

Rearing the Future Flock

A Guide to Breeding Ewe Replacements



Part of Scotland's
Rural College (SRUC)



Introduction

Breeding females form the foundation of any successful sheep flock. The management of replacement breeding females starts before they have even been conceived and continues right through to producing their own offspring. This guide discusses the management of replacement ewes to aid decision-making for maximum efficiency and productivity of the flock.

This should benefit the business by:

- **Increasing the reproductive performance of the flock**
- **Reducing the labour and input requirement**
- **Improving the resilience of the flock and suitability to the farm conditions**



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Section 1: Maternal Genetics

Sire selection

Half of a breeding ewe's genetic makeup comes from its sire. Estimated Breeding Values (EBVs) are a useful tool to determine the genetic potential of an individual compared to others of the same breed. This information can be invaluable in choosing the best sire for breeding maternal replacements – a maternal sire.

When choosing a maternal sire, it is important to focus on breeding traits such as mature weight, milking ability, and litter size. This differs from terminal sire selection, which mainly focuses on the carcass yield of offspring. The traits selected in a maternal sire will ultimately determine the genetic merit of the future breeding flock.

Table 1: Estimated Breeding Values (EBVs) explained

EBV	Explanation	Interpretation
Birth weight	The weight of lambs at birth.	Smaller lambs at birth are indicated by negative values. Lamb weights should be in the region of 4.5–6kg for viable lambs that are born without assistance.
8-week weight	Genetic potential for the growth rate of lambs between birth to 8 weeks of age.	A positive value indicates a greater 8-week weight.
Shearling weight	Indicates mature weight.	Animals with high figures will show an increased mature size.
Litter size	The potential for breeding to produce prolific females.	A positive figure relates to a higher potential prolificacy of female offspring.
Litter size reared	The breeding potential for the rearing ability of female offspring.	Positive values indicate more lambs reared per ewe.
Maternal ability	This is the breeding element of the 8-week weight measurement.	A greater figure indicates a ram's female offspring have an improved milking ability and thus perform better as mothers.
Mature weight (pre-mating)	An indication of genetic potential for the mature weight of female offspring at mating.	A greater value suggests greater mature weight at mating.
Body Condition Score (BCS; pre-mating)	The genetic potential for ewe body condition of female offspring at mating.	Greater values suggest breeding lines that have an improved BCS at mating.

Note: Adapted from Signet, 2023

Additional maternal EBVs (depending on the breed) linked to economics and welfare include:

- **Faecal Egg Count (FEC) (Strongyles and Nematodirus)** – animals that show a negative figure for FEC are more resistant to worms and are likely to excrete fewer worms onto pasture.
- **Serum IgA** – an indicator of immune response under a worm challenge.
- **Parasite Plus** – this is an indicator of sheep that are more resistant to parasites and includes figures for both FEC and Serum IgA.
- **Longevity** – A high value to longevity indicates sheep with higher genetic potential to produce ewes with a longer period of production.

Hybrid vigour: this is another genetic phenomenon to utilise and occurs when the breeding cross produces offspring with greater genetic potential than that of the two breeds individually. For those breeding their own replacements, this may involve crossing the breeds differently for each mating.

Breeder vs. breed: often the breeder of the rams is more important than the breed itself. Questions to ask when selecting a breeder to purchase rams from include:

- **Are they aligned with your flock selection policies?**
- **Is the environment similar to your farm?**
- **Are they bred for health and longevity?**

Variation within a single breed: We must also consider the vast variation within a single breed not just between different breeds and therefore EBVs, observations and breeder conversations are the only way to determine whether the genetics will be suitable for your needs.



Ewe Culling Decisions

In addition to the ram genetics, the ewe flock may need to undergo rounds of heavy culling and selection in pursuit of the perfect flock.

To best manage the breeding flock for replacements, split the flock into two:

- **“A flock” for breeding maternal replacements**
- **“B flock” of ewes with traits that you don’t want to keep in the flock. These ewes are often mated to a terminal sire.**

In order to manage both, flock observations should be made on farm depending on the individual breeding goals. These may include milking ability, lambing ease, rearing ability, 8-week weight, Body Condition Score (BCS) and health. Any ewe that does not make the on-farm criteria for breeding should be then put to the “B flock”.

This will be a fine balance to ensure you don’t have a high replacement rate each year, you may want to make a list with the farm workers to identify the selection priorities.

Example only: How a farmer might prioritise ewe culling decisions to produce the flock they want whilst keeping the replacement rate sustainable.

High priority	When practical*
Prolapses	High mature weight
Poor feet	Assisted at lambing
Poor udders	High BCS loss
Poor teeth	Bad temperament
Barren	Fails to rear twins

*For instance, when the high-priority issues result in culling less than 20% of the ewe flock.



Ewe Lamb Selection

When selecting replacement lambs, the challenge is balancing the need for a large group of ewe lambs to maintain, or grow, the ewe flock whilst also selecting for the traits you want. Again, you might want to agree a list of priorities to identify those you wish to keep, such as the example below.

Example only: Select from mothers who...

High priority	When practical*
Lamb easily	Gave birth in the first cycle
Have lambs with good vigour	Have good temperament
Have good udders and feet	Hold condition without extra feed
Successfully reared twins	Have ideal mature weight

*For instance, when you have a group meeting the high-priority list which is over 40% of the ewe flock.

Target the best ewes based on your breeding priorities for the best maternal ram genetics. In addition, you might set a target weight for your ewe lambs (e.g., 30kg before weaning at 12 weeks) as this is indicative of milking ability and direct growth genetics and check feet and general condition of the ewe lamb when making the decision to retain for breeding. If mating as ewe lambs, keeping more than you require gives the opportunity to further select for fertility as those scanned empty can be sold. Go through ewe lambs between weaning and tugging, to select against dirty bums, poor feet score and low condition.



Section 2: Target Growth Rates

The ewe lamb weight profile is a key indicator for breeding performance.

Key points:

- Sexual maturity is primarily driven by weight.
- Ewes will not typically reach 100% of their potential liveweight until around 3 years of age.
- Ewe lambs and gimmers must be managed appropriately to allow growth during pregnancy and lactation for their longevity and production.

Whether first lambing as ewe lamb or gimmer, hitting the target weights below will be beneficial to their lifetime performance:

Table 2: Target weights

Age	% of mature weight	Lowland Example	Upland Example	Hill Example
Mature weight (over 3 years old)		80kg	70kg	50kg
8 weeks		>20kg	>20kg	17kg
7 months (1st mating opportunity)	60%	48kg	42kg	30kg*
1 year	75%	60kg	53kg	38kg
19 months (gimmer mating)	80%	64kg	56kg	40kg
2 years (gimmer lambing)	90%	72kg	63kg	45kg

*Good to target weight but unlikely to mate hill ewes at seven months old.

The **8-week weight** is of particular importance. AHDB Challenge Ewe research across upland and lowland flocks found that lambs below a target of 20kg at 8 weeks are less likely to meet target weight at weaning and mating, therefore less likely to breed successfully. These lambs should not be kept for breeding.

Taking an 8-week weight also gives a good opportunity for intervention if lambs are underperforming while still on their mothers. If underperforming, consider ways to prioritise quality feed to lambs by weaning early or creep feeding.

Lambing weight influences lamb birth weight and growth rate

Teagasc findings:

Each 5 kg increase in adolescent ewe weight at lambing increased lamb

- Birth weight by 0.25 kg
- Daily growth rate by 10 g

Are your gimmers holding back your scan?

Replacement ewe growth rate, whether lambed as ewe lambs or gimmers, really does impact performance. A focus on achieving good growth rates targets, can have a significant impact on the overall scan and flock profitability. One farmer added 10% to the flock scanning percentage by giving greater attention to ewes lambing as gimmers and running them as a separate flock until their 2nd mating.

Table 3: The importance of gimmer management

	Ewe Lambs	Gimmers	Ewes	Total Scan	Potential Value*
Flock A lambs scanned	104	178	490		
	80%	142%	200%	154%	£73,254.50
Flock B lambs scanned	104	225	490		
	80%	180%	200%	164%	£77,767.00
					£4,512.50

*Based on lambs values at £95/head and assuming losses do not increase with increased gimmer scan
For a 500 breeding flock (130 ewe lambs, 125 gimmers, 245 mature ewes)

Top tip: Train ewe lambs to eat hard feed early on in life

- Train during their first autumn – for those lambing ewe lambs this can be done either pre-mating or one month post-mating.
- Limit grass access by putting them on stubbles, small paddocks, or in a shed.
- Provide around 200g/head/day of high-energy ewe rolls (over 12 MJ ME/kg DM) or grains such as whole barley or oats.
- Options include troughs or snacker feeding. If using troughs, ensure they have at least 30cm/lamb trough space.
- Allow two-three weeks and check to see if they are all eating.

Table 4: Required daily live weight gain (g/day) for ewe lambs lambing as hoggs.

Production Stage	Target Growth Rate (g/day)
Weaning – Mating	200-250
Mating → 6 Weeks Pre-lambing	130
6 Weeks Pre-lambing to Lambing	Maintenance



Section 3: Management of First-Time Lambers

Whether lambing as ewe lambs or as gimmers, the process is new to the ewe and therefore they need additional attention, regardless of age.



Figure 1: The lambing process: The first-time lamber has to navigate a lot of new experiences – give her time and space to express maternal behaviour naturally.

To provide them with the care required, first-time lambers should be:

- **Managed in a separate group to the rest of the flock at mating time and in late pregnancy, as a minimum.**
- **Group size should be kept to less than 30, whether in a shed or outside; this will lead to lower lamb mortality and lower stress in the flock.**
- **Indoors, they should have at least 1m² per ewe.**
- **During lambing, they need to be given more time and space to hopefully lamb without assistance – consider whether it would be feasible to manage them in areas with less disturbance, for example away from busy roads.**
- **After lambing, avoid moving them for as long as practically possible (ideally leave the ewe and newly born lamb(s) for half an hour before moving) – the smaller group size should reduce mismothering risk to enable this. Mobile hurdles can be useful.**

Breeding from ewe lambs

When breeding ewe lambs, it's crucial to choose the right ram for the job. The primary goal is to ensure that the ewe lamb produces a single lamb with minimal intervention, while also allowing her to reach her full mature weight and optimise lifetime performance. The lamb crop is an added bonus from training ewe lambs to breed successfully; it's not the main objective of breeding.

Ram selection criteria for ewe lamb mating:

- **A breed with a small mature size.**
- **High lambing ease.**
- **Low prolificacy.**
- **Use an experienced ram.**

When it comes to oestrous in ewe lambs, fertility is heavily influenced by breeding, body weight, and the time of year.

Fertility of ewe lambs is lower than mature ewes due to lower ovulation rate, reduced chance of embryo implantation and reduced levels of fertility hormones. For these reasons, it is recommended to tup ewe lambs at a higher mating rate (see Table 5).

Table 5 also gives an indication of the mating rate for synchronised ewe lambs. Synchronising ewe lambs by using teaser tups (vasectomised males) can be a good way to help bring ewe lambs into oestrous especially when they are still in early maturity. Teasers should ideally run with the hoggs for 14–17 at a 1:80 teaser to ewe ratio. After the teaser is removed the working ram should then be introduced for 24 to 34 days.

Breeding 20–30% more hoggs than required allows selection for fertility, for instance, those that hold in first cycle (17 days). Changing raddle colour after 17 days can help in this selection process.

Table 5: Recommended mating rate for ewe lambs and gimmers

	Synchronised (Teased)	Un-Synchronised Ewe Lambs	Un-Synchronised Gimmers
Ram: Female	1:30	1:40	1:50

For maximum impact the ewe hoggs should be out of sight and sound of any tups prior to the teaser being introduced. Consider field size – a smaller group in a smaller field will limit the distance the tup has to travel and help him group his ewes, especially with ewe lambs.

Breeding from Gimmers

Regardless of age at first mating, it is still new and requires special consideration although gimmers will be more mature in oestrous. Again, an easy lambing sire and teasers will be advantageous. Keep gimmers in a tighter mating group separate from mature ewes and provide high grass covers (8–6cm) for successful mating.

Section 4: Nutrition Pre-Lambing

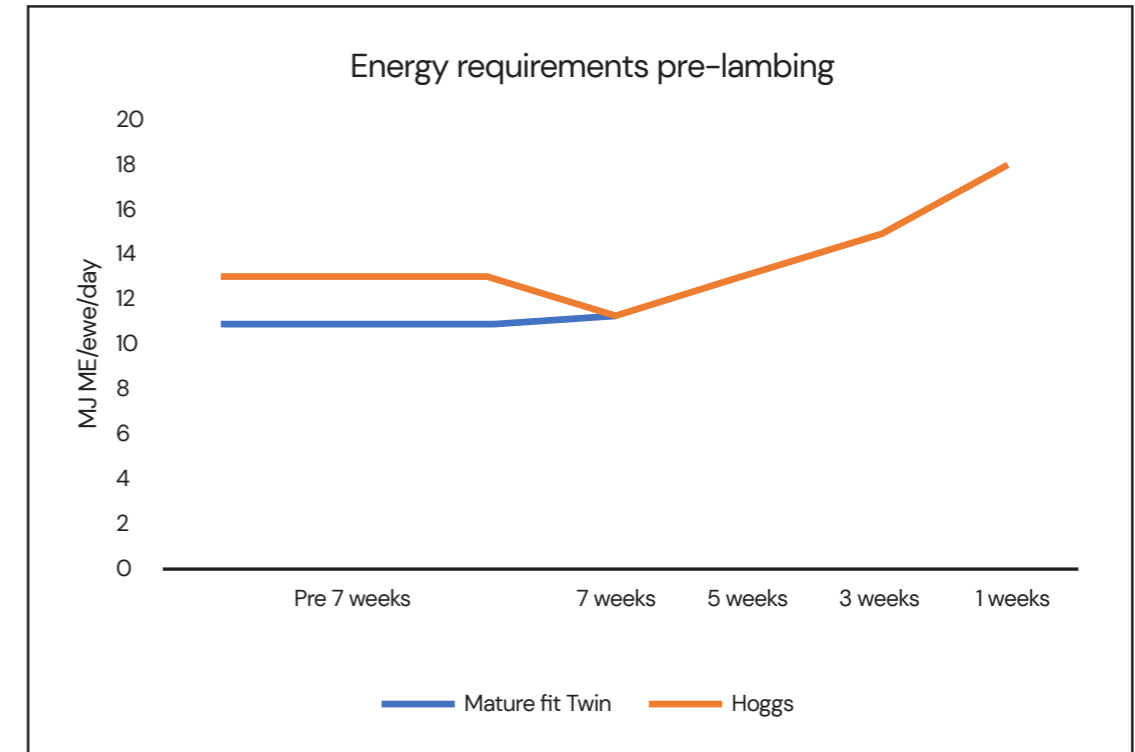


Figure 2 Pregnant ewe lambs have greater energy demands during pregnancy, but this must be brought in alignment with mature ewes (70kg) in the last seven weeks.

Hoggs

Pre lambing

Pregnant ewe lambs should be managed separately from mature ewes throughout pregnancy up until weaning of their first crop of lambs. During mid-pregnancy nutritional requirements are 20% higher than mature ewes to sustain both growth and pregnancy. During late pregnancy, they should then be fed similarly to mature ewes of the same weight.

Overfeeding ewe lambs risks lambing issues

Ideally, aim for 12–15kg weight gain during pregnancy depending on breed (smaller breeds will be at the lower end of the range). This works out at around 130g/d up to 6 weeks pre-lambing, thereafter ewe lambs should be fed for maintenance and foetal growth, i.e., not to gain weight.

Feeding advice: Feed silage rather than a drier forage and on a flat rate to help to balance the ration and avoid sudden changes.

High twin rate? Stepped feeding for twin-bearing ewe lambs may be more suitable, consult an independent nutritionist for more advice.

Table 6: Example ration for a single-bearing ewe lamb (mature weight 70kg).

	Weeks before lambing			
	8	6	4	2
Metabolisable Energy (MJ ME/day)	13.0	12.1	13.1	14.6
Metabolisable Protein (g MP/kg DM)	83	89	95	102
Ad Lib Good Silage (10.5MJ ME/kg DM)				
Ewe rolls (kg, 18% CP, 12.5 MJ ME/kg DM)	0.4	0.4	0.4	0.4

Note: Feed rate should be adjusted depending on quality of silage offered please consult an independent nutritionist for further guidance.

Important: When concentrate requirement exceeds 0.5kg, split into two feeds to aid consistent intake and maintain rumen health.

Gimmers

Ideally, gimmer (shearling) ewes should also be managed separately from the mature flock until weaning their first crop of lambs where they will then join the main flock. This reduces competition from older ewes in the flock and is particularly important at key stages such as mating and pre-lambing where nutritional demands are greater. This can help to:

- Increase the lambing percentage.
- Help manage BCS
- Allow sufficient nutrition for dam growth and lactation
- Reduce light lambs – The lambs from first-time lambers are less likely to hit 8-week weight targets than those from experienced ewes; this can be remedied with better management.

It is important that gimmers are also fed at the same level as mature ewes please refer to AHDB Feeding The Ewe for further guidance on ewe requirements pre-lambing.

Table 7: Scanning Targets

	Lowland	Upland	Hill
Ewe Lambs	100%	90%	-
Gimmers	180%	160%	100%

Table 8: Rearing targets

	Lowland	Upland	Hill
Ewe Lambs	85%	75%	-
Gimmers	165%	145%	85%

Section 5: Lactation Management

A first-time lamber requires 20% more energy and protein than her mature counterparts in lactation.

Lifting Lambs

In most instances, ewe lambs should only rear one lamb with surplus lambs set on to single-bearing mature ewes or raised as pets. This allows better recovery of body condition post-lambing, growth and promotes fertility in subsequent matings. To do this successfully lambing ewe lambs should be timed to when most singles will lamb in the main flock, which is typically after the first two weeks.

Creep Feeding

Some utilise creep-feeding which takes some nutritional demand of lambs away from the mother. This is of particular benefit when grazing availability is insufficient or for ewe lambs with twins.

Any hogs that are left with twins should ideally be treated like a triplet-bearing mature ewe. They should be run as a separate flock, or in with the triplets, for priority feeding.



Weaning Decisions

Choosing the right time to wean can be crucial to the success of the next breeding season for both hogs and gimmers. Lambs can be weaned any time after eight weeks of age and ideally between 8–12 weeks.

Several factors may influence weaning decisions such as:

- **Ewe Condition – BCS loss/gain, weights**
- **Lamb Performance – growth rate, 8-week weight.**
- **Grazing availability – sufficient good quality, low worm burden grass for weaned lambs**

Therefore, weaning date should change according to the season's conditions and the decision can be reinforced with monitoring these aspects.

Wean lambs from ewe lambs no later than 12 weeks old (estimated at 13.5 weeks from the start of lambing) to allow for dam growth by next mating.

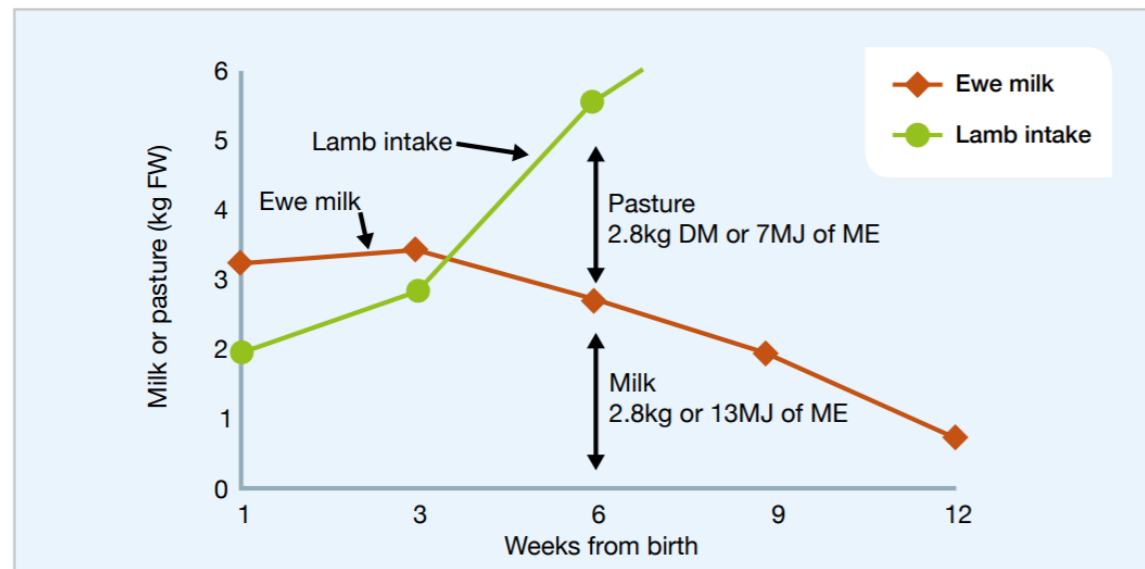


Figure 9: The milk to grass transition for lambs reared as twins (Beef & Lamb NZ)

Figure 9 relates to mature ewes, we know milk production will be lower for first-time lambers, making it more important to wean by 12 weeks.

Section 6: Health

Mastitis Risk

Mastitis affects the performance and longevity of the ewe and lamb growth. Mature ewes are generally the highest risk category of sheep in flock. However, several studies have also demonstrated that first-time lambers are also high risk due to lower milk yield relative to older ewes. Lower milk supply results in lambs suckling more frequently and vigorously which can lead to lesions. Furthermore, the mammary gland of first-time lambers is still developing during her first lactation putting a greater strain on the ewe's energy stores. Lambs on ewes with mastitis are typically lighter at 8 weeks and weaning, making them less likely to meet on farm breeding and production goals.

Be vigilant, select against udder issues and reduce pressure on first-time lambers by supplying adequate quality nutrition. Remove lamb(s) if the dam isn't coping.

Parasite Risk

Nematodirus

During their first grazing season, lambs are at risk of nematodirus. Nematodirus eggs shed by the previous year's lambs will overwinter on pasture and hatch on mass in response to warming temperatures in Spring. In Scotland, the risk period is usually late May into June, depending on the local weather conditions. White drenches are still recommended for treatment of Nematodirus in lambs.

Strongyle worms

The pasture burden of worm larvae that growing ewe lambs are exposed to will depend on the larval burden overwintered from the previous grazing season, egg output from the ewes at lambing, egg output from the lambs themselves and the weather conditions. Good maternal nutrition, especially optimal late pregnancy protein intake, should limit the output from the ewes which will in turn reduce egg outputs in lambs.

In the first grazing season, worm burdens are managed with the strategic use of anthelmintics. Worm egg counts can be useful to guide the timing of anthelmintic treatments. Targeted selective treatment of only lambs with low growth rates is preferable where possible.

Selecting replacements with the highest growth rates despite a worm challenge or burden will indirectly select for those animals with increased genetic resistance and/or resilience to those worms. This should decrease the reliance on anthelmintics to maintain good growth rates in the long term.

Fluke

Sheep grazing pastures with mud snail habitats are at risk of liver fluke. Ewe lambs can be blood sampled (fluke serology) to assess whether they have been exposed to fluke and treatment with a flukicide considered in late autumn if results are positive. In areas more severely affected by fluke, treatment may be required in late Autumn, late winter and summer to control fluke burdens.

Further information on the management of fluke and worms can be found on the SCOPS website.

Vaccinations

General guidance is given below. Ensure all vaccines are stored and administered in accordance with the product data sheet. We recommend you discuss vaccination protocols with your veterinary surgeon.

Clostridial disease

Clostridial disease is a significant cause of death in growing lambs. Protection of young lambs from diseases such as pulpy kidney and lamb dysentery is by vaccinating ewes 4–6 weeks prior to lambing and ensuring good colostrum intakes to transfer immunity. Lambs can then be vaccinated from three weeks of age, depending on the vaccine to provide ongoing protection against diseases such as pulpy kidney, black disease, gas gangrene, tetanus, and botulism. Protection requires initial course of 2 vaccines 4–6 weeks apart followed by annual vaccinations. Where a different vaccine is used in lambs and breeding adults, an initial course will be required when the adult vaccine is first used.

Pasteurellosis

Ewe lambs are at particular risk of pasteurellosis in the Autumn and early winter of the first grazing season. Some of the clostridial vaccinations also contain a Pasteurella component. A Pasteurella only vaccine course or booster prior to the risk period of where lambs are mixed, moved and put on to lush pasture in changeable weather conditions may be appropriate on some farms.



Infectious Abortion

Vaccinations are available to protect against abortions due to Toxoplasmosis, Chlamydial abortion (EAE, enzootic abortion) and Salmonella abortusovis. The Toxoplasma vaccination should be given at least 3 weeks prior to mating and will provide protection for two years. The Chlamydia vaccinations should be given at least 4 weeks prior to mating and can provide 3 years of protection. Oxytetracycline antibiotics should not be used at the same time as administering a Chlamydia vaccination. The salmonella vaccine is a combined chlamydial vaccine, a course of two injections three weeks apart completed at least 5 weeks prior to mating.

Footrot

Some farms use vaccination to help control lameness due to scald and footrot. Vaccinations should be used prior to the risk periods identified on farm, which in the UK are commonly October to December and March to May.

Orf

Ewes and/or lambs can be vaccinated by scratching the skin with vaccine using a special applicator. The vaccination will protect against orf for one year. Ensure that the vaccine is not used in ewe lambs or gimmers within 7 weeks of lambing, as the scabs on the scratch will be infectious during this time.

Johne's disease

Some flocks use a vaccination to aid the control of Johne's disease. The vaccine should be given to all replacement animals between 4 weeks and six months of age.



Lambing as Ewe lambs (April lambing flock)		
	Vaccinations	Treatment
Birth	Consider Orf vaccination	
	First clostridial vaccine	
	Second clostridial vaccine	Nematodirus treatment
Weaning	Consider Pasteurella booster	Strategic worming treatments
	Consider footrot vaccine	Fluke treatment if required
Lambing	Consider footrot vaccine Abortion vaccinations Clostridial booster vaccination	

Important: ensuring ewe lambs maintain trace element status (cobalt, selenium & iodine) is crucial for health and fertility throughout production. Consult your nutritionist for further information on balancing supply.

Key Targets	
Ewe Replacement Rate	20-30%
8 Week Weight	>20kg
Ewe lamb weight: 7 months old	60% Mature Weight
Ewe lamb weight: 12 months old	75% Mature Weight
Gimmer weight: 19 months old	80% Mature Weight
Gimmer weight: 24 months old	90% Mature Weight
Ewe lamb weight gain: weaning to mating	200g/day
Ewe lamb weight gain: mating to 6 weeks pre lambing	130g/day
Feeding objective 6 weeks pre lambing to lambing	Maintenance
Tup: Ewe - Post Teaser	1:30
Tup: Ewe - Ewe Lambs	1:40
Tup: Ewe - Gimmers	1:50
Scanning: Ewe Lambs (upland - lowland)	90 - 100%
Scanning: Gimmers (hill - lowland)	100 - 180%
Rearing: Ewe Lambs (upland - lowland)	75 - 85%
Rearing: Gimmers (hill - lowland)	85 - 165%

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