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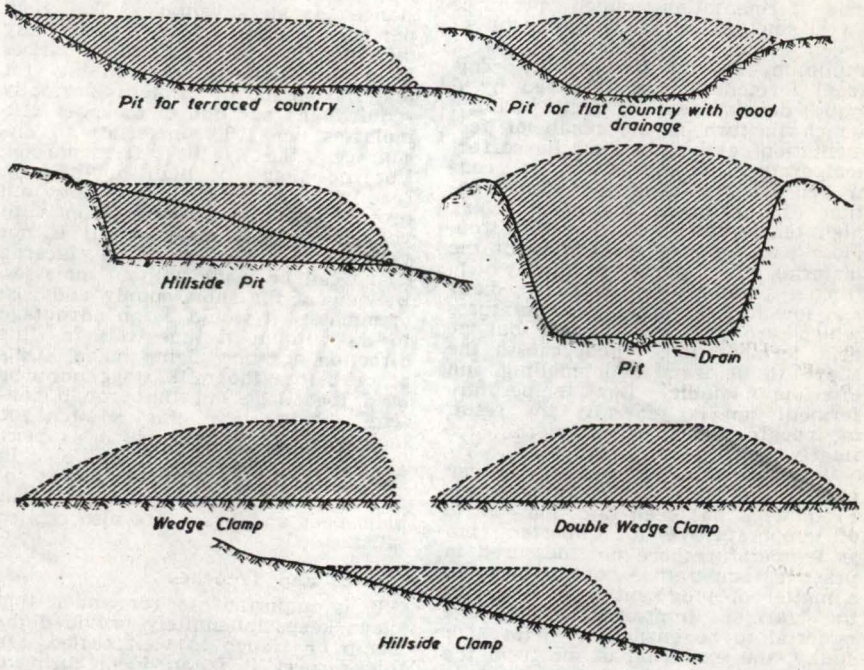
SILAGE FOR SHEEP



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Bulletin No. 251 in this series deals with the principles of silage making and the feeding of silage to dairy cows, and Bulletin No. 252 deals with aspects of mechanisation. The present bulletin summarises the theory and practice of making silage but concerns itself mainly with its use as a feed for sheep. The suitability of silage as a sheep feed has been recognised for many years but little use has been made of it by sheep farmers.

A combination of unrelated circumstances—the increasing difficulty of growing good crops of turnips and other crucifers, the greater use of lucerne and of higher producing grasses and clovers, the recent development in farm machinery for silage making—have contributed to the growing interest of sheep farmers. The most important contribution has been in the development of machinery for handling green crops. The buck-rake and the forage harvester remove the objection of high labour requirements which have in the past been the main drawback to making silage on the average farm. This latter aspect is discussed in detail in Bulletin No. 252.

Pasture Control

Silage making, besides conserving feed, offers a means of pasture control which has much to commend it. Not only may pasture be made into silage whenever the grass becomes long enough to handle in the green state but also at any time of the year and in any weather. Further, the grass may be cut at quite a young stage when damage to pasture, such as occurs in hay making, is largely avoided and when recovery is correspondingly rapid. Thus we have a

most useful method of controlling pasture and at the same time of conserving the material for a time when feed is in short supply.

Principles of Silage Making

Briefly, the principle of silage making is to preserve the green crop by the rapid development of acid throughout the mass, the acids being produced by bacterial fermentation in the packed green material. Not all fermentations give a desirable product. The best silage results from a lactic acid fermentation which produces sweet smelling silage of a good olive-green colour in which there is a minimum loss of food value. This ideal fermentation is favoured by a rapid development of lactic acidity, which in turn is the result of fermentation taking place at the correct temperature. Temperature is controlled by the degree of consolidation of the green material. Very high temperatures which result from loose packing lead to burning of the material. This gives a product which, though palatable, is dark in colour and low in food value. Temperatures which are too low favour butyric acid fermentation, which causes the silage to be sour, evil smelling and often unpalatable. Low temperature fermentation is generally the result of packing succulent material too tightly.

With this brief introduction we can pass to the practice of making silage. From what has been said, the control of temperature is all important, but as temperatures are not measured in practice temperature control becomes a matter of judgment on the part of the farmer himself. Where the material to be ensiled is mature or stalky, the exclusion of air from the ensiled mass becomes more difficult. This means that rapid building plus heavy consolidation is essential to prevent the temperature from rising too high. On the other hand young, succulent material packs tightly of its own and must be allowed time to rise in temperature sufficiently. To attain this, slower building and less consolidation are necessary. In this connection care is required in handling material from the forage harvester because of the ease of packing the chopped material. It will be seen therefore that control of silage making becomes a matter of judgment as to the degree of packing or settling in the ensiled mass. This can only be obtained by experience.

When the cut material is very succulent, as may occur with very young pasture and lucerne, wilting for two to four hours should if possible, be allowed to take place. Alternatively the material should be spread over a greater area of trench or clamp in order to allow sufficient heat to develop. Otherwise the material packs too tightly, becomes sour and seepage may take place.

Material Suitable for Silage

Pasture is quite suitable for silage making especially if it contains a fair proportion of clover and provided it has not become too mature. It should be cut at or preferably before the flowering stage, that is, before the hay-making stage. If the pasture is too mature quality is lost and it becomes difficult to effect adequate consolidation. Lucerne is an eminently suitable crop for silage. Its protein content is much higher than in pasture which, under certain circumstances, is an advantage. The yield per acre is also very high. The only difficulty in ensiling lucerne arises from this high protein content, for material high in protein normally requires the addition of molasses (1lb molasses per 100lb material) to encourage the lactic fermentation. Lucerne silage of high quality can readily be made using molasses and provided the usual care is taken with young succulent material. It is not yet certain whether good lucerne silage can be made without molasses. In view of the short supply and cost of molasses it would be an advantage to do without it and tests in this direction are now being made. Oats at or before the milk stage may be used for silage but the protein content is lower than grass so that the inclusion of a legume such as peas, vetches or lupins is desirable. In Britain and the United States of America other crops such as maize, kale, peas and beans are also ensiled satisfactorily.

Clamps and Trenches

It is important to remember that silage keeps indefinitely provided the clamp or trench is well sealed. In this respect it is an ideal form of conservation. In the processes of conservation, in any form, some losses between cutting the green material in the paddock and the final conserved material are inevitable. The greatest preventable source of loss is that arising from over-heating round the outside of the mass. These losses are greater in clamp silage than in trench or pit silage, due to the greater surface exposed to the air and the difficulty of consolidating sufficiently on the edges of the clamp.

The orthodox methods of ensiling have in the past been in stacks and pits. With the forage harvester the silage should be made in a trench from which access is available at both ends. The buckrake lends itself to either trench or clamp silage. The new factor of tractor consolidation for trench or clamp silage allows greater control of consolidation. As previously stated mature or wilted material should be heavily consolidated to keep the temperature from rising too high. Green, succulent, unwilted material should be allowed to heat up and not subjected to exces-

sive tractor consolidation, nor should too great depth be put into the trench too rapidly, otherwise the silage will become sour and unpalatable.

The size of the clamps and trenches will be regulated by the acreage of material to be ensiled, the layout of the farm and the procedure to be followed in feeding out. In general it is more convenient to have a number of smaller ones, of say, 100-150 tons, than to have several hundreds of tons of material in one clamp or trench. A convenient size of trench to hold 100-150 tons is approximately 60 feet long, 6 feet deep, 15 feet bottom width and 18 feet top width, or its equivalent in other dimensions. Likewise a clamp holding this amount would be about 60 feet long, 18 feet wide built up to 8 feet high at the thick end. The use of the smaller units, while causing slightly higher wastage permits silage of different quality to be kept in different clamps or trenches and to be used at different times of the year and in different paddocks. As a working basis one cubic foot of silage can be taken as weighing about 50lb, which is equivalent to 45 cubic feet per ton.

It is not proposed to give details of the use of the buckrake and forage harvester, but for the initial guidance of farmers, two men can ensile half an acre of material per hour for each buckrake. One man cutting in the morning and carting with the buckrake in the afternoon would handle nearly two acres per eight-hour day. With the forage harvester three men handle a half to one and a quarter acres per hour, or 30-60 tons of material per eight-hour day even over distances up to 1½ miles from the trench.

Feeding from the clamp or trench can be carried out using either the buckrake or tractor and trailer. While the labour involved in feeding is somewhat greater than if hay were used, in actual fact when the feeding out is done systematically there is not a great deal of difference in the times involved. It should not be necessary to point out that silage has a powerful odour and while most people do not object to it, some find it sufficiently disagreeable to discourage them from using the material. However the valuable contribution to carrying capacity of the farm should not be influenced by such considerations.

Feeding to Sheep

In food value silage is generally considerably better than hay, since it is made from material cut at a younger stage of growth. At the same time its food value must not be over-estimated, for it is not comparable with the succulent grasses, greenfeeds and crops. Since the protein content is also generally higher than in hay, silage is a most useful supplement to feeds such as turnips and swedes which are low in protein, and may in fact replace these if greenfeed or hay is also available. Lucerne silage is particularly high in protein and it can be as good as grass in this respect. (Note: for comparative purposes and as a rough guide 3lb silage is approximately equivalent to 1lb hay in food value.)

Silage may be fed any time of the year. It is, however, less palatable than grass and generally speaking sheep will not eat silage as long as they can obtain sufficient feed from pasture. Further, if large quantities of silage are being fed alone for long periods the appetite of the sheep may decline but this can be remedied by the inclusion in the diet of some other feed such as hay, grass or other greenfeed.

Sheep may require in the initial stages some preparation and education in eating silage. If accustomed to eating supplementary feed they will take to silage very readily once pasture growth declines, but if not used to supplementary feed they may have to be concentrated for several days in a bare paddock before they will eat the silage It is advisable therefore that any education required be done in the autumn or early winter. Once they start they usually relish the silage and no further trouble is experienced.

Winter Feed

The main place of silage in the feeding programme is as a supplementary feed during the winter, as an alternative to or in addition to hay, roots or other forage crops. That it can play a major part in winter feeding has been demonstrated decisively during this last winter in Canterbury. As examples, a flock of a thousand ewes in Mid-Canterbury and a mob of experimental ewes at Ashley Dene were wintered for four months entirely on silage with but the barest of pasture grazing. The ewes did not come out of the winter in top condition but they were not inferior to others in the district and they lambed satisfactorily. Except where there is no alternative it is not advisable that silage should be used as the sole diet for such long periods. The same comment could also be made of hay or roots. Some greenfeed, either grass or oats, lupins, chou moellier along with the silage is to be preferred, and hay is very useful in this respect too. But the fact that these ewes have been successfully wintered on silage alone speaks for itself. Other farmers in Canterbury have successfully used silage as the main supplementary feed throughout the long feeding period we have had this year. At Ashley Dene 1500 ewes have been wintered solely on 300 tons of lucerne silage, plus hay. In other words, silage can well become the sole supplementary feed provided that some green pasture can be given.

Other Uses

While in practice silage will be used mainly as a winter feed it is ideally suited to feeding during drought summer and autumn periods when no other succulent feed is available. For example, at Ashley Dene it has been used successfully for many years as autumn feed and especially as flushing feed during the dry autumn period.

Silage may also make a useful contribution to early spring feed. The highest quality and most palatable material should be saved for this period since it is a time when the quality of feed intake is most important. If lambing greenfeed is in short supply good silage should be fed out ad lib with the greenfeed. The ewes will eat it, do well on it, and it can certainly help out a difficult situation at this time of year. It is not suggested, however, that silage replace the need for lambing greenfeed.

These uses by no means exhaust the possibilities of silage utilisation for it is extensively used in Britain, U.S.A. and other countries for fattening cattle, mature sheep and lambs. These aspects of animal feeding have scarcely been tried as yet in New Zealand.

Quantities Required

At Ashley Dene 6-8lb silage per ewe per day was found to be as much as was eaten and on this amount alone the ewes barely maintained their condition through the winter. On this basis the requirement for a 1000 ewe flock would be 20 tons per week. As mentioned previously it is not suggested that sheep be fed silage alone for any length of time as usually other feed such as grass, hay and possibly roots and forage should be available. In other words, the best utilisation of silage is as a true supplement to be fed in addition to grass and possibly other feed. In these circumstances 3lb of silage per day would meet approximately half the requirements. To winter 1000 ewes would require 1½ tons per day, or 150 tons for three months of winter feeding. This means closing approximately 40 acres of pasture or utilising for silage the first cut from 40 acres of lucerne, according to the estimated yield of green material per acre. However, these are merely planned minimum requirements. As a general principle it should be accepted that once silage making has been adopted as a farm practice all surplus spring green material will be made into silage. In an abnormally wet summer all material would be made into silage in preference to indifferent hay. In this way a reserve of good quality feed which will keep indefinitely can be built up against the abnormally dry year.

Conclusion

Now that mechanical equipment is available for making silage at low labour cost it has become practicable to exploit the use of silage on sheep farms. Silage utilisation has advantages in pasture control, in fodder conservation and as an autumn and winter feed for sheep. **It has been shown that silage can play a major role in the supplementary feeding of sheep and can make an important contribution to increased farm production in New Zealand. Reserves of silage once secured remove the normal hazards of increasing the carrying capacity, which otherwise is based on the maximum number of sheep that can be carried through the dry summer or the bad winter.**

Copies of this Bulletin may be obtained from the Secretary, Canterbury Chamber of Commerce, P.O. Box 187, Christchurch.