Section 7

Replacement **Heifer Management**

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Introduction

When mated with high EBI sires, heifers bring new superior genetics into a herd. Heifers can help improve the herd calving pattern as their calving date is more easily managed than for mature cows. When calving early, heifers can produce very profitable milk from grass and achieve higher lifetime output than later calving animals.

1. **What are the key target weights for replacement heifers?**
2. **How do you successfully rear calves from 0-3 months?**
3. **How do you manage replacement calves from weaning to housing?**
4. **How do you manage replacement heifers over the first winter?**
5. **How do you manage replacement heifers in their second season?**

Replacement Heifer Management

1 What are the key target weights for replacement heifers?

Key target

Table 1. Bodyweight (BW) targets for maiden heifers at breeding and for heifers pre-calving by breed/crossbreed.

	HF	NZ	HF*NZ	NR	HF*NR	J	HF*J
6-month heifer BW (kg)	175	160	175	160	175	125	145
Maiden heifer BW(kg) approx 13 months old	330	315	330	315	330	240	295
Pre-calving BW, (kg) approx 24 months old	550	525	550	525	550	405	490

HF = Holstein–Friesian, NZ = New Zealand, NR = Norwegian Red, J= Jersey

Key risks

Heifers don't achieve desired weights

Poor fertility in replacement heifers is often due to heifers being underweight at mating start date (MSD). This can be avoided if weight and weight gain of the heifers is regularly monitored. Heifers can be weighed individually on a weighing scales or a representative proportion of heifers brought to a weigh bridge to get an indication of their weight.

Once the mature weight of the herd is known, target weights can be calculated by using a proportion of mature bodyweight (BW) e.g. 30% mature BW at 6 months, 60% mature BW at 15 months or breeding and 90% mature BW at calving.

2 How do you successfully rear calves from 0-3 months?

Key risks

Calves don't receive adequate colostrum, soon enough

Colostrum or 'biestings' is the rich milk cows produce after calving, which is present for up to six milkings and is the single most important factor in reducing calf deaths.

- A newborn calf has only limited immunity to disease. Colostrum contains antibodies from the mother which help protect the calf against disease while its own immune system 'gets going'.
- In general, older cows produce more, better quality, colostrum than heifers calving for the first time.
- The best source of colostrum is the calf's own dam for two main reasons i) biosecurity (concerns about the potential spread of Johne's disease) and ii) the calf will acquire immunity to fight diseases encountered on the home farm.

How to

Ensure calves get enough colostrum

- Absorption of the antibodies in colostrum is greatest in the first few hours of life and starts to decline after four to six hours, and ceases 24 hours after birth.
- Calves should receive either three litres of colostrum within two hours of birth by stomach tube or at least two litres within four hours or a total of four litres within 12 hours after birth by bottle feeding.
- The initial feed of colostrum should be from the first milking from the cow.
- Colostrum should be fed for another 2–3 days.

- Excess fresh colostrum should be frozen in 2-3l packs for easy use when required.
- Frozen colostrum should be let thaw naturally as heating (e.g. in the microwave) may reduce quality.
- Many calves suckle colostrum from their dam but there is no guarantee that they will achieve sufficient intake so always monitor the calf's progress.

How to

Rear calves from the colostrum feeding stage to weaning

- Feed whole milk or milk replacer to dairy calves at a rate of 4l/calf/day during the first week after birth.
- Increase milk feeding rate to 5-6 litre/calf/day thereafter.
- Young calves must eat solid feed to stimulate rumen development.
- Concentrate should be available to calves after a week or so, even though concentrate intake is negligible in the first three weeks of life.
- Calves have a high energy requirement and making concentrate available helps them to achieve greater dry matter intake than with diets based on roughage only.
- Fresh water should be available at all times.
- Once-a-day (OAD) milk feeding can be introduced from approximately three weeks of age, however calves should be introduced to concentrate and/or straw/hay before changing to OAD feeding.
- Calves are frequently individually penned for the first few days after birth in order to ensure that adequate colostrum is received. Check that they have learned to drink properly before they are group penned.

Key Risks

- Waste milk (i.e. milk unfit to go into the bulk tank) should not be fed to calves due to a risk of transmission of infectious pathogens. Also, never feed milk containing antibiotic residues (as it increases the risk of antibiotic resistance).
- High volumes of milk or milk replacer do not cause diarrhoea in young calves; nutritional diarrhoea is a consequence of either poor quality liquid feed or management failures such as feeding antibiotic milk, not feeding calves enough and/or poor hygiene.

How to

Manage once-a-day milk feeding

- The same volume of milk that was being fed twice a day can be offered in one single feed, at a time that best suits the calf feeder.
- Fresh water should be available at all times.
- Solid feed intake will increase when calves are fed milk OAD so ensure that there is a plentiful supply of solid feed available.

Key Facts

Legislation:

- By law, calves must be fed at least twice daily. As calves are totally dependent on liquid feed for at least the first three weeks of life OAD milk feeding should not commence before three weeks. When calves are being fed milk OAD they must be thoroughly checked on a second occasion during the day and offered concentrate (i.e. a second feed) at this time.

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Alternatives

Calf housing

- There are numerous ways in which calves can be housed – individually or grouped, indoors or outdoors. Regardless of housing system, good hygiene is essential. Disease will increase if bacteria are allowed to build up in the housing area, feeding equipment etc.
- Healthy calves are able to deal with sub-zero temperatures as long as they receive adequate amounts of energy and are provided with overhead shelter from wind and rain.
- Similar levels of weight gain can be achieved with indoor and outdoor systems of housing.
- Ideally all calves should be reared indoors for at least the first three weeks and be sure they are healthy and strong before turning them outdoors.
- A well sheltered paddock (e.g. surrounded by trees) should be used when rearing calves outdoors.
- Calves should be provided with overhead shelter (the picture below shows an example of a portable shelter which provides sufficient shelter).

- If possible calves should be offered fresh grass at regular intervals. This can be achieved by using a double strand of electric wire.
- If calves become ill or are showing signs of ill-thrift outdoors they should be brought back in and treated. They can return outdoors once they are well enough.

Indoor housing

Key risk

Poor ventilation

- Inadequate ventilation of calf houses allows levels of humidity, noxious gases, dust and bacteria to rise, increasing the risk of disease.

Guideline accommodation specifications for replacement heifer calves:

Ventilation	Specifications
Inlet (m^2/calf)	0.08 (0.05 on exposed sites)
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Cubic air capacity (m^3/calf)	6-8
Roof pitch	22^0
Space boarding	20-25mm gap/50-200mm board (12 mm on exposed sites)
Maximum number	
Per pen	16
Sharing a common airspace	50
Canopy height above calf (m)	1.0-1.8
Maximum canopy	(individual pens)
extension (m)	1.5 (group pens)
Floors	
Individual space (m^2/calf)	1.6
Group space (m^2/calf)	2.3
Minimum slope	1:20
Passageways	
Minimum width (m)	1.2

Key Risks

Cross contamination

- Frequently newborn calves are housed indoors in areas contaminated by other calves or older cattle. High mortality rates can result.
- Preferably cows and calves should not be housed under the same roof (i.e. sharing the same air space) even at calving time, due to the spread of pathogens.

Key Risks

Respiratory disease

- For indoor reared calves the quality of bedding material is crucial to minimising heat loss. Deep straw bedding is superior to other bedding material as an insulator; calves can nestle into it which can help prevent respiratory disease in naturally ventilated calf barns.
- Solid dividers between group pens will reduce the risk of respiratory disease.

Key Facts:

- European legislation prohibits solid walls in individual calf pens, it allows calves to be kept individually for the first eight weeks of life, but encourages group housing for animal welfare reasons.

Grouping of calves

- Individual housing of calves, either indoors or outdoors, is linked with improved calf health; however this can require a large investment in terms of finance and labour.
- If calving patterns are not compact, there is a temptation to mix younger calves with older animals for ease of management. However, older calves can be a source of respiratory infection for younger calves.
- Although not very common in dairy calf rearing systems 'all in-all out' systems can help prevent disease transmission from older animals, contribute to better hygiene due to total emptying of the pens, and allow more uniform feeding as groups consist of similar size animals.
- Calves in stable groups have higher daily live weight gain than calves in groups where new calves are continuously introduced to and brought out of the group. Diarrhoea and respiratory disease are also greater among calves in these 'dynamic' groups.
- Calves that are showing signs of ill-health should be removed from group pens immediately and treated so as to minimise the risk to other calves. Ideally these calves should not rejoin their cohorts.

How to

Manage weaning

- Calves can be weaned once they consistently consume 1kg of concentrates per day.
- To ensure constant growth rates, weaning should be gradual, with the volume of liquid feed declining gradually over a period of some days.
- Calves should be at least 80kg before weaning. By weaning on weight a more uniform group of calves is achieved.
- Later calves should be weaned at a heavier weight to maintain the uniformity of size of the main group of calves.

3 How do you manage replacement calves from weaning to housing?

How to

Manage post-weaning

- Rotational grazing in a leader/follower system is the prefered grazing option, with calves grazed ahead of yearlings.
- As calves are selective grazers, they should be offered fresh grass but should not be left in the same paddock for long periods of time.
- Calves should be rotated. A 'calf paddock' where calves remain for the summer is a bad idea.
- Ideal pre-grazing grass covers for calves are 1,000–1,400 kg DM/ha.
- Concentrate can be offered post weaning (1–2 kg/calf) but can be removed from the diet after 4–6 weeks and an all-grass diet offered.

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- Calves should be grouped on size, and if a calf is not keeping pace with the rest of the group it should be transferred to a more appropriate group.
- If calves are below-target weight, a good response to autumn supplementation can be achieved.
- A good worming programme should be followed during the summer months - consult your vet or Animal Health Ireland (AHI) publications.

4 How do you manage replacement heifers over the first winter?

How to

Ensure heifers reach development goals. First winter

- Prior to the first winter, heifers should be weighed (ideally in August) to ensure that they are on target to achieve the desired body weight at mating start date (MSD).
- If not at correct weight, supplementation should be provided as it will be too late to address this at breeding.
- Heifers should be turned out to pasture in early spring i.e. at least six-weeks before MSD.
- Generally higher weight gains are achieved from pasture than from winter diets (weight gains of more than 1kg/day are achievable in early spring at pasture).
- If replacement heifers are not a uniform group, the lighter animals should be prioritised and turned out to pasture earliest and offered concentrates if necessary.
- Consult vet or AHI publications about worming and housing.

Alternatives

There are a number of feeding options available for heifers during the first winter:

- If offering a silage-only diet, heifers should be ahead of their target weight, as a weight gain of only 0.3kg/day can be expected over the winter from a 70% DMD (dry matter digestibility) silage.
- Typically, silage and 1.5–2kg concentrate/day will result in a weight gain of almost 0.5 kg/day.
- Forage crops such as kale are also suitable for replacement heifers during their first winter – however these should only be used on drier soil types where there is limited chance of poaching damage.
- Forage crops are grazed *in situ* and are high in crude protein (~18% CP; see nutrition section) which will also help growth of the animal.
- Weight gains of over 0.5kg/day are achievable from these crops.
- Heifers grazing forage crops should be supplemented with a bolus to ensure sufficient intake of essential minerals.

Key Risks

- If grass growth is poor there will be insufficient grass to meet the feed demand of all heifers. In this situation the turn out date can be delayed but lighter heifers should be selected and turned out earlier than the main group.
- Work in Teagasc Moorepark has shown that although growth rates are lower when grass supply is limited, they still tend to be greater than those achieved on overwinter diets.
- Frosted kale should not be offered to heifers due to risks of bloat.
- In general, compensatory growth does not occur in heifers offered silage-only diets over the winter and should not be relied upon as a method to achieve target weight at MSD.

5 How do you manage replacement heifers in their second season?

How to

Manage grazing during year two

- Heifers should be offered an all-grass diet throughout their second grazing season and concentrates should only be fed to light heifers in early spring if required.
- Good quality silage is generally sufficient for in-calf heifers during the second winter provided that they are up to the target weight at housing. Spring born in-calf replacement heifers will eat 1.1t of 20% DM silage per month. Heifers that are below target liveweight may be fed up to 2.0kg of concentrates per head per day until 6-8 weeks pre-calving.