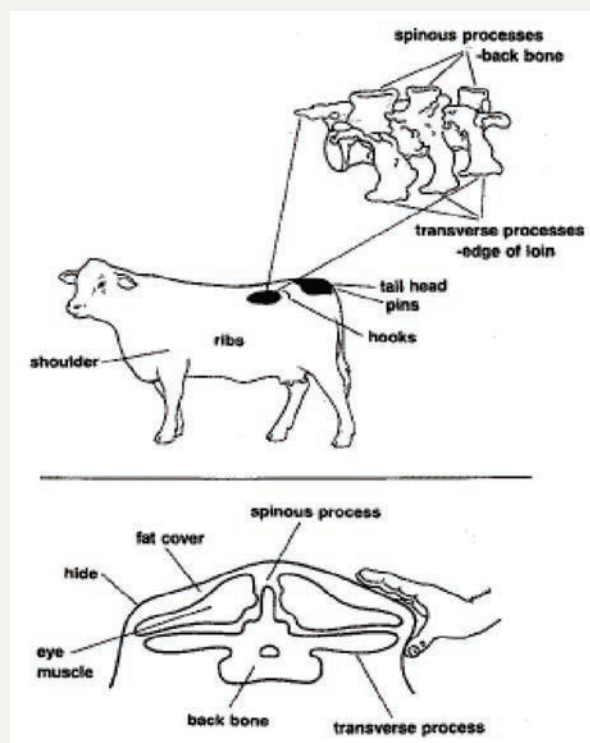
Score 1: Individual transverse processes fairly sharp to the touch & no fat around tail head. Hip bones, tail head & ribs visually prominent.

Score 2: Transverse processes identified individually when touched, but feel rounded rather than sharp. Some tissue cover around tail head & over hip bones. Individual ribs no longer obvious.

Score 3: Transverse processes can only be felt with firm pressure. Areas either side of tail head have fat cover that is felt easily.

Score 4: Fat cover around tail head evident as slight "rounds," soft to touch. Transverse processes cannot be felt even with firm pressure. Folds of fat developing over ribs.

Score 5: Bone structure no longer noticeable, & animal presents a "blocky" appearance. Tail head & hip bones almost completely buried in fat, & folds of fat are apparent over ribs. Transverse processes are completely covered by fat, & animal's mobility is impaired



Body Condition Scoring (BCS)



Pictures Defra

What If: Body Condition Score is not at target level?

Spring Calving	Target	Implications
At Calving	2.5	Lower, If BCS is less than 2.0 there will be a slower return to breeding, the cow will be weaker at calving and will produce poorer colostrum. Higher, If BCS is higher than 3.0 the cow will have greater difficulty calving and re-breeding could be delayed.
At Turnout	2.0+	Lower, If BCS is lower than 2.0 there will not be enough time to recover for breeding with spring-calving cows.
At Breeding	2.0-2.5	Lower, A BCS below 2.0 will result in delayed breeding and possibly lower conception rate.
At Housing	3.0+	Lower, If BCS is lower than 3.0 winter feed costs will be higher Higher, A BCS significantly more than 3.0 is unnecessary, wasteful

Feeding the Suckler Cow

Spring Calving Sucklers

② What are the feed requirements of the dry cow (in late pregnancy)?

Cow feed requirements during late pregnancy are for maintenance of the cow, some growth of the cow particularly if she is young (especially applies to first-calvers) and for the growing foetus. The foetus gains between 75 and 80% of its total birth weight during the last 3 months of pregnancy. Where mature cows are in good BCS (~3.0) at the start of the winter their feed energy intake can be restricted such that some of the body reserves of fat are utilised to reduce winter feed requirements. This feed energy restriction can result in a feed saving equivalent to 1.0 to 1.5 tonnes fresh weight of grass silage.

The feed energy restriction can occur in various ways, such as offering moderate quality grass silage (65 DMD) to appetite, "diluting" the energy value of good quality silage with straw and offering that to appetite, or by restricting the amount of good-quality silage offered daily. Another option is feeding good-quality straw with supplementary concentrates.

- Where the amount of feed is restricted it is important that feeding space is adequate such that all cows can eat at the same time.
- If cows are below good BCS, they cannot be restricted and must be fed to requirements.
- Always offer an appropriate dry cow mineral/vitamin mix.

How to Feed cows pre-calving



- Group cows according to BCS.
- Assuming a BCS of 3.0-3.5 at housing:
- This body condition can be used to reduce winter feed costs.

- If moderate to good quality silage (65-70 DMD) is available, intake can be restricted to 30-35 kg fresh silage prior to calving.
- Assuming a BCS 2.5-3.0, cows should be fed such silage to appetite, if an adequate supply is available, while thinner cows will need 1-2 kg concentrate before calving.
- Good-quality straw plus 2-3 kg of concentrates (including minerals & vitamins) is suitable for dry cows in good body condition. The crude protein content of the concentrate should be at least 18% in order to meet the dietary protein requirement. Feeding straw is not suitable for cows in poor BCS or for cows after calving.

Body Condition Score, nutrition & calving difficulty

Many factors influence the incidence of calving difficulty but calf birth weight and internal pelvic area of the cow account for most of the variation in calving difficulty (dystocia). As cow BCS increases above a moderate level, calving difficulty can increase. Over-fat cows have increased calving difficulty because fat is deposited in the pelvic area, thereby reducing the size of the pelvic canal. Very thin cows also have increased calving problems (and increased calf mortality) due to insufficient strength to withstand the birth process and giving birth to weak, non-vigorous calves.

Low levels of feeding during the last one-third of pregnancy will not result in predictable effects on calf birth weight or calving difficulty.

Key Facts

Nutrition & calving difficulty



- Fat animals can have increased difficulty at calving (fat-filled birth canal etc.). Reduced feeding during the last one-third of pregnancy may not solve this (there can still be problems calving). The problem of excess condition must be addressed earlier.
- Thin cows may have insufficient strength to withstand the birth process and can deliver weak non-vigorous calves.

③ What are the feed requirements of the lactating cow?

Cow feed requirements during lactation are for maintenance of the cow, some growth (particularly young cows) and milk production. Replenishment of body reserves utilised during the indoor winter period is an additional requirement.

- Aim to turn out spring-calving cows to grass as they calve. Cows going to grass directly after calving don't need concentrates if there is a good supply of high-quality grass.
- If cows with calves at foot are indoors on a silage-based diet and in good condition, feed moderate to good quality silage, to appetite, for 4-6 weeks after calving, provided the diet is grass-based thereafter. If silage quality is poor, feed 1-2 kg meals.
- If cows with calves at foot are indoors on a silage based diet and in poor condition, feed moderate to good quality silage, to appetite, plus 2-3 kg meals.
- After calving, first-calvers require concentrate supplementation in all cases until turnout to pasture. Where silage quality is moderate to good, feed 1-2 kg meal and if silage quality is poor, feed 2-3 kg meal.
- Always offer an appropriate mineral/vitamin mix
- Pay extra attention to first-time calvers, shy feeders, old cows and thin and lame cows. Feed minerals – see below.
- Feed a high energy (UFL = 0.94+) ration with 16% protein.

Autumn Calving Sucklers

④ How do I manage the feed requirements of the autumn-calving suckler cow?

How to Feed autumn-calving sucklers pre-calving



Typically cows are grazing pasture. In situations where cow BCS is high and cows are likely to become over-fat, weaning may be delayed and herbage allowance or quality can be restricted. This may be achieved by increasing stocking rate or grazing the cows as followers in a leader-follower grazing system.

- Feed a good quality pre-calver mineral. In general, a mineral bucket is used autumn-calving suckler systems.

How to Feed autumn-calving sucklers post-calving



With 72 DMD silage if autumn-calving cows are in good condition, feed 1.8 kg of meal before and drop to 0.3 kg after breeding. If cows are in poor condition, 1.8 kg before and after breeding.

See Table below.

Feed requirements of autumn-calving cows.

Silage Quality (66 = moderate, 72 = good)	Time	Cow Condition Good ~ 3.0		Cow Condition Poor ~ 2.0	
		Meal Feeding kg / day		Meal Feeding kg / day	
72 DMD	Before breeding	1.8 kg		1.8 kg	
	After breeding	0.3 kg		1.8 kg	
66 DMD	Before breeding	2.5 kg		2.5 kg	
	After breeding	1.5 kg		2.5 kg	

Mature 600 kg cow; Milking 8 kg / day; Change concentrate allowance by ~0.5 kg / kg change in estimated milk yield.

Feeding the Suckler Cow

Checklist



Minerals for the suckler cow – pre-calving

- Feed the right type and level of pre-calver mineral (see example below)
- Feed pre-calver minerals for 4-6 weeks pre-calving
- Pre-calver minerals can be fed by dusting on top of the silage, through water, trace elements can be supplied in boluses (but this will not cover for major elements), molassed mineral buckets and in a carrier ration.
- Don't feed last year's minerals.
- Ensure feeding rate is correct – weigh it out
- If top dressing on silage, do it at least twice a day
- Ensure adequate feeding space (1.5-2.0 ft, 0.5 - 0.66m / cow)

Major Elements	“What you see on the label”	Feeding Rate 120 grams / day What the animal gets / day
Calcium	0%	0 g / day
Phosphorous	4.0%	4.8 g / day
Sodium	13%	16 g / day
Magnesium	17%	20 g / day
Trace Elements		
	mg/kg	
Copper	2,700 mg /kg	324 mg / day
Selenium	50 mg /kg	6 mg / day
Iodine	500 mg /kg	60 mg / day
Cobalt	100 mg /kg	12 mg / day
Manganese	1,000 mg /kg	120 mg / day
Zinc	4,000 mg /kg	480 mg / day
Vitamins		
Vitamin A	400,000 iu / kg	48,000 iu / day
Vitamin D3	100,000 iu / kg	12,000 iu / day
Vitamin E	2,000 iu / kg	240 iu / day

Checklist



Minerals for the suckler cow – after calving

The need for minerals in the suckler cow is significantly lower than that of the dairy cow and in general molassed mineral buckets are adequate to supply minerals. Major elements such as calcium, phosphorus and sodium will be adequately supplied in grazed grass and grass silage. Magnesium must be supplied during the tetany risk period. In the event of a deficiency, supplementation rates of trace elements are:

Trace Elements	What the animal needs to get per day
Copper	150-300 mg
Selenium	3-5 mg
Iodine	12-50 mg
Cobalt	5-10 mg
Manganese	335-415 mg
Zinc	335-750 mg

The lower end of the range is for routine use and the higher levels are advised for stock at risk of severe deficiency.

Key Risks



Magnesium deficiency

Suckler cows are at high risk of grass tetany (staggers) particularly on lush grass rich in potassium and nitrogen, in cold wet conditions. It can also occur on autumn grass. Cows need a supplement of 30 g of magnesium (or 60 g of calcined magnesite) during the high risk period.

Methods of magnesium supplementation include:

- Pasture dusting.
- Molassed mineral buckets/licks.
- Low feeding rate carrier concentrate feed.
- Water application.



Section 6

Calf Nutrition

by Mark McGee, Siobhan Kavanagh, Emer Kennedy



Introduction

Whether from the suckler herd, or the dairy herd, a good start is essential for calves.

- ① What are the nutritional needs of the suckler calf from birth to weaning?
- ② What are the key issues in feeding artificially reared dairy-bred calves?

Calf Nutrition

① What are the nutritional needs of the suckler calf from birth to weaning?

- As soon as possible after birth the calf must receive colostrum or first milk, which supplies the nutrients needed for survival. As well as being a source of nutrients colostrum contains immunoglobulins or antibodies, which are essential to the survival and health of the calf.
- Milk yield of the cow is the primary nutrient source for the suckled calf during the first few months of life. Milk yield is higher for beef x dairy breed cows than beef x beef breed cows. Due to their origins some beef breeds, such as Simmental, have a relatively high milk yield, but there is large variation in milk production within all breeds. Young cows, particularly first-calvers, generally have lower milk yield than mature cows. Lactation curves of suckler cows are relatively flat – their milk yield is relatively constant.
- Calves suckling cows with higher milk yield grow faster than those suckling cows with lower milk yield. The lower the milk supply from the cow, the higher the intake of grass by the calf, but the increase in grass consumption usually cannot compensate fully for a restriction in milk supply and therefore, calf growth rate is lower.
- As calves grow, and their dam's milk yield is static or starts to decline, they eat more grass.
- In order to meet calf growth potential and weaning weight targets, "creep feeding" meal and/or "creep grazing" the calf can be used to compensate for a lack of milk produced by the cow and/or deficiencies in grass supply or quality.
 - Creep feeding results in an increase in dry matter/nutrient intake despite a decrease in grass intake, and consequently, increases in growth rate. Calf growth response to creep feeding is higher when cow milk yield is lower, when grass supply is inadequate and when grass quality is poor.
 - Similarly, calf growth response to creep grazing is a function of cow milk yield, and grass supply and quality where the cows are grazing.

- Under the "Animal welfare, recording and breeding scheme for suckler herds" (Suckler Welfare Scheme), supplementary concentrate feeding for four weeks pre-weaning is compulsory.
- Male calves are heavier at birth and grow faster pre-weaning ($\sim +0.1$ kg/day) than females.
- The limited capacity of the suckler calf to compensate post-weaning for growth setbacks experienced pre-weaning due to insufficient milk, means that live weight differences at weaning are largely retained until slaughter.

Key fact

The suckled calf receives nearly all its nutrition from the cow for the first three months of life.

Key targets

Pre-weaning daily live weight gain (not including creep feeding). Calves from:

Beef x Dairy cows:

- Males = ~ 1.15 - 1.30 + kg; Females = ~ 1.05 + kg

Beef x Beef cows:

- Males = ~ 1.05 - 1.20 + kg; Females = ~ 0.95 + kg

② What are the key issues in feeding artificially reared dairy-bred calves?

Key Target

Target live weight gain pre-weaning of 0.5-0.6 kg / day

How to

Decide how much liquid feed the calf should be offered

- The calf should receive at least 13-15% of the calf birth weight in whole milk or good quality milk replacer mixed at 125 grams / litre of water.

- Calves should get liquid feed twice a day until they are at least three weeks of age.
- Nipple feeding is more natural and tends to satisfy the suckling urge but feeding method does not have a major effect on weight gain.

Examples of Feeding Rates for Different Breeds

Breed	Holstein, Friesian, HF x Norwegian Red Cross	HF x Jersey Cross	Jersey
Average birth weight	37-40 kg	32 kg	28 kg
Minimum Volumes fed / day up to day 5	5 litres	4.5 litres	4.0 litres
Minimum Volumes fed / day after day 5	6.0 litres	5.0 litres	4.5 litres

Key risk



- Whole milk is the natural follow-on from colostrum but
 - Milk from cows that are under antibiotic treatment (including for mastitis) should not be fed to calves.
 - Milk with a high bacterial contamination, e.g. high SCC, risk of Johne's disease, salmonella and *E. coli*, should only be fed to calves after pasteurisation
 - Ideally milk from the first eight milkings should be pasteurised and chilled before feeding to calves

Milk from cows treated with antibiotics, and still within the withdrawal period, should never be fed to calves as it can affect the taste of the milk leading to calves not drinking as much milk, with resultant lower weight gains. But, more importantly bacteria that are resistant to these antibiotics can develop and if animals need to be treated with these antibiotics they may not work as effectively.

Checklist

Milk replacer?

- There is significant variation in quality of milk replacers. You generally get what you pay for.
- A good quality milk replacer should preferably contain only milk derived protein sources.



- To promote growth aim for a crude protein level of 22-25%.
- Fat sources should be highly digestible and preserved with an antioxidant.
- Crude fibre levels above 0.15% can be indicative of plant proteins. Avoid high crude fibre levels.
- Target ash content of 6.5-7.5%

How to

Decide how much concentrate to feed



Intake of concentrates is the single most important factor in the development of the calf's stomach

- Use a high specification calf ration. Target energy density = 0.95 UFL, crude protein content = 18%, balanced for minerals.
- A coarse ration will stimulate rumen development and calves will start to 'chew the cud'. Avoid finely ground feeds
- Additives are no substitute for good feeding management. Calves should have access to clean, palatable starter concentrates from 4-7 days old. Only offer small quantities of fresh feed every day, as this will reduce waste
- Calves fed coarse starter concentrates eat more and have higher weight gains than calves fed pelleted starters
- After a few weeks pelleted starters can be gradually introduced.

Alternatives

Roughage



- The concentrate feed is significantly more important than the roughage to develop the calf's stomach.
- Calves need small quantities of roughage – hay or straw. This is more important if feeding a pelleted ration.
- Avoid feeding too much. It can result in a pot belly. There is a greater risk of this with overeating of hay.
- Where pot bellies (or hay bellies) are observed it indicates that the rumen is packed with hay which can not be digested properly

Calf Nutrition

Key Question



Is water important?

- Water is important for rumen development. Clean water should be offered at all times. Milk is not a substitute for free access to water.
- A clean, fresh supply of water should be offered from 3-4 days of age

How to

wean calves.



- Wean calves at least 80 kg live weight when the calf is consuming at least 1 kg of concentrates per day.

- Calves that have access to concentrates from the second week of life and are offered the minimal required volumes of milk will usually eat 1 kg of starter concentrates from approximately 8 weeks of age.
- If calves that are offered near ad libitum milk, gradual weaning should not begin before week 12.
- In weaning, gradually reduce the volume fed over a period of 7-10 days. Calves fed twice a day should be reduced to once-a-day before weaning.
- When weaning calves aim for a uniform group as it makes post-weaning management easier. Age should not be an important factor at weaning.
- Increasing the weaning weight as the season progresses can help avoid having a group of small calves in addition to the larger earlier-weaned calves.



Section 6

Feeding weanlings and store cattle in winter

by Siobhan Kavanagh



Introduction

Exploiting subsequent compensatory growth is a key goal when feeding weanling/store cattle in winter.

- ① How do I feed weanlings during winter?
- ② What are the feed needs of store cattle during winter?

Feeding weanling and store cattle in winter

① How do I feed weanlings during winter?

- To minimise feed costs and exploit compensatory growth at pasture during the following grazing season, aim for a moderate rate of live weight gain (0.5-0.6 kg daily) during the first winter. There may be a case for higher weight gains and higher supplementation rates (than those outlined below), if animals are being sold out of the sheds at the end of the winter, instead of returning to pasture. Animals growing too slowly during winter will not be able to compensate sufficiently at pasture.
- Concentrate supplementation rate will be dictated by grass silage quality and animal type. Less concentrates are required when high digestibility silage is available.

Concentrate supplementation levels (kg/day) for weanlings offered grass silage differing in dry matter digestibility (DMD)

	Poor (62% DMD)	Average (68% DMD)	High (72% DMD)
Continental steers / bulls	3.0	2.0	1.0
Continental heifers	2.6	1.7	0.9
Friesian steers	2.6	1.7	0.9

- Meals should be front-loaded (i.e. feed more concentrates at the beginning of the winter than at the end of the winter) and reduced towards the end of the winter. The extra meal allows the animals to adjust to moderate quality silage for example, continental steers need 2.0 kg per day on 68 DMD silage or 300 kg meals over a 150 day winter. This could be fed as 2.5 kg for the first 100 days and 1.0 kg for the next 50 days.
- The concentrate should be high in energy (UFL = 0.94+) and contain 14-16% crude protein on a fresh weight basis. Minerals / vitamins should be included in this mix.
- If feeding fodder beet to weanlings, limit feeding rate to 5-10 kg fresh weight and feed 0.2-0.4 kg soya bean meal to balance it for protein. A mineral suitable for feeding with fodder beet (i.e. a maize/beet mineral) should be offered.

Checklist

Example of general purpose cattle mineral fed @ 20 g / 100 kg live weight, for example a 300 kg animal would need 60g.



Nutrient	Inclusion	Nutrient	Inclusion
Calcium %	14	Copper mg/kg	3,000
Phosphorus %	5	Selenium mg/kg	45
Sodium %	16	Iodine mg/kg	500
Magnesium %	-	Cobalt mg/kg	65
		Zinc mg/kg	4,000
Vitamin A iu/kg	200,000	Manganese mg/kg	1,000
Vitamin D3 iu/kg	40,000		
Vitamin E iu/kg	500		

② What are the feed needs of store cattle during winter?

Store cattle are animals that are being housed for a second winter, with the intention of going back to grass again the following spring.

How to

Feed Store Cattle over the winter



- The response to concentrate supplementation for stores is lower than for weanlings and subsequent compensatory growth at pasture is generally greater.
- Target daily live weight gain during the housing period is 0.5 kg/day for heifers and 0.7 kg/day for steers.
- The optimum level of concentrate supplementation for store cattle in winter is in the range of none to 2.0 kg / day, depending on silage quality. For good quality silage (72 DMD or greater) feed no meals. For moderate to poor quality silage feed 1.0-2.0 kg concentrates / day.
- Crude protein concentration of rations for store cattle should be 14-16%.
- Mineral requirement is similar to weanling cattle (see above). Use a general-purpose cattle mineral unless alternative forages and feeds such as maize silage, whole-crop cereal silage or fodder beet are being used.

Key terms

Compensatory growth



Compensatory growth usually occurs when animals have a plentiful supply of high-quality feed (usually grass) available following a period of restricted growth. Compensatory growth allows animals that received a limited diet over winter to 'catch up' with animals who were on a higher plane of nutrition (e.g. higher levels of concentrates) over winter.

Section 6

Feed options for Finishing Cattle

by Siobhan Kavanagh, Mark McGee



Introduction

The finishing period is when animals are fed an energy-dense diet so that they will grow rapidly and add muscle/meat to their frame and optimise fat cover in preparation for slaughter.

- ① How do I finish steers and heifers on grass?
- ② Should I feed concentrates to grazing animals?
- ③ How do I finish animals on grass silage & meals?
- ④ How do I finish animals on a high concentrate diet?
- ⑤ How do I finish animals on fodder beet + forage + concentrates?
- ⑥ How do I finish animals on forage maize or whole-crop cereal silage + concentrates?

Feed options for Finishing Cattle

Checklist

The key nutrients for the finishing animal

- **Energy:** Energy intake is the main determinant of live weight gain of cattle. Therefore, maximising energy intake is important.
- **Protein:** Steers and heifers have a relatively low requirement for protein during the finishing period. Aim for 11-12% crude protein (CP) / kg diet dry matter (DM). For bulls that are growing (up to 550 kg LW) aim for 13-14% CP / kg diet DM. For finishing bulls (greater than 550 kg LW) aim for 11-12% CP / kg diet DM.
- **Fibre:** Where forage makes up a large proportion of the diet, fibre levels are likely to be adequate. When feeding meals ad lib, ensure that animals receive at least 10%-15% of their dietary dry matter as straw, hay or grass silage, in order to maintain rumen function.
- **Minerals:** All finishing animals should receive appropriate minerals for the duration of the finishing period. For grass silage-based diets this is a general purpose mineral. For diets based on alternative forages (e.g. maize silage) or fodder / sugar beet feed a maize/beet mineral. On ad lib concentrate diets, ensure that the inclusion rate of the mineral matches the feeding rate of the ration.
- **Water:** The water requirement of finishing cattle depends on the proportion of dry feeds i.e. concentrates in the diet. Animals on an ad lib diet will have a much higher requirement for water than animals on a grass silage-based diet. Under normal conditions (free access to feed, silage, etc) and water), an animal will consume approx 20 litres of water over a 24-hour period. This could be 1.5-2.0 times greater for ad lib concentrate systems.

Key facts

- Increasing the level of supplementary concentrate fed increases live weight and carcass weight gains, but at a diminishing rate. This means the performance benefit from each additional kilogram of concentrate is less and especially so at high levels of supplementation.

- In general, the growth response to concentrate supplementation is higher in animals of high growth potential than those of lower growth potential.
- The efficiency of feed utilisation by finishing beef cattle primarily depends on the weight of the animal (it decreases as live weight increases), the potential for carcass growth (e.g. breed type, genetic merit, gender, compensatory growth potential) and the duration of the finishing period (it decreases as the length of the finishing period increases).

1 How do I finish steers and heifers on grass?

Aim for high-digestibility grass to maximise gain of animals finished off pasture. Pre-grazing covers of between 1,200-1,600 kg DM/ha (pre height 8-10 cm) are desirable. See Grassland chapter.

Key Target

Gain from grass (kg per day)

	Suckled Beef		
	Bulls	Steers	Females
Daily Gain 2 nd Summer	1.25-1.45	0.85-1.05	0.80-1.00
	Dairy Beef (males)		
	Fr Bulls	Fr Steers	AA/HE Steers
Daily Gain 2 nd Summer	1.10-1.30	0.80-1.00	0.90-1.00



② Should I feed concentrates to grazing animals?

The answer depends on:

How much grass is available (and how good its quality is)
 Target finishing date and the markets

In early summer

- If grass is plentiful and quality and grazing conditions are good, feeding supplementary concentrates may mean animals perform slightly better but it is very rarely economical.
- If grass supply and/or quality is poor there will be very little substitution and it is likely that feeding 2-3 kg / day of concentrate will be economical – but cost of gain is higher than where animals are fed grass alone.
- While pasture supplementation with concentrates at this time is seldom economical there may be situations where the extra cost/performance is justified. For example, if it means animals can be finished and sold early into a higher-price market, or the concentrates may help an animal to 'get over the line' into a higher carcass grade.

In late summer/autumn

- On beef farms in autumn, grass demand is usually greater than supply and often grass quality is lower than earlier in the year. As a result, finishing cattle at this time of the year usually requires concentrates to be fed at pasture or alternatively, animals are housed indoors.
- Autumn grass is still a cheaper feed than silage or concentrates, so finishing animals on pasture is usually much less expensive than if they have to be housed.
- There is a carcass growth response to concentrate supplementation at pasture in autumn for finishing steers.

Feed 0.5 kg meal per 100 kg live weight (3.0 kg / day to a 600 kg steer) with good autumn grass

Or

Up to 1.0 kg meals per 100 kg live weight where grass is scarce or of moderate to low quality

- Even if you cannot finish animals at pasture, short-term supplementation is often worthwhile as it reduces the requirement for more costly silage later. Also, the 'build up' period to a concentrate finishing diet can be implemented at pasture prior to indoor finishing.

What supplement type should be used?

Animal performance is similar whether the supplement to autumn grass is starch-based (cereal) or fibre-based (pulp).

How to

Feed concentrates at grass in autumn

Energy rather than protein is the limiting factor in autumn grass and supplementation with concentrated energy sources rather than protein is required.

Can I finish bulls at grass with meals?

- Research to date indicates that it is preferable to finish bulls indoors on a concentrate-based diet after a sufficient growing period at grass.

Should I feed concentrates to 18-19 month-old bulls before housing for finishing on ad lib concentrates?

- Offering meals to bulls at grass before housing to accustom them to meals is an option but:
 - They can do a lot of damage to the pasture,
 - Rates of gain may be low if conditions are poor,
 - If they are roaming a lot, live weight gain will be poor
 - It is preferable to finish bulls indoors on a concentrate-based diet.
 - It's easier to manage.

Feed options for Finishing Cattle

Key term

Substitution

Animals will always eat concentrates if they are available. But if they can fill up on concentrates they will eat less forage. This is called 'substitution' and it can push up total costs because grass is so much cheaper as a feed than concentrates.

③ How do I finish animals on grass silage & meals?

Key facts

- It is not possible to finish animals on grass silage alone, even with very good quality (high dry matter digestibility) silage. Some concentrate supplementation is needed. However, the better the quality of silage offered, the less concentrates required to finish animals.
- When feeding a fixed total quantity of supplementary concentrates over a set finishing period it doesn't make any difference to performance whether you feed it at a flat rate, at a stepped increasing rate or ad lib towards the end of the finishing period.
- There are no animal performance or feed efficiency benefits from feeding the same quantities of silage and concentrates as a total mixed ration or separately.

Key Target

Suckled Beef			
	Bulls	Steers	Females
Daily Gain on Ad Lib	1.15-1.35	0.9-1.10	0.8-1.00
Silage + Meals (kg)			
Dairy Beef (males)			
	Fr Bulls	Fr Steers	AA/HE Steers
Daily Gain on Ad Lib	1.05-1.25	0.85-1.05	0.80-1.00
Silage + Meals (kg)			

Key Target

Animals require dry, well-preserved, high-quality (72 DMD or greater) grass silage. See chapter on conserved forages for details on how to achieve this. If grass silage is less than 70 DMD, other options need to be considered.

Key Target

Aim for a total dry matter intake of 1.7-1.8% of live weight

How to

Calculate intake as a % of body weight

- Weight of the animal, for example 600 kg live weight
- Measure fresh weight intake, for example
 - Grass silage (20% DM) 30 kg fresh weight
 - Concentrates (87% DM) 5.5 kg fresh weight
- Convert to dry matter basis
 - Grass silage $30 * (20/100) = 6 \text{ kg DM}$
 - Concentrates $5.5 * (87/100) = 4.8 \text{ kg DM}$
 - Total (a+b) $6 + 4.8 = 10.8 \text{ kg DM}$
 - Calculate intake as % of live weight
 $(\text{dry matter intake}) / (\text{live weight}) * 100 = 1.8\% \text{ of body weight}$

Silage Quality

Animals require well-preserved, high-DMD grass silage, see chapter on making quality grass silage.

Key Question

How much concentrate should I feed?

- This depends on how well the animal can respond and the relative prices of beef, forage and concentrates. For finishing cattle, estimates of carcass efficiency (kg concentrates per kg carcass), silage substituted (kg DM per kg carcass gain) and the true costs of grass silage and concentrates are required.

Concentrate supplementation rates (kg/day) required to achieve target growth rates in combination with high, medium and low quality grass silage

	Grass Silage Quality			
	Target Gain kg/day	High (72 DMD)	Medium (68 DMD)	Low (64 DMD)
Continental steers	1.00	5.5	7.0	8.5
Friesian steers	0.85	4.0	4.5	6.0
Continental heifers	0.85	4.0	4.5	6.0

Supplement type?

- A wide variety of feed ingredients are available and used extensively in beef rations in Ireland. However, cattle offered concentrate rations differing in ingredient composition BUT formulated to have the SAME net energy and protein levels will have similar intake, growth, feed efficiency and carcass traits. Aim for a minimum energy density of 0.92 UFV / kg as fed in the concentrate. (0.92 UFV is equivalent in energy value for finishing to 0.92kg of standard dried barley)

What protein level should be in the ration?

Finishing cattle will only respond to additional supplementary protein in barley-based concentrates when grass silage has moderate to low digestibility and/or low protein content.

- For finishing steers or heifers offered well-preserved, high digestibility grass silage there is no response to additional protein with barley. Under these circumstances feed a ration with 11-12% / kg fresh weight crude protein

What type of mineral do I need?

- All animals should receive a suitable mineral / vitamin supplement in winter, regardless of the length of the finishing period.

Key fact

Grass silage can be incorporated into the diet of finishing bulls.

Research from Northern Ireland suggests that excellent quality grass silage (75 DMD) can constitute up to 1/3 of the diet (where the remainder is concentrate feeds) without any negative effect on animal performance.

④ How do I finish animals on a high-concentrate diet?

High concentrate diets can also be described as ad lib diets or diets where animals are offered as much concentrates as they can eat.

Key Target

Suckled Beef			
	Bulls	Steers	Females
Daily Gain (kg)	1.70-1.90	1.25-1.45	1.05-1.25
Dairy Beef (males)			
	Fr Bulls	Fr Steers	AA/HE Steers
Daily Gain (kg)	1.35-1.55	1.15-1.35	1.05-1.25

Key Target

Maximum length of finishing period

Heifers	60-80 days maximum
Steers	70-90 days
Bulls	Up to 180 days, preferably 80-120 days

How to

Manage roughage supply

- The animals should eat a minimum of 10% of their intake as roughage
- The options include grass silage, hay, straw and alternative forages including maize silage and whole-crop cereal silage. Ensure access is good but limit intake. If forage quality is too good, intake can be excessive
- Should it be mixed through the concentrate or fed separately? There should be no difference.

Key risk

Rapid fermentation of the high levels of starch in high grain diets can result in acidosis. Gradual adaptation to the diet is critical and a minimum level (One kg DM/ day or 10% of the dietary DM) of a palatable roughage/forage should always be provided to maintain rumen function.

How much concentrate will animals eat?

- On average animals will eat about 2.0-2.2% of body weight per day. Friesians have higher intake capacity than continental breeds. Supplementation rates of 10-13 kg fresh of concentrate feeds would be expected in this system. e.g. A 600kg animal would eat 12-13kg of concentrate plus roughage.

What type of concentrate should I feed?

- Aim for a blend of cereals and digestible fibre sources (i.e. soya hulls, beet pulp, citrus pulp) to minimise the risk of digestive upsets. High levels of cereal (~80-85%) can be used but the risk of digestive upsets is potentially greater and great care must be taken with feeding management.

Feed options for Finishing Cattle

How much protein should I feed?

- Steers, heifers and finishing bulls need 11-12% CP / kg DM in the complete diet. For growing bulls aim for 13-14% CP in the complete diet.

Do I need a buffer / yeast?

- A buffer / yeast acts as an insurance policy but it is no substitute for good feeding management.

Checklist

Minerals

- High levels of meals must be balanced for minerals.
- Feed a general-purpose cattle mineral. Ensure that the inclusion rate of the mineral matches the feeding rate of the ration.
- If feeding high levels of cereals, ensure the calcium content of the mineral is adequate to balance the cereal.
- Check that the mineral inclusion rate matches the feeding rate of the concentrate used.

How to

Manage an ad lib feeding system (where animals can eat as much concentrates as they like)

- The system is suitable for short finishing periods of approximately 60-90 days for steers and heifers, and up to 180 days for bulls
- It is essential to regularly estimate dry matter intake on the farm. Changes in intake can indicate illness.
- Adequate fibre in the diet is critical. At least 10% of the diet must be a source of long roughage to maintain rumen function.
- High energy-feeds should be fed for maximum weight gains.

- A mixture of energy sources, e.g. cereals and pulps, are preferable for this system. A good source of digestible fibre such as soya hulls will help reduce the risk of digestive upsets. Do not use ground cereals.
- Minerals must be fed to maintain good health
- Animals should have access to water at all times. Lack of water will depress intake and performance. Troughs should be cleaned out regularly

Feeding management is critical

- Allow an introductory period of 3-4 weeks
- Never go below 5% feed remaining in the trough
- Avoid sudden changes in diet
- Remove stale feed regularly
- Permanent supply of fresh, clean water

Animals need to be checked daily for signs of ill-health. Animals should be treated for lice, worms, etc at housing. Adequate air movement is vital for this system.

High concentrate diets

Pros & Cons

Pros

Predictable performance
Higher killout %
Reduced days to finish
Lower fat cover
Saving on working capital, slurry storage and housing due to shorter finishing

Cons

Can be expensive if concentrate prices are high
Risk of digestive upsets
High level of management needed

5 How do I finish animals on fodder beet + forage + concentrates?

What type of fodder beet?

- Use high dry matter fodder beets e.g. Magnum

How much fodder beet should I feed?

- 25 kg of fodder beet is equivalent to 5.5 kg of barley.
- For cattle of 500-600 kg do not exceed 25 kg.
- For weanlings (250 - 350 kg) do not exceed 10 kg

How much concentrate should I feed?

- Supplementation rates will depend on level and quality of silage and fodder beet used. 20 kg of fodder beet is equivalent to 4.5 kg of concentrates, but it must be balanced for protein and minerals. If feeding good quality silage ad lib with 20 kg of fodder beet, use concentrates to supply protein and minerals (See below).

What type of concentrate do I need?

- Fodder beet is high in sugars, therefore avoid ingredients that are high in sugar. Aim for a high level of digestible fibre sources such as soya hulls. If there is home grown cereal included in the diet, use a fibrous protein such as rapeseed meal to balance for protein.

Key Risks



Using starch / sugar-based concentrate mixes with fodder beet increase the risk of digestive upsets. Use digestible fibre sources. Buffers such as sodium bicarbonate also act as insurance policies but are no substitute for good feeding management.

The Table below presents the kg of protein balancer for various quantities of fodder beet for growing animals/weanlings (steers/heifers & bulls) and finishing steers + heifers, see later for bulls.

Equivalent to	Concentrate Crude Protein		
	20% Maize gluten feed	35% Rapeseed meal	45% Soyabean meal
Weanlings (balanced to 14% CP with grass silage as the sole forage) kg fresh fodder beet			
10	—	1.0	0.6
Finishing (balanced to 12% CP with grass silage as the sole forage) kg fresh fodder beet			
20	2.0	0.8	0.5
25	2.2	1.0	0.8

For example, feeding finishing steers and feeding 20 kg of fodder beet, feed 2.0 of a 20% protein balancer or 0.8 kg of rapeseed meal + minerals or 0.5 kg soyabean meal + minerals.

Feed options for Finishing Cattle

Key Risks



Feeding high levels of fodder beet to weanlings may result in inadequate protein supplementation (unless using straight soyabean meal + minerals).

Key Question



Do I need to feed minerals with fodder beet?

- Fodder beet is low in minerals, particularly phosphorus, and must be balanced up accordingly
- Always check the label for feeding rate

Key Question



Can fodder beet be used in bull finishing diets?

- As per using fodder beet for weanlings and finishing steers and heifers, treat fodder beet like a concentrate in bull finishing systems. 5 kg of fodder beet is the equivalent of 1 kg of barley. If feeding 20 kg of fodder beet in an ad lib system, feed 7-10 kg of a 14% CP ration, fortified with minerals suitable for beet.

How to



Manage fodder beet feeding

- Always wash and chop harvested fodder beet before feeding. Unwashed beet can carry up to 18% clay as tare, even in good harvesting conditions.
- Over time the intake of soil (containing iron and molybdenum) will affect the availability of minerals, particularly copper. A high intake of soil over a prolonged period may also affect rumen function.
- Feeding management must be excellent with beet to avoid digestive upsets
- Introduce slowly. Start with five kg/head/day and increase by five kg every 3-4 days until desired level is reached.
- When feeding exceeds 14 kg (finishing cattle) feed twice a day or use a TMR mix.

- All animals should have access to beet at the same time. Therefore, feeding space should be 600 mm (2 feet) for finishing cattle or 500 mm for weanlings.
- Freshly-harvested beet contains high levels of nitrates. Always allow a delay of 4-5 days after harvesting before feeding.
- Frosted beet will cause digestive upsets. Avoid feeding it where possible.

Checklist



Storing fodder beet

- Beet can be stored in a long narrow clamp, max 4 m wide and up to 2.2 m high.
- The clamp should be covered with straw to a depth of 0.5 m.
- A polythene cover may be used over the straw but a central vent 0.5 m wide should run along the apex of the clamp to allow ventilation.
- Beet for storage should be tightly crowned or serious losses can occur.

Checklist



Ensiling fodder beet

- Beet roots should ensile perfectly without adding any absorbent containing sugar. The main reason for adding the absorbent is to soak up the large volumes of effluent.
- The roots do need to be crushed to avoid too many large air spaces.
- Using 1 tonne of absorbent for every 5 tonnes of beet roots will retain most effluent.
- Ingredients that will retain effluent include beet pulp, citrus pulp, soya hulls, rapeseed meal, cottonseed meal and distillers grains. Ingredients that will not retain effluent well include maize gluten feed and soyabean meal.

- If done correctly, over 95% of the feed value added in the concentrates is retained. It is best not to put grain in the beet at the very top of the silo. It can attract vermin.
- If mixing a number of ingredients with the beet, the mixing of the ingredients needs to be good. These ingredients must then be well mixed with the beet.
- A drainage system (could be straw bales) should be put in under the silo to channel out the effluent that escapes.

Pros & Cons	
Pros	Cons
High energy yielding crop	Significant labour input
High feeding value	Significant capital investment in equipment needed if starting out
High rates of gain	Risk of digestive upsets

⑥ How do I finish animals on forage maize or whole-crop cereal silage + concentrates?

Key Target



Live weight gain

Suckled Beef			
	Bulls	Steers	Females
Daily Gain	1.4-1.6	1.1-1.3	1.0-1.2
Dairy Beef (males)			
	Fr Bulls	Fr Steers	AA/HE Steers
Daily Gain	1.3-1.5	1.0-1.2	1.0-1.2

Forage quality / inclusion

- Good quality forage maize: 30% dry matter, 25-30% starch
- Good quality whole-crop cereal silage: 40-45% DM, 25-30% starch
- Alternative forages can be offered as a mix with grass silage or as the sole forage

How much concentrates should I feed?

- There is a concentrate saving of 2 kg with good quality forage maize and whole-crop cereal silage.
- Feed 3-3.5 kg of meals for a target gain of 1.00 kg live weight per day with good quality forage maize or whole-crop cereal silage
- Feed 5.0-5.5 kg of meals for a target gain of 1.20 kg live weight per day with good quality forage maize or whole-crop cereal silage.

How much protein should I feed?

- For steers and heifers, if feeding 50:50 grass silage: maize silage (both good quality), feed 5 kg of a 14% CP concentrate mix or 3 kg of a 16% CP concentrate mix, depending on target performance (see above).
- For growing bulls, if feeding 50:50 grass silage: maize silage (both good quality) feed 3-4 kg of a 20% CP concentrate mix.
- For finishing bulls, if replacing 33% of the ad lib diet with maize silage, feed 8-9 kg of a 14% CP concentrate mix.

What type of mineral do I need?

- Forage maize and whole-crop cereal silage are low in major and trace elements and must be balanced with a maize / whole crop balancer mineral.



Section 7

Animal Health - a Strategic Perspective

by David Graham, Animal Health Ireland



Introduction

The impact of animal health is not limited to within the farm gate, but has implications beyond this that affect marketing, consumer decisions, regulation and trade.

- ① What is the role of Animal Health Ireland?

Animal Health - a Strategic Perspective

① What is the role of Animal Health Ireland?

While the national infra-structure to generate and deliver advice on breeding and feeding is already largely in place, this has been less developed for animal health. One significant step in addressing this deficit was the establishment in 2009 of Animal Health Ireland (AHI) with the goal of improving the profitability, sustainability and competitiveness of livestock farmers and related industries through superior animal health. AHI has a specific interest in non-regulated infectious diseases i.e. those which government does not have a legislated responsibility to deal with. Given the range and number of these diseases, one of the earliest tasks was to identify those that should be prioritized for action. This was done through a series of consultations, and resulted in the following being identified: BVD, IBR, Johne's disease, mastitis/milk quality, parasites, infertility, calf diseases and lameness.

These diseases differ in a number of important ways, including the wide variety of infectious agents that are involved (viruses, bacteria, worms and fluke). Some are caused by single agents (e.g. BVD), while others may be caused by a number of different agents. For some there are specific treatments or vaccines available, while for others there are not. Elimination of the agents responsible for some diseases is possible at the herd level or beyond, whereas for others, it is a matter of ongoing management to minimize their impact. In light of these factors, it is not surprising each of these diseases needs to be addressed on its own merits, and AHI has already established technical working groups to review and promote best practice at farm level and beyond for a number of these conditions.

Key diseases are:

- Bovine Viral Diarrhoea (BVD)
- Johne's Disease
- IBR

In conclusion, the remainder of this decade and beyond is anticipated to be a period of intense activity across a number of fronts, and it is vital that cattle health is adequately addressed. Inevitably, progress on health will require difficult decisions at times, but these will be vital to ensure sustainable, profitable production that maintains and enhances market access and consumer preference for Irish produce at home and abroad.

Details of all of these programmes, and of work on other diseases can be found at www.animalhealthireland.ie.



Section 7

Biosecurity

by James O'Shaughnessy



Introduction

Biosecurity refers to practices used to prevent both the introduction of and spread of disease within a farm.

- ① What are the key principles in achieving good biosecurity?
- ② How do I reduce the risk of introducing disease onto my farm?
- ③ How should I manage an isolation facility?
- ④ What are the advantages and disadvantages of having cattle and sheep grazing together?

Biosecurity

① What are the key principles in achieving good biosecurity?

- Develop a biosecurity plan with your veterinarian which is suited to your farm. Set goals which are realistic and achievable.
- Review your biosecurity plan annually.
- Isolate all animals on entering your farm (purchased/unsold animals/returning from shows) for 28 days and test for evidence of disease.
- Ensure farm visitors disinfect themselves on arrival (at farm entrance). Provide protective clothing and footwear for visitors to wear.
- Do not share equipment (trailers, slurry spreaders etc.) or animal products (milk, colostrum, slurry etc.) between farms.
- Keep other domestic and wildlife animals (including all vermin) away from feed bins, pasture and water sources.
- Use only piped water sources from a mains water supply.
- Maintain the boundary fence (3 metre double spaced cattle proof fence).

Checklist

To prevent disease entry

Directly by cattle

- Purchase of infected cattle.
- Cattle returning from shows or unsold at auction.
- Infected livestock entering your land or spread of disease from nose-to-nose contact from neighbouring cattle across a boundary fence.

Indirectly by cattle

- Indirectly through the use of contaminated equipment. For example, the sharing of livestock trailers/slurry spreaders/nose tongs etc. between farms.
- The sharing of milk or colostrum between farms. For example, the practice where some farmers source colostrum from their neighbouring farms to feed a newborn calf.

- Visitors entering your farm who are carrying faeces/urine/blood on their clothing/footwear who don't disinfect themselves on entering your farm.

Domestic/wildlife animals

- Contact with wild or domestic animals. For example, having a dog on farm with access to feed bins or where cattle graze can potentially introduce Neospora. Deer can be a source of Johne's disease, while sheep can be a source of leptospirosis, BVDv and Johne's disease.

Rivers/air

- Allowing livestock access to rivers/streams on farm can run the risk of introducing diseases such as salmonella, leptospirosis and Johne's disease.

② How do I reduce the risk of introducing disease onto my farm?

- Maintain a closed herd. Do not buy in cattle if possible.
- Isolate all purchased animals on arrival at your farm for a minimum period of 28 days in your isolation facility. This also applies to animals returning from shows or unsold animals from auction. During this period, observe for clinical signs of disease and conduct any necessary tests and treatments.
- The boundary fence between your farm and the neighbouring farm should be double fenced. The gap between the fencing on your land and the neighbouring farm should be 3 metres wide. It must be cattle proof and must prevent nose-to-nose contact between cattle.
- Provide disposable clothing and footwear for all visitors. Ensure all visitors disinfect themselves at the entry point to your farm.
- Do not share equipment between your farm and neighbouring farms. This includes the sharing of slurry spreaders, livestock trailers, calf dehorning crates, nose tongs etc.



- Do not use colostrum, milk or slurry from neighbouring farms.
- Do not allow other domestic or wild animals (farm dogs, sheep, goats, deer etc.) access to the following: 1. feed bins/bunkers 2. pasture where cattle graze, and 3. water sources.
- Use only piped water sources from a mains water supply for your cattle. Do not allow cattle access to rivers/streams coursing through your farm.

Checklist



If I have to buy in cattle what are my purchase guidelines?

- Buy as few cattle as possible from as few sources as possible.
- Try to purchase young cattle only.
- Try to purchase cattle from accredited disease free herds. Failing this, purchase cattle from closed herds with strict biosecurity practices in place. If neither of the two herd types can be found, purchase cattle privately from small local herds, where the local veterinarian can provide all necessary information on that herd (disease history, results of laboratory screening etc.).

3 How do I manage livestock in the isolation facility?

- An isolation facility is a shed/paddock where all purchased cattle and cattle returning from show/sales are placed upon arrival at the farm.
- Ideally, it should be situated at the farm entrance.
- It must not be used as a shed to also house sick animals on the farm.
- If the isolation unit is a shed, it should be separate from other livestock sheds (no sharing of airspace under the same roof) and cattle in the isolation unit should be a minimum of three metres in away from other cattle on the farm.
- Livestock are quarantined in this isolation facility, generally for a minimum period of 28 days.
- The isolation unit should have its own animal handling facilities
- Any equipment used in this unit must remain in this unit, coupled with being washed and disinfected before and after use. For example, the isolation facility should have its own nose tongs, halters, buckets, thermometers etc.
- The unit should have separate storage facilities for dung/urine.

How do I manage livestock in the isolation facility?

- All purchased cattle or cattle returning from shows/sales should be monitored daily for signs of disease while in quarantine (minimum quarantine period of 28 days).
- As part of the daily farm routine, cattle in quarantine should only be tended to *after* all the other cattle on farm have been looked after.
- While in quarantine, cattle can be tested for various diseases (subject to your biosecurity plan).
- During the quarantine period, cattle can be vaccinated for diseases against which you are currently vaccinating your herd for and treated for parasites.

What diseases should I test my cattle for while in the isolation facility?

- The decision on which diseases to be tested for should be determined following consultation with your veterinarian. These will be incorporated into your biosecurity plan which your veterinarian will have drawn up.
- The diseases of interest in a beef herd should include some or all of the following; *Leptospirosis, BVD, IBR, Johne's disease, Neospora, Salmonella, Parasites, Digital Dermatitis, Ringworm and Genital Campylobacteriosis.*

Biosecurity

How do I test purchases for specific diseases?

- This should be decided in consultation with your local veterinarian.
- **BVD.**
Option 1. (better option). Only purchase animals which have been tested for BVD virus before purchase and keep these animals in isolation for 28 days post purchase
Option 2. Test purchases on arrival for BVD virus and keep in isolation for 28 days.
- **Leptospirosis** – Test purchases 28 days post arrival using a blood test Alternatively consider treating purchases with antibiotics only (discuss with vet.).
- **IBR** – Test purchases 28 days post arrival using a blood test for IBR antibody.
- **Johne's disease**– Test purchases using both a blood test and faecal sample (for culture). Performing faecal culture requires the animal to be in isolation for up to four months.
- **Neospora** – Breeding females should be tested on arrival for neospora using a blood test. As breeding females may test negative and still be carriers, strong consideration should be given to retesting these females during the dry period (4-10 weeks pre-calving).

④ What are the advantages and disadvantages of having cattle and sheep grazing together?

Advantages

- Sheep will graze parts of pasture (close to dung patches) and eat certain weeds that cattle will refuse to eat. This improves overall pasture quality.
- The main gastrointestinal worms that affect cattle do not affect sheep. Thus by grazing cattle and sheep together, there will be a dilution effect as the stocking density will be lower for cattle when they are co-grazed with sheep.

Disadvantages

- Sheep can act as a source of Johne's disease, BVD and leptospirosis. Therefore the grazing of cattle and sheep together can result in the spread of these diseases between the two species.

Therefore, although there are advantages of grazing cattle and sheep together with respect to pasture quality and parasite control, the overall advice is not to graze both species together (or house in the same building).

