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We Need More Silage



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Light tractors fitted with buckrakes, carting greenstuff to the silage pit

3.—NUTRITIVE QUALITIES

THE chief aim in making silage is to conserve green immature herbage of fodder crops in a condition most closely resembling that of the crop in its natural state. It is essentially a succulent food, and the succulence is one of its greatest attributes for it makes silage extremely palatable to stock at times when fresh green herbage is not available. In addition to its palatability, well-made silage contains a higher proportion of vitamin A than is found in hay or other dried conserved fodders, and this makes it particularly valuable for the promotion of health and fertility.

All silage does not have the same degree of nutritive value, as the quality will depend upon several factors, chief of which are the type of herbage ensiled and the stage of growth at cutting.

When we compare silage with other concentrates, using the customary standards based upon the percentages of protein equivalent and starch equivalent, the feeding value of silage appears to be low. We must take into consideration however, the fact that silage contains a large quantity of moisture which gives it succulence. From three-quarters to four-fifths of the weight of silage is moisture. When an animal is feeding on dry concentrates it must increase its water intake accordingly but silage provides the closest approach to green fodder in its natural state.

Silage has an added advantage in being a somewhat adaptable foodstuff in which the feeding values can to some extent be controlled. It is well known that the nutritional requirements of cattle vary, according to whether the food is needed for growth, fattening, or milk production, and these variations are reflected in the starch-protein ratios which are most appropriate for the particular objects in view.

For instance, a starch to protein ratio of about 10 or 12 to one is suitable for maintenance or fattening but if we wish to ensure quick growth and milk production over and above the maintenance requirements, a much narrower ratio will be needed, one in the vicinity of five to one.

Keeping in mind these general principles, it is possible, within broad limits, to regu-

late the composition of our silage to give the approximate feeding values required.

For maintenance or fattening purposes, a fodder is needed having a high proportion of digestible carbohydrates with a comparatively low proportion of protein. To produce such a fodder, crops consisting of maize or cereal mixtures should be cut when in a relatively mature state, just before ripening commences. At this stage they will approach their maximum yield per acre in weight and bulk.

For a production food designed to increase milk production or furnish the nutrients for rapid growth, a much higher proportion of digestible protein is necessary and it is fortunate that the ensiling process, if applied efficiently, can result in the least loss of protein of any fodder conservation method.

To give a high proportion of protein the crop should contain ample quantities of legumes wherever possible. The crop should be grown rapidly and cut well before maturity. Where the pasture is predominantly composed of grasses, the protein content can be increased to some extent by the application of a soluble nitrogenous fertiliser about a fortnight before cutting is commenced. Cutting the crop well before the mature stage is reached will obviously reduce yields to some extent, but this is largely compensated by the increased nutritive qualities of the fodder, and its ready digestibility; while the early cutting may also be compensated by the regrowth available for additional grazing or another cut later in the season.

It will be seen from the foregoing that there has been a considerable change in the general attitude towards silage making. At one time farmers were inclined to ensile any rubbishy growth which was available in the hope that it might become reasonably good fodder. Today, with a better understanding of the processes involved, the farmer who practises silage making has under his control many factors which he can operate to his own best advantage.

TYPES OF SILAGE

As the result of investigations carried out at Cambridge on the problems associated with the controlling of quality in silage making, it was found possible to distinguish four distinct types of silage

each produced by different methods of ensiling, type of crop, temperature, etc., and these were:—

1. Sweet dark brown.
2. Acid light brown or yellow brown.
3. Green fruity.
4. Several grades of sour silage.

These are now described with the intention of providing a rough but rapid means of grading silage, to use as a guide in feeding and improvement of future lots.

1. Sweet Dark Brown Silage.—This is produced as a result of conditions which allow the temperature of the mass being ensiled to rise above 113° F. and these predisposing factors are:—

- (a) A comparatively dry crop, either one that has been allowed to wilt excessively after being cut, or one that has reached an advanced stage of maturity.
- (b) Intermittent stacking or ensiling, especially if treading down is not adequate, will allow a rapid increase in temperature in each layer.
- (c) In stack silage especially, with so much surface area exposed to the air, fermentation is greatly facilitated.

This type of silage has that sweet, pleasant smell similar to that found in over-heated hay and probably for this reason is very appetising to, and is readily eaten by, all classes of stock. It is a comparatively dry form of silage.

However, on account of the high temperature and excessive fermentation that has taken place in the process there has been a considerable loss of digestible food materials, so much so that it is not recommended, due to the waste involved and the inability to provide an adequate ration for producing animals.

2. Acid Light Brown or Yellow Silage.—This is the type of silage usually found in tower, clamp and to some extent pit silos, depending of course upon conditions at ensiling. As a rule it results from crops which have been cut when reasonably mature and allowed to wilt for some hours before carting, so that when ensiled the moisture content is roughly in the vicinity of 79 per cent.

It requires no special precautions as a rule and the temperature rise is to the region of 86° F. to 104° F. with very little loss in the way of moisture and juices draining away from the silo.

The final product has the characteristic brown to yellowish brown colour with the distinctive smell and taste, probably due to small amounts of the volatile organic acid, acetic acid, for whilst the chief preservative, lactic acid, is present in a concentration up to 2 per cent., it is non-volatile, and hence odourless.

Stock, once they have acquired the taste, thrive on this type of silage which they eat readily. It is definitely to be recommended.

3. *Green Fruity Silage.*—This type derives its name from the fact that the silage produced is in truth fresh and fruity, having a green to olive-green colour and a smell that has been described as delicious. Furthermore, research has shown that the digestibility is very high.

It is produced when the crop is cut at an early stage of maturity, from the time of flowering till the seeds are half formed,

and ensiled immediately. Under these conditions a temperature of approximately 85° F. is attained.

The one big disadvantage of this type is the fact that large quantities of juice drain from the ensiled mass to carry away considerable quantities of soluble food materials. If the effluent is allowed to collect around the base of the silo a putrid stinking mass will result, but on the other hand, if suitable drains are constructed the liquid material can be successfully fed to both cattle and pigs.

4. *Sour Silage.*—Sour silage is frequently found at the base of a pit or tower silo as the result either of ensiling a very immature watery crop and not allowing for the fact that such material will rapidly pack down to the exclusion of air, or excessive compaction and compression of the first few loads.

In both cases the rapid exclusion of the air has caused the plant cells to die quickly and cease respiration and consequently the temperature rise is small, leaving conditions ideal for the growth of undesirable forms of organisms particularly the butyric acid type. The smell may resemble that of rancid butter.

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