

Stored forages for *rare* *breeds*

By Dr Richard Small.

Owners of stock animals, especially those on small acreages, are likely to need a source of conserved forage to carry their animals through the winter. For new owners the range of alternatives, such as hay, haylage, silage and perhaps even foggage, can be confusing. As some of these also come in varying bale sizes the diversity is even greater. So, as this issue of *The Ark* looks forward to spring, it may be an appropriate time to consider the options for feeding our animals next winter, as decisions need to be made now.

Hay making

Most rare breed keepers are likely to use hay as the main form of conserved forage. Hay is made by cutting the maturing grass in

summer and drying it by wind and sun so that the moisture content is too low to allow more than very slow decomposition by micro-organisms. In this form the dried grass can be kept for at least a year, but it will slowly lose its nutritional value as, for example, vitamins break down.

Hay is the traditional means of conserving fodder and has a long history. Grazing animals are excluded from the hayfields in spring and the grasses and other plants allowed to grow. When the grasses near maturity the sward is cut and left to dry in the field. Ideal conditions are dry, breezy and warm, to accelerate drying, but bright sunlight can bleach the hay, contribute to the loss of vitamins such as A, D, E and K and, if prolonged, can dry the hay too much making it brittle and more

dusty. More serious is rain, which both leaches nutrients out of the hay and delays drying. Rapid drying ensures that the respiration of the plant stops quickly – initially respiration continues to convert sugars to carbon dioxide and water, lowering the energy value of the final hay crop.

Hay making is a skilled job, as the growth of the grass must be expertly judged to optimise both the yield and the feed value of the hay. As the grass matures, flowers and sets seed the feed value declines, so there is an optimum time when yield and feed quality are balanced. However, hay can be cut a little earlier than this and will be described as meadow hay – the lower yield and higher feed value will mean meadow hay is more expensive to buy. Alternatively, if the grass has been left standing for

“Good tedding is the chief poynte to make good hay.”

*John Fitzherbert (1523)
Boke of Husbandry.*

longer, perhaps because of adverse weather conditions, and has set seed it will be called seed hay. This will cost less than meadow hay, but its feed value will be less. Hay is usually cut at 4-6cm above the soil surface.

Another skill is judging when the hay is ready to be baled. After cutting, the grass swathes need to be turned at intervals, ideally twice a day, and ‘tedded’, that is fluffed up so that air can circulate amongst the plant material and speed the

Table 1: Feed value of hays of varying quality.

Feed value factors	Hay quality		
	Good	Moderate	Poor
Dry matter (g/kg)	900	850	800
Crude protein (g/kg DM)	150	100	50
Digestible crude protein (g/kg DM)	100	60	30
D value	65	55	50
Metabolisable energy (MJ/kg DM)	10.5	9.0	8.0

Source: Frame, J. (1992).

drying process. Some hay making machinery ‘conditions’ the hay, that is bruises or abrades the grass to accelerate drying. However, such conditioning can increase losses through leaching if it rains. If weather conditions are favourable the hay may be ready in two to three days, but four to five days is more common. Hay should be baled when any overnight dew has dried off and is perhaps best done in early afternoon, especially where hedgerows shade the hay from early morning sun.

Feed value of hay

Hay is usually assessed by its moisture content, and the aim is to achieve a moisture content of 150-200g/kg (15-20%). As the grass starts out with a moisture content of 700-800g/kg this means that each tonne of dry hay will have lost 2-3 tonnes of water! However, baling can start when the moisture content is 25-30% provided the hay can be ‘cured’, that is stored where air can circulate amongst the bales so moisture continues to be lost.

The feed value will depend on the factors discussed above, such as whether the hay was exposed to strong sunlight or rain and how quickly it was dried. Table 1 shows the feed values of good, moderate and poor hay. The feed value parameters shown in the table require laboratory analysis which few rare breed keepers are likely to consider warranted when buying hay, or evaluating the quality of their own hay, but the table may help to determine whether other supplementary feedstuffs are needed. The feed value will also depend on the grasses and other species present in the hay; some plants may be richer in minerals than others, and some herbs can be beneficial in preventing or treating

some diseases.

More often, hay is evaluated visually and by its ‘nose’ (smell). Good quality hay should smell fresh and ‘sweet’. A white powder or white flakes within the bales, or a mouldy smell, indicates that the hay was baled when the moisture content was too high or that the bales became damp subsequently, allowing mould fungi to grow. The fungi will have utilised some of the feed value of the hay and their spores can be a health hazard to stock and humans. Mouldy hay should therefore not be used. The palatability of poor quality, but non-mouldy, hay can be increased by pouring a molasses solution on to the hay at feeding time.

The feed values shown in Table 1 refer to grass hays, but hay can be made from other fodder crops such as clover, lucerne or oats. These generally have greater feed values but tend to be used only for specialist enterprises such as dairy goats, camelids or high-value equines that can justify the considerably greater cost. Of course, most hay is now made from perennial rye grass (with or without white clover) leys.

If buying hay, check for undesirable plants: thistles and briars can puncture lips and gums and allow access of disease organisms such as orf. Ragwort is more toxic, and more palatable, to stock when dried and hay with ragwort should be rejected. Seeds of these and other weeds such as dock may also lead to an infestation of your land. On conservation grazing hay feeding may be proscribed as it may introduce species that would not naturally be found in that habitat. Conversely, feeding hay with seeds of desirable species can be an inexpensive way to diversify swards.



Nowadays hay is usually baled, and the word traditional is used for small rectangular bales. For stock keepers with few animals these are often most convenient as they can be handled without specialist machinery.

Bale shapes and sizes

Traditionally hay was stacked in the field to cure and would be left there until needed. Nowadays hay is usually baled, and the word traditional is used for small rectangular bales. For stock keepers with few animals these are often most convenient as they can be handled

without specialist machinery. The bales consist of 'slices' that allow easy division and generally weigh about 25kg (55lb), but weight depends on moisture content, packing density and size.

For larger enterprises that can justify the capital costs of the handling machinery there are large rectangular (sometimes called Heston) bales or round bales.

There is another aspect to the shape of bales – their ease of stacking and exposure to the weather. Round bales do not stack efficiently, leaving much space between bales. Along with large rectangular bales, they are also potentially dangerous – fatalities are not unknown if a bale falls or rolls, or even from being caught up in the round baler machinery.

Small bales need careful storage as rain can penetrate deep into each bale, spoiling most the hay. In a stack the outside bales will protect those inside, so the smaller the exposed surface in proportion to the volume the better. As well as protecting the bales from the weather, it is important to ensure they do not take up moisture from below: even concrete floors can transmit moisture by capillary action. Small bales can be stacked on pallets to allow air to flow underneath the hay.

Hay in the grazing system

Following collection of the hay the grass is usually given a few weeks (depending on weather conditions) to recover before stock were introduced to graze the aftermath. Often this was newly weaned young stock which not only benefited from the flush of new growth but also from the lower number of parasites present on the pasture after being free of grazing animals for several months.

Hay is thus a convenient winter feedstuff for the rare breed keeper, but suffers from the vagaries of our weather that can cause making hay to be a hit or miss affair for even the most experienced hay maker. With climate change predictions suggesting wetter summers for the UK hay making will not become any easier.

Further reading

Frame, J.1992. *Improved Grassland Management*. Farming Press, Ipswich.

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