



Cattle Out-Wintering Systems



This booklet describes out-wintering systems for suckler cows based on trials on Scottish farms over 4 years, in a wide range of environments.

The objective of these trials was to reduce feed and labour costs by minimising the time cattle spend in buildings in the winter. Many Scottish farms can grow brassica crops with the potential to reduce costs, but not all can out-winter cattle successfully on them due to constraints of soil type and the need to meet cross compliance objectives and maintain animal welfare.

The need for action

Beef cow numbers in Scotland are predicted to fall to 445,000 in 2009, a 16% reduction since 1998. Many farmers have reduced herd size because of low profitability, and changes in the support system are also a factor in declining cow numbers. In hill and upland areas many farmers are relying on Less Favoured Area Support Scheme payments and there is no doubt changes in support measures are needed to maintain the Scottish beef herd.

Net margins per suckler cow range from -£150 to -£250 for herds taking calves to weaning, excluding subsidy payments; future profitability for the sector as a whole will depend on increasing returns and reducing costs.

Systems of out-wintering can be based on either grass that has been deferred from grazing, or forage brassica crops supplemented with conserved forage. In either case, animals are spending less time inside, harvesting their own resources and spreading their own dung – all of which leads to significant savings in labour, machinery, fuel, bedding and feed costs, and with the added advantage of better animal health and welfare.

By illustrating the potential for out-wintering, it is hoped that this booklet will encourage farmers to maintain cow numbers and – as a result – build their share of the UK beef market.



Potential advantages of out-wintering

- Reduced costs of straw bedding and machinery.
- Reduced wintering costs for all or part of the winter.
- Availability of cow housing for alternative uses (e.g. finishing more cattle).
- Reduced exposure to store market volatility as more shed space available.
- Increased health status (e.g. reduced pneumonia risk).
- Easier calving (reduced build up of infection, improved cow condition).
- Reduction of damage to soils through tracking.
- Even, efficient and low cost distribution of manure.
- Cattle appear content and healthy.
- Less labour time.
- Better working environment away from dust etc.



The out-wintering decision

Objectives

For cattle to be out-wintered successfully on any system, welfare and prevailing environmental conditions must be considered. Failure to adhere to welfare or cross compliance measures could potentially have an impact on the Single Farm Payment, if penalties are imposed.

Prior to decisions being made it is advised that discussions take place with local agricultural officers and relevant environmental officers, which is important when land is under certain conditions such as SSSIs.

The importance of the out-wintering decision is not simply to compare out-wintering systems versus housing, but to look at the potential for farms to reduce housing time and assess the labour saving implications.

All systems demonstrated are based on partial out-wintering as the spring calving cows are normally housed one month prior to calving for management purposes.

This is not a new concept, but one that has again become more relevant.

The decision to out-winter will depend on a combination of soil type, climate and breed of cattle, and the scale of the enterprise is also important. Hill and upland farmers with hardy breeds of cattle capable of withstanding severe climate constraints will be attracted to out-wintering on deferred grazing. Upland and lowland farmers in drier areas (less than 1000 mm [40 inches] of rainfall) and where soil types are loamy rather than clay-based, may consider growing forage brassicas to out-winter either cows or youngstock. The larger arable farmer with suckler cows may consider putting cows out for part of the winter on stubble turnips grown as a catch crop following cereals.



All results described in this booklet were achieved depending on that specific year's growing season.

SECTION 1

Pages 6-25

Out-wintering on specialised brassica crops

This booklet describes systems used to successfully demonstrate out-wintering spring calving cows on brassica crops. Brassicas used during the project were kale, stubble turnips and swedes. Cows were fed on a strip grazing system with an electric fence moved each day in the field of brassicas.

Long fibre was fed at all times, mainly as straw.

Free access minerals were available at all times.

At the end of this section there is also a summary of work carried out at SAC during winter 2005/2006 when weaned spring born steers were strip grazed on kale.



SECTION 2

Pages 26-31

Out-wintering on deferred grazing

The practice of deferred grazing – setting aside and resting pasture in the autumn for winter grazing – for spring calving cows has been adopted on a number of farms in order to reduce the costs of winter feeding. This section will feature a case study farm where it has been successfully carried out on grass dominant hills.

NB. Rocky heather-dominant areas with minimal winter vegetation are unsuitable for this system unless supplemented.



SECTION 1

OUT-WINTERING ON SPECIALISED BRASSICA CROPS

Importance of shelter and soil type

"Which is more important to the suckler cow, a dry lie or shelter?"

Often these two objectives are incompatible; a field that is well sheltered may not be exposed to drying winds and can thus be wet. Cows like both shelter and a dry lie.

Where soils are heavy and not well drained, they will poach easily. This can result in welfare problems and longer term difficulties for reseeding. Poaching and associated welfare problems are GAEC issues.

There is a specific legal requirement for cattle to have access to a well-drained lying area.

Runback areas where cows can lie, ideally with shelter, must be available and capable of taking cattle all through the winter. It may be advantageous to have two runbacks available during the winter so that cattle can be moved onto fresh ground whilst poached ground recovers.

On successful sites cows will be seen lying down with reasonably clean coats. However in very wet and windy weather they will be more interested in sheltering and will be seen huddling behind trees or hedges. In doing so they may severely poach the area so that it quickly becomes too muddy for them to lie down. If the rest of the field is wet with water lying in poached areas, cattle may choose not to lie down until they are exhausted. This is not a good situation so the priority should be for fields that dry out rapidly and provide a dry lie.

Shelter is also important to provide protection during extreme conditions as cows exposed to the elements in such circumstances will suffer stress.



Avoiding damage to soils and watercourses

- Minimise the risk of soil erosion by avoiding the use of steeply sloping fields.
- Avoid ruts and wheelings as these can cause damage to soil structure and lead to severe soil run-off.
- Don't out-winter near watercourses or springs.
- Strip graze and move the fence daily to minimise poaching and increase feed utilisation.
- Allow sufficient fence face for all cattle to eat at the same time and avoid heavy concentrations of stock in any area.
- Ideally use out-wintering for non-bulling cattle (e.g. pregnant spring calving cows) of medium weight, to limit poaching.



Restricting vehicle access

Placing supplementary fibre feed in the field before the winter avoids the need to travel daily when ground conditions are wet and therefore avoids ruts and soil damage.

This can be achieved by putting supplementary big bale straw in the fields at harvest time usually up the middle of the fields. Straw was net wrapped five times for extra protection. Damage to the fields, especially the gateways, was significantly reduced and run off and erosion minimised.



Bales for feeding placed in the kale prior to the start of winter

Direct drilling

Direct drilling brassica crops such as kale into an existing grass sward killed off with glyphosate can help reduce poaching damage. Ploughed areas tend to suffer more damage, but do tend to give higher yields. The decision on whether to plough or to direct drill needs to be made on the basis of individual soil type and the need to retain moisture to achieve early germination.

Extensive grazing

It is not always necessary to sow early and go for the biggest yields. In 2004, brassicas were sown later and did not yield as predicted and the cows were managed extensively. This proved to be beneficial as the cows moved over the ground quickly, minimising soil damage, and this could be a positive option for the future. Many arable farmers were delighted to see the negligible levels of soil damage, especially in the lower yielding stubble turnips, indicating that they could consider stocking cows extensively over a large acreage whilst meeting cross compliance obligations.



Choosing fodder crops

Select the most suitable varieties following consultation with a seed merchant. The chosen varieties must match the farms requirements based on stock to be grazed, soil type and climate. Winter hardiness of varieties will vary. E.g. stubble turnips do not have the longstanding ability during winters in comparison to kale and turnips.

Breed and condition score

Only fitter cows in CS 2.5 or more should be out-wintered on forage brassicas. Cows are likely to lose some condition on the system particularly if the weather is severe and it is best to exclude first and second calvers, older and leaner cows.

Many beef type breeds are typically used for out-wintering. Avoid using dairy breeds or predominantly dairy crosses.

Health and welfare issues

The health and welfare of out-wintered cows is generally better than housed cows. They spend more time on their feet and are in better condition, resulting in easier calving. In SAC trials, only three out of 50 cows out-wintered (6%) needed to be assisted in 2005.

Any change to husbandry may mean disease patterns change. Keeping cattle outside has the potential to increase their exposure to infective stages of parasitic gut worms, lungworms, liver fluke and tick infection.

Additional Information

- Heavily stocked sheds throughout winter can lead to health problems such as pneumonia in young calves.
- Reducing indoor stocking helps all round health and welfare.
- Cattle wintered outside in the right soil conditions appear contented and healthy.

WARNING:

It is important that the winter feeding programme is not solely based on brassicas. Establishment and yield varies so there must always be an alternative feeding option such as silage or straw.

Many farmers grow a succession of different brassicas throughout the spring and/or summer to reduce the risks.

Supplementation of cattle out-wintered on forage brassicas

Requirement for fibre

Kale, stubble turnips, swedes etc are effectively concentrate feeds with a low content of structural fibre. The main source of energy in brassica crops is in the form of sugars, which ferment rapidly in the rumen, and care must be taken to introduce these crops slowly to avoid acidosis. Brassicas, particularly kale, also contain anti-nutritive factors such as the compound SMC0. This is converted by the rumen microbes to an anti-metabolite DMDS, which destroys the haemoglobin in red blood cells causing anaemia.



Supplementing brassicas with long fibre such as straw or silage ensures a balanced diet and avoids any problems. For spring calving suckler cows a 50% brassica and 50% straw diet (DM basis) is preferred, although in some areas farmers have used rations based on 70% brassica and 30% straw without problems.

Minerals and Trace Elements

It is recommended that the crop be analysed prior to winter to determine mineral status. Brassicas are low in the trace elements selenium, iodine and copper, adding to the potential problems caused by anti-nutritive compounds.

Mineral/vitamin supplements are thus needed to provide levels of copper, selenium and iodine and should be fed on a free access basis. However, to ensure adequate levels are consumed it is better where possible to sprinkle minerals regularly over straw or silage that is being fed.

Rumenco have developed a free access mineral and vitamin supplement for brassicas which typically comprises:

	%	mg/kg	iu/kg
Calcium	14	Cobalt	80
Phosphorus	12	Copper	2,000
Magnesium	10	Iodine	300
Sodium	7	Manganese	3,000
		Selenium	25
		Zinc	3,000
		Vitamin A	500,000
		Vitamin D	100,000
		Vitamin E	1000

Practical management and daily tasks

Calculating the area to be fed daily

Weigh several areas of the field using a metre square frame.

For example: 6.83kg of fresh material per metre square. Multiply the fresh weight by 10,000. This equates to 68.3t/ha (27.7t/acre) of fresh material and has a typical dry matter content of 12%, which will provide 8.2tDM/ha (3.3t/acre).



Calculations for strip grazing kale

Firstly set the energy intake at about 15% higher than required for housed cows. Thus for spring calving cows target 90 MJ per day rather than 80. Allocate 5kg of dry matter of kale per day with another 15% added for wastage to give an overall allowance of 5.75kg dry matter per day. The other 50% in dry matter needs to come from long roughage.

Calculation of straw required

Straw (long roughage) intake of a suckler cow will be between 6 and 7kg of fresh material per day, which gives the 50% dry matter required.

Cows used during the course of the work were spring calving cows who were given a restricted allowance each day as they were on a maintenance only diet. Over-feeding would lead to stems being left uneaten, cows getting too fit, and the feed in the field being finished before the targeted date. Higher allocations are given when the cattle need more than a maintenance diet.

● EXAMPLE:

Field size: 4.25ha (10.5acres).

Yield: 8.2tDM/ha (3.32tDM/acre) = 34.9tDM. = 34,990kg.

Cow requirement: 5.75kgDM per day (field therefore provides 6,085 cow feeding days).

Taking a typical length of an out-wintering period of 160 days prior to calving this is sufficient for 38 cows. Thus 38 spring calving cows require 219kgDM per day.

Since each metre square has 6.83kg fresh at 12% dry matter = 0.82kgDM/m².

So the requirement is 219kgDM/day divided by 0.82 = 267m²/day.

If the feeding face of the kale is 200m wide the fence should be moved approximately 1.35m/day.

Moving the Fence

The wider the face the less the fence has to be moved forward every day. Cows tend to eat under the electric wire about 1m deep. If it is calculated that the fence only has to be moved about 1m then it is moved each day to the edge of the crop. This maximises utilisation, reduces wastage and saves labour. Where the field is of a difficult shape it may be necessary to move the fence twice daily.

Brassicas used during the project

Seeds are normally treated with *Ultrastrike*, which is a new dressing for better crop establishment and protection against pest attack such as flea beetle.

Swedes

Swedes provide high energy, autumn or winter feed between September and February. Grazed in situ or lifted and stored for later feeding. Traditionally grown in Scotland, northern England and the south west, areas of high rainfall are best suited to this crop.

Yields: Typical fresh weight yields of 70 - 75 tonnes per hectare (28 - 30t/acre) with a DM of 9% to 13% to give approximate dry matter yields of between 7 and 10 tonnes per hectare (2.84 and 4t/acre). The low dry matter varieties are easier to graze as the flesh is softer especially for older animals whose teeth may be broken. High dry matter varieties store better and are more frost tolerant but may need to be chopped.

Feeding Values: With a digestibility of over 80%, ME is between 12.8 and 13.1MJ/kgDM with a crude protein level of 10 - 11%. Bulbs are deficient in protein once the leaves have been frosted off.



Cows strip grazing swedes in Aberdeenshire

Kale

Kale is an ideal feed for autumn or winter grazing and can be grown in most sites throughout the UK, sowing mainly in late May for maximum yield.

There are 2 types of kale:-

High yielding varieties with thick stems should be used before Christmas.

Leafier varieties are more winter hardy with a longer utilisation period of September to March.

Hybrid varieties like Bittern are especially winter hardy and digestible.

Kale also provides cover for game birds.



Kale varieties

Maris Kestrel

Maris Kestrel is the leading variety in the UK

- Superior leaf to stem ratio for better animal performance
- Vigorous early growth
- Resistant to lodging
- Good winter hardiness
- Long utilisation period
- Comment: suited to young stock and cows with the aim to put weight on



Bittern

Taller than Maris Kestrel so less overall energy and protein due to more stem

- Good winter hardiness
- Good whole plant digestibility
- Excellent palatability
- High sugar content
- Ideal for stock only needing maintenance diet

Yield: Fresh yields of 60 - 65 tonnes per hectare (24.3 - 26.3t/acre) are typical from a kale crop. Dry matter yields of 8 - 10 tonnes per hectare (3.2 - 4t/acre) would be expected from a dry matter of 12% to 16%.

Feeding Values: With a digestibility of over 68%, kale has an ME of 10 to 11MJ/kgDM and a crude protein content of 14%.

Utilisation: September to early March. Ideal crop to go right through the winter.



Stubble Turnips

Used as a catch crop to provide variable amounts of forage 12 - 14 weeks after sowing. Typically sown in early autumn after winter cereals, stubble turnips can also be sown in the late spring.

Leafy types have better anchorage with good winter hardiness for use after Christmas. Bulbing types produce large palatable bulbs for extra intake.



Stubble Turnip varieties

Vollenda

- High yields and dry matter.
- Unrivalled resistance to bolting.
- Very good early vigour where sowing in August/September will deliver a feed crop between November and January
- Offers good resistance to clubroot and alternaria

Yields: The average fresh weight yield is 38 - 40t/ha (15.4 - 16.2t/acre), giving dry matter yields of 3.5 - 4t/ha (1.4 - 1.6t/acre).

Feeding Values: D-values for stubble turnips are 68 - 70D with a crude protein level of 19 - 20%. This will produce an ME of 11MJ/kgDM.

Utilisation: Normally June to December, and more suited for early winter. Tends to survive a short hard frost period but not continual periods of frost. Recent winters have allowed utilisation into January.



Andrew Durston, North Nevay in stubble turnips

Examples of stocking rates and sowing dates

KALE

Spring Calving Cows

Stocking rate: 10cows/ha (4cows/acre) for 100 days

SAC sowing date: 1st June. Glyphosate applied 7 days before direct seeding.

Variety: Maris Kestrel at 6kg/ha (2.5kg/acre)

Steers

Stocking rate: 10 steers/ha (330kg to 400kg) for 100 days (4 steers/acre).

A higher allowance was offered to encourage steers to eat the high quality leaf, accepting greater wastage of the lower-protein stems.

STUBBLE TURNIPS

Spring Calving Cows

Stocking rate: based on 5cows/ha (2cows/acre) for 100 days.

This is based on very high germination of stubble turnips (90% over whole field).

SAC sowing date: 14th August (later sowing than mid August is not recommended).

Variety: Vollenda at 6kg/ha (2.5kg/acre)

Note: Best practice in dry conditions is to disc the soil to break up the soil to create a bed. Some crop failures in 2005 resulted from limited germination from seed sown on top of the ground. Light discing proved to be beneficial before sowing, and fields should always be rolled.

SWEDES

Spring Calving Cows

Stocking rate: 22cows/ha (9cows/acre) for 100 days. Very high yields achieved in an actual case study monitored by SAC.

Varieties: Kenmore and Rutatofte at 0.5kg/ha (0.2kg/acre)

Worm and fluke treatment for out-wintered cattle

The Issue

Changes in husbandry systems mean that disease patterns may alter and therefore routine treatments and prevention programmes should be reviewed. Out-wintering may increase exposure to the infective stages of the parasitic gutworms, lungworms and liver fluke.

The biology

The infective stages of gutworms and lungworms tend to reach peak numbers on the pasture from mid-July onwards. Where youngstock have been grazing the pasture and where the stocking density has been high the pasture will be most contaminated. Pasture that has been grazed by cows and calves together will be less heavily infected. Extensive grazing and pastures that have not been grazed with cattle over the summer will have a lower risk of infection. The infective stages of fluke contaminate pasture from early autumn onwards.

The disease

From the end of summer the infective stages of gutworms on pasture tend to become dormant in the gut lining and emerge to cause damage in the spring. This emergence is called Type II disease and can be fatal, particularly in immature animals.

Cattle are more resistant to the effects of fluke than are sheep, but where nutrition is compromised fluke can have a severe and potentially fatal impact on the health of even adult cattle. Fluke is now being seen in areas where it was previously never diagnosed.

Treatment strategy

Adult cows in good body condition should not need routine treatment for gutworms or lungworms. Exposure to low levels of parasitism helps promote immunity and is largely beneficial to control in the herd. Thin cows or first calf heifers moved onto more extensive grazing should benefit from a worm treatment in October or November. Younger stock can be treated in the same way. If in doubt, check faeces samples for worm eggs. Any wormer used should be active against the inhibited stages of the parasites.

If the farm is in a high risk area for fluke, all out-wintered cattle should be treated in January and May. Additional treatments may be needed in some years – check the farming press for fluke warnings.

Screening for fluke eggs is another option. This should be done in January and faeces from ten of the thinner cattle can be pooled at the laboratory to reduce cost. If fluke eggs are present then the cattle should be treated.

Action

Changes in husbandry should prompt a review of the routine treatments and preventive strategies with your vet.

CASE STUDY 1 - KALE

John and Andrew Nelson, Cogarth Farm, Parton, Castle Douglas, Dumfriesshire

A 202ha (500 acre) upland grass farm, mainly rough grazing and permanent grass. The Nelsons have been out-wintering at Cogarth for over 30 years. Soils contain high levels of gravel and stones, so ploughing is not always possible. Putting fields down to kale for 2 years before grass minimises the cultivations within the reseeding policy.



Most of the suckler herd is out-wintered on either kale or on the hill.

Approximately 4ha (10acre) of kale is grown each year with 0.8ha grass runback. Field has been entered into the RSS as extensive grazing.

Height:	30-120m (100-400ft)
Rainfall:	1400mm (56 inches)

Cattle Enterprise

130 spring calving cows calving from 1st April, consisting of Aberdeen Angus X Friesians and three-quarter Aberdeen Angus crosses. Aberdeen Angus and Charolais sires.

38 Cows were put on kale; all in calf to the second and third cycle.

Only 1 cow needed assistance to calve during 2007. 53 cows (51%) calved to the 1st cycle and 40 (38%) calved to the 2nd cycle.

In calf heifers, first calvers and thin cows (below condition score 2) were not out-wintered.

All cows were dosed for fluke.

Results: Kale

- Kale lasted 127 days so cows ate 7.25kg/DM per day
- Straw consumed = 3.5kg per day fresh = 3kg/DM per day
- Total dry matter intake per day = 10.25kg based on 640kg cow
- 70% dry matter intake from the kale and 30% from straw, with no problems.

Note: General recommendation is not to feed more than 50% kale in the dry matter.

Tips from Cogarth

1. In early autumn the purchased straw bales are put in black plastic bags as they are being positioned in the kale field to reduce wastage.
2. Lower establishment costs and higher yields in second kale crop as fields only received a discing and light roll. Seed/fertiliser scattered by fertiliser spreader.
3. Cogarth decided to feed less straw due to the cost of purchasing more in at £58/tonne (now over £75).

Cow lost 0.29kg/day liveweight whilst on the kale (Nov – Jan), which is expected in spring calving cows (see table 1).

Table 1: Changes in weight and condition score of 38 cows on kale

38 cows	14/11/06	12/3/07	Weight loss over period	Loss per day
Weight	643kg	609kg	-34kg	0.29kg/day
CS	2.69	2.28	0.41	

From November to one month pre-calving the cows lost 0.41 CS so meeting target condition score of 2.3 pre-calving.

DIARY OF KALE ESTABLISHMENT AND USE AT COGARTH FARM

1st June

- Light disc and harrowed as field is 2nd year kale.
- Maris Kestrel sown at 6kg/ha (2.5kg/acre) with oscillating spout fertiliser spreader with the manure mixed in.
- Second harrowing followed by light rolling.
- Fertiliser: 120kg/ha (3cwt/acre) of 20:8:12 N:P:K.

11th June

- Kale starts to germinate.

21st July

- Crop looking well but heavy infestation of weeds (redshank).
- Crop under attack on the leaves with noticeable holes (Diamond Back moth).
- Fertiliser: 80kg/ha (2cwt/acre) 20:8:12 N:P:K.

28th July

- Spraying with Pearl Micro at 120g/ha (49g/acre).
- Sprayed at 400l/ha (162l/acre).

5th August

- Fertiliser: 40kg/ha (1cwt/acre) straight nitrogen to give an overall total of 170kgN/ha, 50kgP/ha and 75kgK/ha.

23rd November

- 38 cows put onto kale with access back to grass field.
- Stocking rate based on 10cows/ha for 100 days (4cows/acre).



8th December

- Cows were no longer given access back to grass field. Straw was then introduced.

30th March

- Kale was finished after 127 days and all cows removed.

CASE STUDY 2 – STUBBLE TURNIPS

SAC Easter Howgate, Bush Estate, Midlothian

Height: 250 – 275 metres (8-900ft)
Rainfall: 1250mm (50 inches)

Pure Charolais, Limousin and Angus crosses were put on stubble turnips for the winter 2005/2006.

Following wholecrop, stubble turnips were established in mid August to be grazed from November to February.

Weight and condition monitoring

Results showed an overall loss of only 5kg (-0.05kg/day) from November 2005 to the end of February 2006. (See table 2). Cows lost condition as targeted over the winter starting at CS 2.98 dropping to 2.80 in January and a final score of 2.70 in February. They were then housed one month prior to calving carrying slightly more condition than targeted. (Target CS 2.5)



Table 2: Performance at second weighing for stubble turnips and control groups

Group	November Start Weight (kg)	13/2/06 End Weight (kg)	Loss Kg/Day	November Start Condition Score	13/2/06 End Condition Score	Loss over period
Stubble turnips	745	740	0.05	2.98	2.70	0.28
Control	722	719	0.03	2.93	2.60	0.33

Table 3: Stubble turnips feed value- November 2005

	Total kg	Tops	Bulb
Average	4.45	2.93 (66%)	1.52(34%)
Dry Matter	90.5g/kg	91.4g/kg	90.3g/kg
ME 11.3	11.4	11.2	
CP 210	240	171	

DIARY OF STUBBLE TURNIPS ESTABLISHMENT AND USE 2005/2006 AT EASTER HOWGATE FARM, BUSH ESTATE

12th August

- Wholecrop harvested.

13th August

- Field disced.

15th August

- Cambridge roll.
- Vollenda sown at 6kg/ha (2.5kg/acre) then rolled again.

18th August

- Nitrogen applied at 60kg/ha (1.5cwt/acre).
- First day of rain for some considerable time.

22nd August

- Stubble turnips germinating especially on the heavier soils and where straw residues maintained moisture (slower to emerge on lighter soils).

17th November

- Cows put into the field.
- Stocking rate based on 5cows/ha (2cows/acre).

Calculation

4.45kg = 44.5t/ha fresh (18t/acre).

At 90.5g/kg DM = 4t/ha (1.62t/acre) DM = 0.42kg/m².

Allowance is for 6kgDM/day.

19 cows = 114 total per day.

114 divided by 0.42 = 270m² per day or 1890m² per week.

Initially starts at 250m but moves to 160m.

Based on 160m then needs to move = 1.7m/day.

Cows were initially fed 2.4m/day.

Important factors learned at Easter Howgate:

- Best establishment has been discing the field to break the surface, sowing, Cambridge roll, N applied at crop emergence.
- Ability to establish the crop up to mid-August.
- 2 crops from one field in a year.



CASE STUDY 3 - SWEDES

Jim Riddell, Nether Coullie, Kemnay, Inverurie, Aberdeenshire

Soil Type:	Sandy/Loam
Above Sea Level:	92 metres (300ft)
Rainfall:	850mm (34 inches)

Jim Riddell along with his father Jim farm Nether Coullie and land at Braeside, Blairdaff, which extends to 182ha (450 acres). The farm comprises 135 sucklers, 450 breeding ewes, 45ha (111 acres) cereals (10ha (25 acres) taken as wholecrop).



For winter 2006/2007, 4.8ha (12 acres) swedes, 6.5ha (16 acres) kale and 14.2ha (35 acres) stubble turnips were planted.

Cattle Enterprise

105 spring calving cows and 30 autumn calvers with all spring cows out-wintered previously on swedes and stubble turnips.

Cows are all homebred as mainly Aberdeen Angus and Aberdeen Angus crosses weighing on average 586kg. Most cows go to Charolais bulls and there is also an Aberdeen Angus bull to provide replacements.

By 14th May 2007, only 8 cows and heifers out of 97 had needed assistance. 5 of these were calved using ropes. Of the 5, four were heifers.

Forage brassica fields – swedes

Varieties: Kenmore and Rutatofte 4.52ha (11.16 acres)

Yields varied from 10.5kg to 12.5kg/m² with an average of 11.5kg. This equates to 12.88t/DM/ha (5.22tDM/acre).



Table 4: Results of protein and dry matter weight in the leaf and stem

Sample	Weight	DM g/kg	Dry Matter Weighting	CP g/kg/DM
Leaf	2.35 = 23%	133.2	27%	305
Bulb	8.11 = 77%	105.8	53%	152
	10.46kg	112		163

DIARY OF SWEDES ESTABLISHMENT & USE AT NETHER COULLIE, KEMNAY, INVERURIE

17th May

- 180kg/ha (4.5 cwt/acre) 12:24:12 N:P:K +7.5 S03 + Boron.
- Total 70kgN/ha, 140kgP/ha and 70kgK/ha.

24th May

- Sown at 0.5kg/ha (0.2kg/acre); Kenmore 70% and Rutatofte 30% of mixture.
- Treflan spray at 2.2l/ha (0.89l/acre).
- Sowing plus spraying at same time with 1 pass with sprayer at front of machine.

25th May

- Butisan at 1.1l/ha (0.45l/acre).



30th October

- 52 cows on swedes moving up to 80 during the winter.
- Stocking rate from high yield based on 22cows/ha for 100 days (9cows/acre).

5th April

- Swedes finished.

Calculations for strip feeding swedes

For the winter the cows should be allocated 5kg DM of swedes per day with another 15% added for wastage to give an overall allowance of about 5.75kgDM/day. The field was measured for yield with an average of approximately 12.88t/ha (5.22t/acre) dry matter.

Yield can vary considerably and so this highlights that measurements should always be taken to allow accurate feeding.

Nether Coullie actual results on Swedes

Cows consumed on average 5.9kg dry matter per day with 6.2kg straw dry matter

Grazing cow days per acre = 891

Example: If 60 cows: 1 acre will do 891 divided by 60 cows = 15 days

Important factors learned at Nether Coullie

- Swedes are the preferred feed due to the high yields achieved.
- Success based on experience with the crop.
- High yields have led to lower feed cost per day.
- Kale varied over the last few years.
- Growing brassicas at different times of the year spreads the risks – swede yields can be assessed before stubble turnips are sown.

The out-wintering decision – financial considerations

The following table gives approximate costs per day on brassicas. This has been calculated from the information in the case studies and updated to reflect current fertiliser costs.

Financial results are based on 2007/2008 actual costs.

Please be aware that when carrying out costings, changes have to be altered to reflect the current costs at that time.

Soil Analysis

It is important to properly manage fertiliser inputs. Soil status should be determined for P&K.

Fields with medium/high status will have the potential for lower inputs and the benefit from increased levels of P&K from cattle grazing over the following winter. Utilisation of dung and slurry will play a vital role in profitability. Case study at North Nevay was successful only using broiler litter for his kale production.

Table 5 gives the costs based on straw at £35/tonne while Table 6 shows how the savings start to reduce over the control group when the straw value rises to £55 and £75/tonne.

Table 5: Cost per day and savings made per cow – dry spring calvers (straw at £35/t)

	Total cost per day includes fixed costs	Saving over control group per day	Actual cost of growing brassica per day	Straw cost per day based on £35/t	Other costs including time spent, minerals etc
Stubble turnips	£0.56	£0.73	£0.21	£0.25	£0.10
Swedes	£0.61	£0.68	£0.27	£0.25	£0.09
Kale	£0.82	£0.47	£0.46	£0.25	£0.11
Control	£1.29	£0.00	£0.80(silage)	£0.21(bedding)‡	£0.28

- ‡Cost of straw for control is 21p for bedding (6kg@£35/t), which is not incurred if on cubicles or slats.
- All costs include labour.
- Control group has machinery and building costs also included.
- The control group is cows inside on straw courts being fed a silage-based diet.
- Growing costs have been put in based on contractor charges yet other farms will carry out the operations themselves with lower costs.
- No machinery used in the fields on a day to day basis as all straw bales required were placed in them prior to cattle entering them.

Sensitivity Analysis

Table 6: Savings over control group with movement in straw price

	£35/tonne	£55/tonne	£75/tonne
	Saving over control group per day	Saving over control group per day	Saving over control group per day
Stubble turnips	£0.73	£0.71	£0.69
Swedes	£0.68	£0.66	£0.64
Kale	£0.47	£0.45	£0.43†

†At £75 per tonne the control group have a bedding cost of £0.45. If the farm has them on slats or cubicles with no straw used the actual cost per day will be similar to kale. However cost of disposing of slurry would need to be considered.

Table 7: Growing Costs (£)

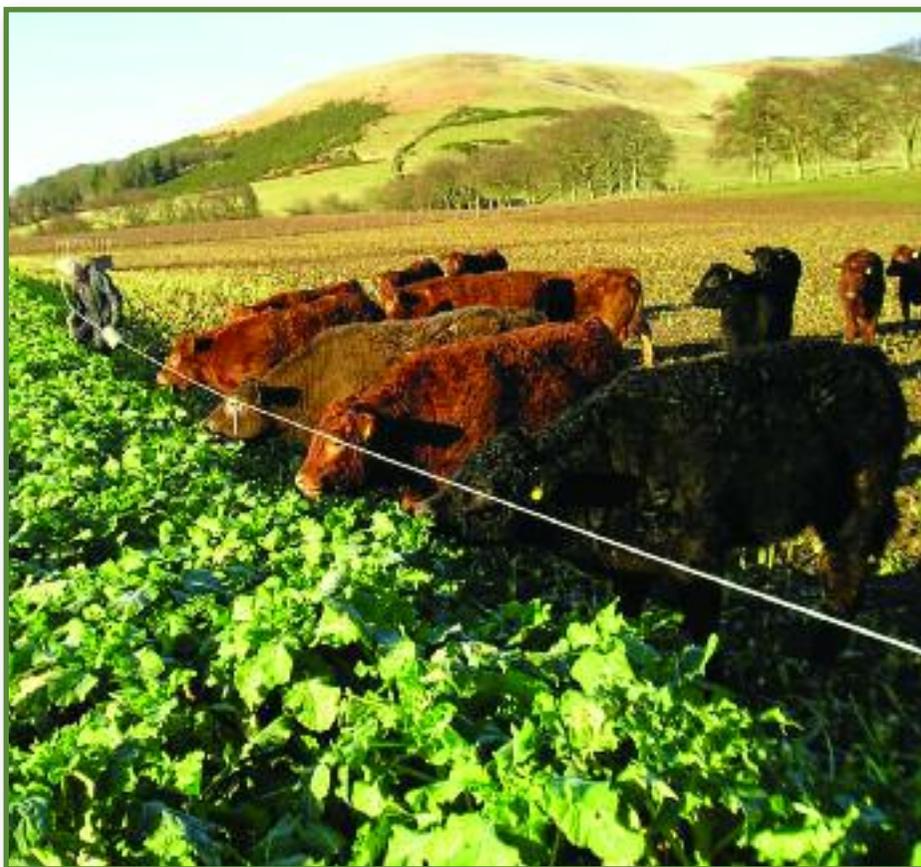
	Stubble Turnips Easter Howgate	Swedes Nether Coullie	Kale
Item	Costs per ha (acre)	Costs per ha (acre)	Costs per ha (acre)
Cultivations	42.25 (16.90)	119.6 (47.84)	67.5 (27.0)
Seed	25.00 (10.0)	45.55 (18.22)	106.67 (42.67)
Fertiliser	65.63 (26.25)	337.5 (135.0)	333.75 (133.50)
Spreading fertiliser	7.5 (3.0)	10.0 (4.0)	7.5 (3.0)
Spray	0.00	50.0 (20.0)	37.45 (14.98)
Spraying costs	0.00	20.0 (8.0)	5.0 (2.0)
Growing cost/ha (acre)	127.55 (51.02)	582.65 (233.06)	557.88 (223.15)
Straw/minerals	173.6 (69.44)	646.3 (258.52)	344.38 (137.75)
Labour	42.8 (17.12)	119.16 (47.67)	82.5 (33.0)
Total costs/ha (acre)	343.95 (137.58)	1,348.13 (539.25)	984.75 (393.90)
Grazing days/ha (acre)	622 (249)	2,228 (891)	1,220 (488)
Cost per day	£0.56	£0.61	£0.82
Tonnes DM/ha (t/acre)	3.63 (1.45)	13.38 (5.35)	7.33 (2.93)

Out-wintering Spring Born Steers On Kale

During the winter 2005/2006 at the SAC in Scotland, 3 groups of Limousin and Aberdeen Angus steers were weaned in late October housed for 3 weeks and then put on kale with one group supplemented with straw and the other silage. A specifically formulated mineral for cattle on brassicas was offered ad-lib. The third group (control) was housed on slats. All groups consisted of 15 steers.

After a period of 127 days (1st November – 8th March) the control group had put on 14kg more weight than the steers on kale (0.87kg/day versus 0.74kg/day) supplemented with straw and 14g more than those supplemented with silage (0.87kg/day v 0.76kg/day).

When they were put to grass the kale groups demonstrated greater compensatory growth, averaging 0.63kg/day versus the control group at 0.55kg/day.



Steers strip grazing on kale at Easter Howgate

Table 8: March to August 2006 Performance at Grass

Group	Kale + Straw	Kale + Silage	Control Group
Weight at weaning (kg) 1/11/05	306	307	302
Weight after kale (kg) 8/3/06	400	403	412
Overall gain (kg/day)	0.74	0.76	0.87
Weight after grass July 06	494	489	492
Gain since March (kg/day)	0.65	0.59	0.55
Gain since weaning (kg/day)	0.69	0.67	0.70

Although the kale-fed cattle were marginally out-performed by the housed cattle in terms of growth rates, out-wintering was shown in this study to be more cost effective, with cost being £0.10/kg lower (see Table 9).

Table 9: Costs per day including control group

	1. Kale + Straw	2. Kale + Silage	Control Group
Kale cost per day	£0.46	£0.46	
Concentrate cost per day			£0.18
Wholecrop cost per day			£0.48
Straw cost per day @ £35/t	£0.07		
Silage cost per day @ £30/t (30% DM)		£0.12	
Labour cost per day @ £10/hr	£0.12	£0.12	£0.08
Fixed costs (machinery)			£0.15
Total cost per day	£0.65	£0.70	£0.89
Cost per kg gain	£0.88	£0.93	£1.03



SECTION 2

OUT-WINTERING ON DEFERRED GRAZING

Deferred Grazing – Points To Ponder

The practice of deferred grazing – setting aside and resting pasture in the autumn for winter grazing - for spring calving cows has been adopted on a number of farms in order to reduce the costs of winter feeding. Whereas there should be no problems in maintaining cow performance with this system before the year-end, there could be problems with grass quality and/or supply and intakes in the New Year. For optimum performance and to allow for adequate dry matter intake, the grass should have an energy (ME) content higher than about 8MJ/kgDM, corresponding to a D-value of about 54, and a protein (CP) in excess of 90g/kgDM.



CASE STUDY 4 - DAVID KIRKPATRICK, AUCHENBAINZIE FARM

Out-wintering System (Deferred Grazing)

Auchenbainzie is run on a commercial basis and David Kirkpatrick has adopted his own way of out-wintering (deferred grazing) to suit the farm over the last 2 years. The 857ha unit is split between hill and upland grazing ranging from 60 to 300m. In addition to 230 spring calving suckler cows, the farm also runs 220 Holstein dairy cows and 1,700 breeding ewes.



The suckler herd is a mix of Aberdeen Angus cross and Stabiliser cross cows. Calves are weaned and housed on 15th October and cows go out onto a 200ha green hill including molinia/bent grassland, meadow grass, fescue and heather. Under this system, cows were brought down after the New Year and were turned onto kale (45 acres) and then came inside one month prior to calving.

No sheep or cattle graze the hill from June to October. No in calf heifers, old cows or thin cows are grazed on the hill. The only supplementation given is minerals.

The Auchenbainzie system

The hill was split into two distinct 100ha areas, with approximately 66 cows to each area (1-1.5cows/ha). Grass analyses showed that the minimum protein requirement for dry suckler cows

of 8-9% was provided from the hill (Table 10). Selective grazing would initially mean that cows received higher levels of protein than shown in the analyses.

Table 10: Forage analyses from Auchenbainzie hill grazing

	October 2007	December 2007	January 2008
Dry Matter (%)	32	28	28
Energy (MJ/kg DM)	9.3	9.3	8.2
Protein (%)	N/A	8.7	8.8

Previous work by SAC has shown that deferred grazing quality reduces after New Year (it is not conserved, unlike silage) and is then insufficient to meet the increasing demands of the calf. Additional feed would be required if these cows were to stay longer on deferred grass, although recent mild winters have helped maintain grass quality for longer allowing savings to be extended (up to one month pre-calving). It is, however, important to always have alternative feed in hand (do not rely on mild winters), and it should be noted that taking cows off mid-winter reduces the risk of damage to species rich pastures.

At Auchenbainzie, cows were brought into the handling yards in January 2008 and split into 2 groups. Cows that were under condition score 2.5 were put on to kale (61). The yield of kale was poorer than normal at Auchenbainzie so 71 cows scoring 2.5 upwards were returned to the hill and fed on Rumenco Cattle Super Energy blocks initially (1 block to 15 cows every 2 days) then changed onto cobs towards the end of January (to eliminate bullying that occurred with blocks). Cobs were fed from a snacker up to 4th March, when cows were housed to start calving from 1st April.

This system, if carried out in the correct fields, is a low cost option, potentially delaying housing and the associated costs for up to two months. In 2007, the cost benefit was estimated to be £0.28/head/day.

The quantity and quality of the grass available for winter grazing will vary tremendously from site to site and will be affected by a number of factors:

Pasture species

Some species such as perennial ryegrass, tall fescue and cocksfoot tend to produce more autumn/winter growth than other species.

Length of time the pasture is rested

Dry matter yield is directly related to the length of the autumn rest and to the amount of autumn rainfall. However, the longer the autumn rest, the poorer is the quality.

Pastures that have had a relatively short rest consist largely of young leafy material of high quality, suitable for young or producing stock. A long rest produces a high yield of poorer quality pasture, suitable for maintenance for older and non-producing stock.

Grazing system

As cows will graze selectively given the choice, strip grazing the stockpiled forage tends to extend forage quality longer than continuous grazing.

Weather and rainfall

Higher winter rainfall tends to reduce the digestibility of the stockpiled forage so the quality of grass will be higher and will be maintained for longer in drier areas. Also, in wet winters there is an increased risk of herbage degradation due to fungal growth and the possibility of mycotoxins in the sward.

Problems with low grass availability and/or quality are unlikely to occur before the year-end. This is especially true when winter weather is mild (now typical); since grass will still be growing at soil temperatures over 7°C the quantity and quality available should be adequate. However, from mid January onwards it is likely that grass quality will start to deteriorate.

It is therefore essential to monitor cow condition during this time and prevent excessive loss of condition by using appropriate supplementation. Low protein grass can be supplemented with blocks or licks but if the digestibility of the grass available is also low then some additional energy supplementation – as baled silage or concentrates – will be required. If this is not possible then there is no option but to put the cows on a conventional winter diet for the last few weeks before calving.

Forage analysis showed low levels of copper, selenium and phosphorus. Blood samples were low in selenium.

Rumenco have a free access mineral and vitamin supplement for the deferred grazing situation, which typically comprises:

	%	mg/kg		iu/kg	
Calcium	15	Cobalt	80	Vitamin A	500,000
Phosphorus	8	Copper	1,500	Vitamin D	100,000
Magnesium	10	Iodine	150	Vitamin E	1000
Sodium	7	Manganese	2,000		
		Selenium	25		
		Zinc	2,000		

Rumenco has now developed "Pressed Mineral Blocks" which will be more suited to the hill situation.

Auchenbainzie 2008/2009

The aim is to wean cows in October and have cows out on the hill for the entire winter, including calving. They will be supplemented initially by a Rumenco "Pressed Mineral Block", ensuring the cows become used to block feeding.

From mid-November 2008, Rumenco high energy blocks will be introduced. The aim is to keep the cows in good condition right up and through the New Year, as they will be on the hill for another 3 - 4 months. Once the cows have become accustomed to the blocks and are not grazing outside a defined area, the 'snacker' will be introduced to ensure a set amount of cobs each day are eaten, to allow condition to be maintained throughout pregnancy.

Important factors learned at Auchenbainzie

1. In calf heifers, older and thin cows are not suited to this system.
2. Deferred grazing is ideally suited to cattle up to the end of December.
3. After that period cows lose condition too quickly due to the lower feed quality and the increased demands by the unborn calf.
4. If cows are going to be kept longer on the deferred grazing then additional feed is required.
5. Feed needs to be introduced early on (November) to allow an adjustment period and keep them in good condition into the New Year.
6. It is advisable to feed cobs nearer to calving to avoid bullying and ensure all cows receive equal feed daily.
7. Ticks are a potential problem.

Potential disease risks with out-wintered cattle

Ticks, Tick-Borne Fever and Suckler Cows

Ticks and tick associated diseases in cattle, sheep, grouse and deer are becoming more common in Scotland with many hills thought previously not to be affected now carrying a threat.

Tick-borne fever (TBF) is caused by a bacteria *Anaplasma phagocytophila* and is transmitted by the sheep tick *Ixodes ricinus* when it bites a susceptible animal. Clinical signs of TBF in cattle include a high temperature, possibly associated depression, reduced food intake and a suppression of the immune system. These clinical signs may not be evident clinically in extensive suckler cow systems. The high temperatures can also cause embryo loss and abortion, which is well recognised in sheep.

SAC Veterinary Services has investigated some suckler herds in south west Scotland with high barren rates in cattle that have been out-wintered on tick affected hills. Embryo loss has occurred when the cattle have been out-wintered on the hill and - with other potential factors for the high barren rate ruled out - TBF has been isolated as the likely cause.

This particular disease presentation seems to apply only to suckler cows that have not been on hill ground before and are not acclimatised to hill conditions. Farmers need to be aware of this condition as a potential problem and discuss the risks and potential control strategies with their vet.

TBF in cattle at Auchenbainzie Farm

A history of embryo loss in naïve cattle being put into a tick environment points to TBF being a problem at Auchenbainzie demonstration farm.

For calving in 2007 the aim was to acclimatise the cattle to the tick environment when not pregnant to raise their immunity to the disease. While it is not known how long the immunity to TBF lasts in the absence of tick exposure it was assumed that cows that went to the hill in



2006 would in 2007 have immunity to the disease and blood results supported this. Therefore heifers that had not previously been on the hill grazed this ground in the early summer.

Pour-on acaricide and antibiotic treatments are of potential use to control TBF when the cattle move onto this hill, however there is no trial data to support their use in cattle (only sheep) and there are no products licensed for tick control in the UK for cattle. There are concerns that by treating with an acaricide it only delays rather than prevents tick exposure, thus the aim of acclimatising cattle to the hill environment to try and control the disease.

To monitor the situation, cows' antibody status and pregnancy status are checked before and after they graze the hill.

Please refer to page 15 in regard to fluke and worm treatments.

The feed quality issue

If protein levels fall below about 8% then this will be insufficient to meet the requirements of the rumen bugs. Dry matter intake – and energy intake – will therefore fall. A spring calving cow will have rising energy demands (35% higher from mid-January) at a time when deferred grazing quality is falling, so rapid weight and condition loss is inevitable without supplementary feeding.

Mineral and Vitamin Supplementation: Deferred Grazing

It is important to provide a mineral and vitamin supplement when out-wintering cows on deferred grazing, especially on hill pastures that tend to have poorer soil nutrient status. Such pastures are commonly deficient in certain of the trace elements (notably copper, cobalt and selenium) and with old pasture even major minerals, such as phosphorus, may be low.



Cows on hill with a rocker feeder for minerals

Deferred grazing – an alternative system

One of the out-wintering treatments investigated on SAC's farms 2005/2006 was a field of permanent pasture, at approximately 245m (800 ft) above sea level.

After either a late first cut of silage or grazing it was shut up (13th July) and fertiliser applied. No second cut of silage was taken. In mid-November cows were strip grazed.

Results showed that the deferred grass was capable of keeping the cows up to New Year, after which point the reducing quality of the grass was insufficient to meet the increasing demands of the calf (reinforcing earlier findings). Additional feed would then be required if cows are to remain longer on deferred grass.

Second cut silage can be made from half the field, with wrapped bales left in situ and fed alongside deferred grazing. If carried out in the correct fields, this system offers a low cost option to many, delaying housing for up to 2 months.



Cows being strip grazed on grass during winter at Easter Howgate



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