



# AGRICULTURAL SCIENCE STUDY GUIDE

## Week 16



### Hill sheep production

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# Hill ewe has untapped potential

This article looks at the role of hill sheep in rural economies

The Irish hill sheep sector plays an important role in rural economies and the maintenance of the natural landscape in many of Ireland's most scenic areas. However, low margins – coupled with reduced support payments and often depressed markets for store hill lambs – have seen the sector decline over the last two decades. Notwithstanding this, the Scottish Blackface hill ewe is a very hardy and resilient breed and is hugely responsive to improved nutrition. The hill ewe has a significant untapped potential both in the hill environment and as the dam of prolific crossbred ewes for the lowlands.

The Scottish Blackface breed accounts for approximately 22% of the 2.5m ewes in Ireland. The majority of these Blackface sheep are maintained on hills or marginal land that is not suited to other sheep breeds or other farm enterprises.

Profits from these hill sheep enterprises very much depend on prices obtained for lambs sold. A large proportion of these lambs become available for sale annually from August onwards.

#### Learning outcomes

At the end of this study guide you should be able to:

- ☞ Understand the categories of sheep production in Ireland.
- ☞ Identify the main breeds of hill sheep production.
- ☞ Know the characteristics of these sheep breeds.
- ☞ Understand the breeding strategy in



hill sheep production.

- ☞ Describe the criteria for the selection of replacement ewes and rams.
- ☞ Understand the feeding and management principles.

#### Categories of sheep production

There are two main types of sheep production in Ireland: upland (mountain/hill) and lowland, as detailed in Table 1.

#### Mountain/hill sheep breeds

The Blackface mountain breed is most suited to hilly terrain with poor-quality herbage as it is a smaller breed.

Wicklow Cheviot is more suited to fertile hills. It is a breed of medium size and weight. See Table 2.

#### Breeding strategy in mountain/hill sheep production

- ☞ Purebred mountain ewes are crossed with purebred mountain ram of the same breed, eg Blackface mountain ewe x Blackface mountain ram.
- ☞ Ewe lambs are kept within the flock or sold for breeding.
- ☞ Mountain ram lambs and some ewe lambs are fattened for the Italian market.
- ☞ Mountain ewes fail to thrive after four to five years and can be sold to lowland sheep farmers as “cast or draft ewes” or culled. The better-quality grass improves their fertility.
- ☞ These cast or draft ewes are mated with rams of a prolific breed, producing crossbred offspring.
- ☞ Blackface mountain ewe x border

Leicester ram = Greyface.

- ☞ Blackface Mountain ewe x Bluefaced Leicester = Mule.
- ☞ Wicklow Cheviot ewe x Suffolk = Brownface.
- ☞ Crossbred ewes display hybrid vigour. They are hardy, have good mothering abilities and good milk production from their mountain dam while inheriting good prolificacy from the sire.
- ☞ Crossbred ewes are used as replacement ewes for breeding.
- ☞ Crossbred ewes are mated with a terminal sire producing lamb that will be slaughtered.
- ☞ The terminal sire will produce lambs with a high growth rate, good conformation, good carcass quality and leanness of meat.
- ☞ These lambs can be sold as early or mid-season lamb.
- ☞ Suffolk rams will produce lamb for the early Easter market.
- ☞ Texel rams will produce lamb for the mid-season market.

#### Selection of replacement ewes/rams

- ☞ Selection occurs in midsummer.
- ☞ Age and health of ewes are examined.
- ☞ Replacement ewes almost always come from existing stock.
- ☞ Ewe hoggets are commonly used. However, they must be examined for any imperfections before being introduced into the flock.
- ☞ The ram is replaced every few years to prevent inbreeding.

### Feeding and management principles

#### Performance at grass

Post-weaning performance at grass very much depends on quantity and quality of grass available. Results from Teagasc studies suggest that well-grown weaned hill lambs on well-managed pasture can achieve approximately 115g/day or 0.8kg/week in early autumn, while in late autumn this performance drops to 0.4kg/week. Growth rate of lambs on hill pastures will be 50% below these levels. Furthermore, if the weaned lambs are very light, less than 25kg, at this time of year performance will be depressed further.

#### Management principles

- ☞ Pregnancy scanning of hill ewes is an important tool in the management of pregnant ewes.
- ☞ Separation of ewes based on litter size and condition score is important. Feeding these ewes additional feeds prior to lambing will greatly increase the output from the ewes.
- ☞ Supplementary feeds should be assessed as regards their energy and protein content.
- ☞ There are different feeding options available to hill farmers and the best suited to the farmer's conditions and commitments should be selected.

#### Consequences of underfeeding in the last two months of pregnancy

- ☞ Thin ewes.
- ☞ Small weak lambs.
- ☞ Poor supply of colostrum.
- ☞ High lamb losses.
- ☞ Poor milk yield.
- ☞ Extra labour.

**Table 1:** Upland v lowland sheep production

| Upland   | Lowland  |
|--|--|
| Extensive farming  | Intensive  |
| Rough mountain and hill grazing  | Permanent grassland/lays                         |
| Scrubby grasses and heathers   | Top-quality grasses                              |
| Low stocking rate: Two to seven ewes per hectare (depending on quality of land/vegetation) | High stocking rate: 10 to 15 ewes/ha             |
| High ewe and lamb mortality rates  | Lower ewe and lamb mortality rates               |
| Low production targets, generally single lambs   | Higher production targets, more twins & triplets |
| Blackface mountain, Wicklow Cheviot  | Suffolk, Texel, Belclare and cross-breeds        |

**Table 2:** Blackface mountain v Wicklow Cheviot

#### Characteristics of mountain/hill sheep breeds

| Breed              | Origin                                  | Physical characteristics                                      | Profile   | Mature body weight (kg)  |
|--------------------|---|---|---|--------------------------|
| Blackface mountain | Scottish/English border                 | Horned<br>Black legs<br>Black face (sometimes white markings) | Very hardy<br>Lambs lean, light carcass<br>Good mothering abilities and milk production | Ewe - 60kg<br>Ram - 70kg |
| Wicklow Cheviot    | Cheviot hills (English/Scottish border) | White face and legs<br>Wool-free face and legs                | Hardy breed<br>Good mothers<br>Easy lambing   | Ewe - 65kg<br>Ram - 90kg |

## Nutrition in animals

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# Nutrition plays key role in performance

This article looks at the importance of nutrition and ration formulation to meet protein, energy and performance requirements

**A**nimal nutritionists formulate diets for animal feed companies. They use computer programs which have the typical values for protein, starch and energy for each feed ingredient. The feed company will analyse ingredient deliveries as they arrive on site and will adjust the computer program for the results of their own analysis. This is done to ensure quality tests at the end of ration manufacture have the correct protein and energy values, ie they are within specification. Certain ration ingredients are good sources of protein, eg soya bean meal which also has an excellent amino acid profile. Other ration ingredients are an excellent source of energy, eg barley and wheat, but when fed at high levels they have a risk of causing acidosis. Whereas maize grain is high in energy and starch and it has a very low risk of acidosis.

Ingredients such as citrus pulp, beet pulp and soya hulls are good sources of digestible fibre.

Molasses is best known for binding pelleted concentrates together and improving the palatability of ration. Feed companies are required by law to list ingredients in descending order on an inclusion rate.

The source of protein used to formulate a ration has been shown to be important. A study was carried out on ewes to evaluate the effect the source of protein has on lamb performance.

### Activity

Name a ration ingredient used to add protein to the ration and state why this is a particularly useful source of protein \_\_\_\_\_

Why is maize an excellent source of energy in rations? \_\_\_\_\_

Name the feed company that supplies feed to the animals on the farm you are studying. Ask your farmer how many types of animal feed he/she purchases \_\_\_\_\_

This study found that ration where the source of protein was from soya bean resulted in increased lamb birth weights (+ 0.36kg) and subsequent high lamb liveweight gain (22g/day) over the first five weeks post birth compared with the ewes and lambs fed a ration based on byproducts of rapeseed meal, distillers grains and maize gluten feed.

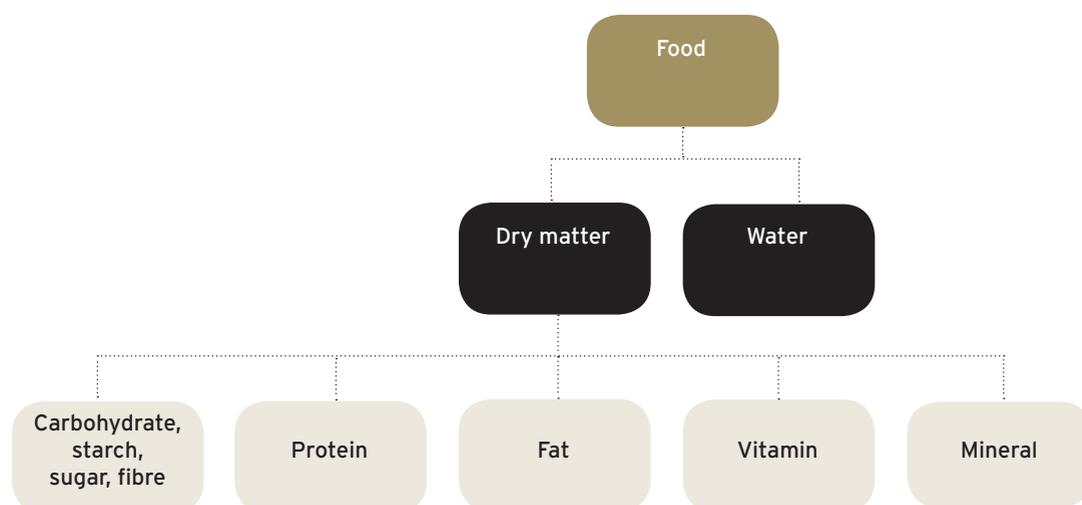
Lambs from ewes offered the soya bean based concentrate were 0.8kg heavier at weaning. Both rations were adjusted to 18% protein and the same energy content.

In this experiment what is:

1. The variable that was changed?
2. The variable that was measured?
3. The variables that were kept the same?

**Crude protein** is the amount of pro-

### Constituent breakdown of concentrate feed



tein in an animal feed.

In ration formulation protein is tested by determining the percentage of nitrogen in the feed using the "Kjeldahl method" and then multiplying the nitrogen percentage by a constant 6.25. This protein figure is described as crude protein.

Energy is the most limiting factor in beef finishing and dairy diets. Therefore, maximising energy intake is important. In the net energy system, a French-designed system, energy is expressed as Unite Fourragere Lait (UFL) and Unite Forragere Viande (UFV) depending on the class of animal being fed. Air-dried barley is set as the standard 1 UFL or 1 UFV and all other feeds are compared to barley in relation to energy level.

**Energy for growth of less than 1kg liveweight gain per day or energy for milk**

**production is called 1 UFL. UFL is used for suckler cows, dairy cows and growing animals and rations target 0.94 UFL.**

**Energy for gaining weight at 1kg or greater than 1kg liveweight per day is expressed as UFV. UFV is used for finishing animals including bulls, steers and heifers – rations target is 1 UFV.**

**Macro minerals:** the main minerals include calcium, phosphorus, magnesium, sodium, potassium and sulphur. These are measured in grams per head per day or grams per kg DM.

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

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

Teachers: this article is based on material from Siobhan Kavanagh's Teagasc booklet on Concentrate feeds. It is available on the Teagasc website: <https://www.teagasc.ie/media/website/publications/2010/Feed-IngredientOptions-SheepRations.pdf>



### Short questions

Q1. Using Table 1, rank the top three ingredients used in concentrates in order of protein content (starting with the highest)?

- (a)
- (b)
- (c)

Q2 Why are wheat and barley rolled before inclusion in ration formulations?

Q3 Name the type of animal and the target energy density figure for each of the following UFL \_\_\_\_\_

Target energy \_\_\_\_\_  
UFV \_\_\_\_\_  
Target energy \_\_\_\_\_

### Structured questions

Q4 Using Table 1, suggest which ingredient is an outlier (a data eg % point that is distinctly separate from the rest of the data), and justify your answer with reference to the table.

### Synoptic question

Considering the price of maize is 30% to 40% more than barley comment referring to the energy values in Table 1.

- Comment on the value of these in
- (i) a growing animal's diet
  - (ii) a finisher diet and
  - (iii) a milking cow's diet.

Table 1: Feeding values of concentrate ingredients per kg as fed

|                  | DM%  | UFL  | UFV  | Crude protein % | Crude fibre % |
|------------------|------|------|------|-----------------|---------------|
| Wheat (rolled)   | 86.6 | 1    | 1    | 9.7             | 2.3           |
| Barley (rolled)  | 86   | 1    | 1    | 9.7             | 4.1           |
| Beet pulp        | 88.1 | 1    | 0.93 | 8.8             | 18            |
| Citrus pulp      | 87.5 | 1    | 0.92 | 6               | 11.6          |
| Maize grain      | 86   | 1.05 | 1.04 | 8.7             | 2.3           |
| Maize distillers | 89   | 1.03 | 1    | 26.6            | 8.9           |
| Molasses         | 73.5 | 0.74 | 0.76 | 4.5             |               |
| Oats             | 87.4 | 0.9  | 0.85 | 9.7             | 11.8          |
| Palm kernel      | 89   | 0.85 | 0.84 | 14.6            | 21.2          |
| Rapeseed meal    | 86.4 | 0.91 | 0.83 | 33.8            | 11.7          |
| Soya hulls       | 87.9 | 0.89 | 0.87 | 10.5            | 35.4          |
| Soya bean meal   | 86.4 | 1.02 | 1.02 | 48.1            | 4.5           |