

Guidelines for Finishing Store Lambs on on All-Concentrate Diets.

MG Diskin^a, N Claffey^a, F Campion^a, M Gottstein^b,

^aTeagasc, Mellows Campus, Athenry, Co. Galway.

^bTeagasc, Macroom, Co. Cork.

**Teagasc, Mellows Campus, Athenry, Co.
Galway.**

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Key Take Home Points when finishing lambs on concentrate diets

- It will be necessary to train lambs to eat concentrates 2-3 weeks prior to housing – outdoor with creep feeders/trough or indoors with access to roughage.
- Never introduce lambs to concentrate feed when they are fasted
- If finishing lambs on an all concentrate diet, ensure diet is formulated for this purpose, initially offer 300 g/lamb/day and increase by 200 g/lamb/day every 3 days until full feeding, and continue to offer a small quality of long roughage (hay, silage, or straw). Ensure that lambs have water at all times.
- Each lamb should be allocated at least 0.8m² of floor space.
- Ensure that the sheep house is well ventilated and adequately bedded with straw in bedded sheds.
- Ensure that there is adequate trough space for lambs –especially during the time that they are being built up to ad-lib concentrates. (need 30cm per lamb of trough space)
- If lambs are being fed indoors ensure that a clean fresh supply of water is available at all times
- Carefully examine declared ingredients list to assess ration quality
- Avoid too much starch or finely ground ingredients.
- Coarse or slightly cracked ingredients are more slowly digested and, therefore, create a safer feed. However, the downside is that coarse feeds tend to attract birds and lambs tend to sort and leave behind unpalatable ingredients (rapeseed, distillers etc.)
- Mineral and vitamin inclusion essential for longer feeding periods. Ensure that the mineral and vitamin mix included in the ration is specific for intensive finishing of lambs
- If finishing males lambs include ammonium chloride for long keep lambs to prevent urinary calculi. Inclusion rate is 0.5% or 5 kg per tonne.
- There should be no need for additional mineral and vitamin supplementation where properly balanced concentrates are being fed.
- If lambs are being fed indoors ensure that concentrate feed is available at all times.
- Purchased lambs should, on arrival on the farm, be given a “quarantine” dose for gastrointestinal worms and liver fluke, foot bathed and housed for 48 hours.
- Plunge dip or inject with macrocyclic lactone group product to control sheep scab.
- Long-stay (> 6weeks) lambs may benefit from vaccination against clostridial diseases and pasturella pneumonia.
- Canine tapeworm infection can be eliminated with regular (monthly) worming of dogs using praziquantel.
- Prompt removal and or correct storage of sheep carcasses to avoid scavenging by dogs and foxes. Keep dogs away from sheep feed.

Introduction

Ireland's strength in sheep production lies in its ability to produce meat from an almost entirely grass-based diet thus giving us a competitive advantage over many of our EU competitors. Maximizing production from grazed grass should be the objective of all sheep production systems. However, in some instances and frequently in hill areas, grass supply and or quality is inadequate to finish lambs. Increasingly, more of the store lambs are finished in late autumn and early spring

period on concentrate and roughage diets. The aim of this document is to provide a reference guide as to infrastructure, nutrition, health and welfare requirements for lambs being finished indoors intensively on concentrated diets

Concentrate diets for finishing store lambs

The purpose of supplementing lambs with concentrate feed is to provide them with a concentrated form of energy and protein in a digestible form which is also balanced to provide essential vitamins and minerals. •If finishing lambs on an all concentrate diet, ensure diet is formulated for this purpose and pay particular attention to the ingredients that are in the ration (see Table 1).

Table 1. Energy density of various ingredients when included in lamb finishing diets.

High Energy	Medium Energy	Low Energy
Cereals (Maize, Barley, Oats, Wheat)	Maize Gluten	Pollard / Wheat feed
Pulps (Citrus & Beet)	Soya Hulls	Palm Kernal
Soyabean Meal	Rapeseed Meal	Sunflower
Distillers Grains		Oatfeed
Peas & Beans		Cottonseed
Molasses (<5%)		
Oil (small quantities)		

Growing lambs (less than 35kg) have an additional requirement for protein and should receive a diet containing 13-14% crude protein. Lambs that are well-grown and in the finishing phase, will not benefit from dietary crude protein levels above 12%. Excess protein is simply excreted in the urine and uses up energy in that process (see Table 2). Avoid too much starch or finely ground ingredients. Coarse or slightly cracked ingredients are more slowly digested and, therefore, create a safer feed. However, the downside is that coarse feeds tend to attract birds and lambs tend to sort and leave behind unpalatable ingredients (rapeseed, distillers etc.). Mineral and vitamin inclusion is essential for longer feeding periods. Ensure that the mineral and vitamin mix included in the ration is specific for intensive finishing of lambs. It's strongly recommended to include ammonium chloride at 0.5% or 5 kg per tonne to prevent urinary calculi in male lambs. There should be no need for additional mineral and vitamin supplementation where properly balanced concentrates are being fed. When lambs are fed on an all-concentrate diet the minimum crude fibre content of the ration should be at least 7%. Supplementary long roughage in the form of hay/straw or silage is recommended to aid rumination/saliva production (reduces the risk of acidosis) and provide the animals with environmental enrichment.

Table 2. Concentrate feed guidelines

Constituents (as fed)	Maximum level	Mininum Level
Energy (UFL)	None	0.92
Crude Protein %	12% finishing 16% growing	12%
Crude Oil %	6%	n/a
Crude Fibre %	n/a	7%
Sugar & Starch %	35%	n/a

Water

When lambs are being fed indoors ensure that a clean fresh supply of water is available at all times. Each lamb will consume between 4 and 8 litres of water daily depending on diet dry matter levels and intake. Consequently it is important that the water supply is sufficient to meet these requirements. All water pipes should be protected from frost to prevent freezing. All drinking points should be checked daily for cleanliness and supply.

Introduction of lambs to meal feeding

If finishing lambs on an all concentrate diet, initially offer the specially formulated diet at 300 g/lamb/day and increase by 200 g/lamb/day every 3 days until full feeding, and continue to offer a small quality of long roughage (hay, silage, or straw). Ensure that lambs have water at all times. Ensure that there is adequate trough space for lambs –especially during the time that they are being built up to ad-lib concentrates; need up 30cm of trough space per lamb depending on lambs size..

Housing and stocking rate in pens

Most lambs that intensively finished indoors on concentrates are housed on either slats or expanded galvanised metal. Both floor types are suitable and provided the floors do not clog up, lambs will remain clean and will comply with the requirements of the Clean Livestock Policy (CLP). It is important to pen lambs according to live weight. This will help to facilitate an all in all out strategy and allow for cleaning and disinfection of housing between finishing lots. Do not mix ewe and ram lambs. Each lamb should be allocated at least 0.5m² (light (25kg) hill lambs) to 0.8m² (45-50 kg lambs) of floor space per lamb. Ensure that the sheep house is well ventilated and adequately bedded in straw bedded sheds.

Lambs that refuse to eat

A small proportion (<2%) of hill lambs refuse to eat or are very shy feeders. Usually they stand at the rear of the pen when meal is fed and get progressively thinner with time. It's best to remove them and put them on pasture..

Routine Husbandry

Lambs should be carefully herded/examined twice daily and lambs showing evidence of sickness or not eating removed and treated. When lambs die your local veterinary surgeon should be consulted and should undergo a post-mortem examination or be sent to the Regional Veterinary Laboratory as soon as possible after dying. As lambs grow space allowance should be increased. Avoid injuries to lambs and blemishes on carcasses by avoid any mishandling of lambs, broken slats, sharp objects sticking from pens etc. On occasions slats can become clogged with feed and or faecal matter and this should be removed to avoid fleece contamination.

Selecting lambs for slaughter

The weight at which lambs are drafted for slaughter will depend on market specification, particularly the maximum carcass weight paid, kill out rate (KO%) which, is very much a function of breed, gender, diet and degree of finish. Producers should also avoid over-fat carcasses as these are discounted and it's expensive to lay down fat. Carcass fatness is mainly affected by gender

(ram, wether or ewe lamb) and breed. Scottish Blackface wether lambs reach an adequate carcass fat cover (fat class 3) at about 18 kg carcass weight with Texel x Scottish Blackface wether lambs having an adequate fat cover at 20 kg. For lambs on an all concentrate diet, KO % will increase by approx. 5 percentage points by comparison to un-supplemented lambs. Rams lambs reach heavier carcass weights before adequate fat cover is achieved. Suggested minimal drafting weights are presented in Table 3.

Table 3. Suggested minimum drafting weights for male lambs finished on an all-concentrate diet.

Breed	Gender	Target Carcass weight (kg)	Expected KO%	Minimal weight at drafting (kg)
Conn-Mayo Scottish Blackface	Wether	18	45	38
Conn-Mayo Scottish Blackface	Ram	20	43	44
Texel x Scottish Blackface	Wether	21	47	42
Texel x Scottish Blackface	Ram	23	46	47

Evidence to-date suggests that KO% is 1 to 2 percentage points lower for Perth and Lanark type Scottish Blackface lambs. Consequently, drafting weight can be increased by 1-2 kg for such types. If lambs are recently shorn minimum drafting weight can reduced by 1 kg. Lambs can be drafted at lower weight but will result in lower carcass weights. There may also a lack of fat cover on ram lambs when drafted at lower weights.

Lamb health

All lamb finishers should draw up a flock health plan in conjunction with their Veterinary Practitioners. Purchased lambs should, on arrival on the farm, be given a “quarantine” dose for gastrointestinal worms and liver fluke, foot bathed and housed for 48 hours. Long-stay (> 6weeks) lambs may benefit from being vaccinated against clostridial diseases and pasturella pneumonia. It’s advisable that vaccinations are completed two weeks before housing. Anthelmintic resistance in worm populations is a real threat and so quarantine drenching is important to avoid inadvertently importing resistant worms and fluke. Lameness can lead to very poor performance in store lambs. When animals are housed, lameness spreads quickly as sheep are in close proximity to each other. The most frequent way that footrot or contagious ovine digital dermatitis (CODD) enters a farm is through the importation of infected sheep. All lambs should be foot bathed on arrival (see Table 4). Any lame lambs must be treated as a separate group. Regular foot bathing, every two to three weeks is advisable during the housed period.

Withdrawal dates

When administering any products to food producing animals, producers must be cognisant of withdrawal dates. For some products the withdrawal dates are long. The current weight of the lamb and expected slaughter dates must be considered when selecting products to be administered. A treatment plan for purchased lambs is outlined in Table 4.

Tapeworm (*Taenia ovis*) infection of lamb carcasses.

There is evidence in Ireland of abattoir rejections and condemnations of lamb carcasses because of the presence of tapeworm cysts (*Cysticercus ovis*) in the muscle or organs (liver, lungs, heart,

diaphragm, carcass muscle) of the lamb. Frequently these lambs come from an individual or small number of farms. Where this occurs the producer is at the total loss of these carcasses. As there are no signs of infection in the living sheep, feedback from the abattoir is frequently the sole diagnostic and monitoring tool and, given the lag between infection and diagnosis, control is very difficult in the face of infection and reactive control measures are limited. The sheep is the intermediate host for these canine tapeworms (*Taenia ovis*) that effect dogs and foxes in Ireland. Usually the infection is picked up by sheep in the summer and is then found in older, finished lambs that have been overwintered. Control depends on anthelmintic treatment of affected dogs as well as management strategies to prevent transmission from dog to sheep and vice-versa. Canine infection can be eliminated with regular worming using praziquantel (six-week interval recommended). Treating at this interval eliminates the worms before they become sexually mature and, therefore, prevents the shedding of eggs. Dogs should also be prevented from roaming as this increases the likelihood of them becoming infected by tapeworms. Minimise the exposure of sheep, especially lambs, to canine faeces by keeping dogs off sheep pastures. Avoid buying lambs from flocks with a history of disease. Keep dogs away from sheep feed. Incoming dogs should be treated with praziquantel one week before arrival on the farm.

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Table 4. Treatment plan for purchased lambs		
Reason	Treatment [†]	Comments
To prevent the introduction of resistant roundworms	Option1 Moxidectin e.g. Cydectin Moxodec plus monepantel (Zolvix)	Keep off pasture for a minimum of 4 48hr and turn out to contaminated ground preferably the driest part of the farm if fluke is also a consideration (see below)
	Option2 Derquantel (STARTECT)	
To prevent the introduction of resistant liver flukes	Option 1 Closantel eg Flukiver Option 2 Nitroxylnil eg Trodax Option 3 Rafoxanide eg. Ridafluke	Put to graze on driest part of the farm a minimum of 4 weeks and repeat treatment 6 or 7 weeks later for closantel and nitroxylnil based products, respectively.
To prevent the introduction of more virulent footrot strains or Contagious Ovine Digital Dermatitis (CODD) [‡]	Examine sheep. All lame sheep should be segregated, maintained as one group and treated according to clinical presentation /diagnosis. All animals should be footbathed zinc sulphate /copper sulphate solutions); Any of these will cure Scald, prevent and control footrot but has no effect on CODD. Consult your veterinary surgeon about suitable antibiotics for treatment of CODD.	Stand sheep on a dry surface for 1 hour after footbathing. Place on pasture where sheep have not grazed for a minimum of 2 weeks. Maintain isolated from the main flock for a minimum of 4 weeks . Continue to monitor sheep throughout this period for any signs of lameness. Isolate any lame sheep and treat as necessary
To prevent the introduction of scab	Plunge dip or treat with an injectable macrocyclic lactone.	Maintain isolation from the main flock
Vaccinations to prevent clostridial diseases and pasturella pneumonia	Use multivalent vaccines according to manufacturer's recommendations. Unvaccinated lambs or lambs of unknown status require a primary course consisting of two injections four to six weeks apart.	Most cases of clostridial disease are fatal. Pasteurellosis can also be fatal. These vaccines are probably the two most effective vaccines used in sheep and will substantially reduce these losses.
Orf	When orf is already present in your flock or it appears in bought in lambs, isolate the affected lambs and vaccinate all other lambs.	If orf is not already present on your farm and you do not expect it is present on the bought in lambs, do not vaccinate as you will be introducing the problem.
[†] All treatments should be administered in accordance with the manufacturer's instructions with attention to withdrawal periods [‡] Adapted from O'Leary (2010) Eradication and control of Lameness of Sheep. Veterinary Ireland Journal I Volume 4 Number 7		