

THE PRODUCTION OF SILAGE*

INTRODUCTION

THE importance of the production of silage to form a supplementary feed for cattle, as the succulent portion of the ration in semi-arid countries, has now being definitely established. In times of drought and the consequent shortage of pasture and green feeding stuffs, the value of silage is enhanced out of all proportion to its cost of production, which, especially by the "pit" or "trench" method, is by no means prohibitive.

The purpose of this leaflet is to lay before farmers in Cyprus the fundamental principles underlying the production of silage in order that they, in common with farmers in other dry-land countries, may take advantage of this method of preserving succulent fodder for their animals. Silage may be used at all times, as a cattle feed, but it is especially valuable in times of shortage of other green feed; it contains a comparatively high quantity of digestible nutrients and, if properly made, is very palatable to stock.

Ensilage is simply a process by which green and succulent plant materials are preserved for cattle feeding, by placing them in airtight chambers, stacks or pits. The underlying principle in all three systems is the exclusion of air.

CROPS TO GROW FOR THE PRODUCTION OF SILAGE

The best crop to grow under Cyprus conditions for the production of silage is maize and a brief account of the cultivation of this crop is given below. The crop should be cut in a less mature state than is required for the production of grain, viz., it should be cut when it is just coming into cob, so that much of the succulent material may be preserved.

THE CULTIVATION OF MAIZE

(a) *Soil Preparation*

A thorough preparation of the soil is essential. Where possible, the land should be ploughed as soon as the previous crop has been taken off, as this facilitates weathering, and leaves the soil in a receptive state for the early rains. Before planting the land may, with advantage be cross ploughed to a lesser depth and in any case the soil should be worked down to a fine tilth, to destroy weeds and form a suitable seed bed.

(b) *Planting*

The seed may be broadcast, but this practice is wasteful and not particularly efficient, and for this reason is not recommended if it can possibly be avoided. In Cyprus there are no mechanical maize planters, such as are used in the great maize-growing countries, but in the long run the farmer will probably find that it pays him to plant the seeds in rows by hand. Should the area be too large for this to be done economically, however, it might be necessary to resort to the broadcasting method.

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The seed should normally be planted 1 to 3 inches below the surface, the greater depth for lighter soils, in rows $2\frac{1}{2}$ to $3\frac{1}{2}$ feet apart to allow room for the inter-cultivation. The seeds should be so spaced as to give the plants a distance between them of from 12 to 20 inches in the row.

The rate of seeding will normally be about 3 to 5 lb. of seed per donum, with considerably larger quantities required if broadcast (12 to 20 lb. per donum). The date of planting will necessarily vary in different parts of the Island, and the best conditions for the growth of the young maize plant can only be determined by observation based upon experience in the district in question. In Cyprus, it will probably be necessary to plant considerably after the commencement of the rains in order to avoid getting the seedlings through in the coldest part of the year.

Under Cyprus conditions, maize also be grown as a Summer crop under irrigation and when this is done the land may be prepared in advance, as required, and sowings made in March and continued until July. In the late sowings the grain will not mature, but if the crop is being grown for the production of silage, this does not matter.

(c) *Manuring*

Productive maize soils are almost, invariably characterized by a high content of organic matter; where this is deficient, as evidenced by the deflocculated and light colour of the soil, it must be remedied by the application of large quantities of stable or goat or sheep manure or by green manuring. It is not usually a practical proposition to apply commercial nitrogenous fertilizers, potassic fertilizers, phosphates or lime, unless the soil is known to be deficient in one of these constituents.

TYPES OF SILOS

There are three methods of producing silage in common use in other countries, according to whether the material is stored in a tower, a stack or a pit silo. The former is probably the best method, but the initial cost of erection puts it beyond the reach of many farmers, who find one of the two latter methods almost as satisfactory. The most convenient type of silo for use in this Colony, will probably be found to be the "pit" silo or the "trench" silo which are similar in operation and easy to construct.

THE TOWER SILO

A tower silo may be built of concrete, stone or wood and is usually 20 to 30 feet in height and 10 to 15 feet in diameter, with a door at a convenient level for the silage to be forked out when required for feeding. The maize is run through a chaff cutter and elevated to the top of the silo by means of a "blower". A man inside the tower sees that the material is evenly distributed and trodden down, and the pressure of the top layers brings about the necessary exclusion of air.

THE PIT SILO

Pit silos are inexpensive in construction and for this reason are the most popular type. In these, the ground located in a well drained situation is excavated, leaving somewhat sloping sides 10 to 12 feet in depth and of varying capacity.

The maize may either be put in whole, with the stem ends nearest the walls, or it may preferably be passed through a chaff cutter which facilitates close packing. When properly settled, a layer of grass covered by about 2 feet of soil should be used as a covering, and when starting to feed, the pit should be opened from the side and the silage cut vertically.

A simple modification of the pit silo is the "trench" silo, in which a trench about 5 feet deep and any desired width and length, is employed for making the silage. The trench is filled the same way as the pit silo and covered with a layer of earth which should be about 2 feet thick.

Almost any size of silo may be made for the production of silage by the methods described above, but if very large quantities of silage are required, it is better to have two moderately-sized silos than one very big one, as the moderately-sized silos facilitate feeding. Suggested dimensions for a trench silo are 20 feet long by 10 feet wide by 5 feet deep, but as has before been stated, almost any measurements may be adopted.

THE STACK SILO

Although the methods of producing silage described above are probably superior, the necessity for the construction of expensive tower silos and less expensive pit silos was removed by the discovery that silage may be made successfully in stacks, similar to hay stacks, and subjected to pressure by relatively inexpensive processes. When silage is stacked in this manner, chain presses, hydraulic presses or lever presses may be applied, if convenient; otherwise poles may be pitched and braced in position, with a super-imposed cover of boards heavily loaded with bricks or other weights.

In the case of a stack silo, the whole maize is used and built into stacks 20 to 25 feet diameter or less and 12 to 15 feet or less in height, with the stem ends outwards. This done, the whole is covered with straw and weighted down either as described above, or by simply placing a layer of heavy stones on the top of the stack, and the sides are trimmed down to present an even surface.

TYPES OF SILAGE

Whether sour silage or sweet silage results from the operation of making, is determined mainly by the temperature at which fermentation takes place within the mass of herbage. The temperature is largely regulated by the pressure and the amount of oxygen present within the silage.

Silage is sour or sweet according to the amount of certain organic acids present on the sample, principally acetic, lactic and butyric. If a stack silo is viewed in section from top to bottom, the upper layers will be seen to be more brown in colour than the lower layers. The lower layers have been converted into sour or green silage because the pressure of the material from above has excluded the air and fermentation has taken place at a low temperature. As there exists a lower pressure in the upper layers, freer access of air has given rise to a higher temperature fermentation, killing the organisms, which under conditions of less heat set up an acid fermentation, sweet silage resulting.

The best silage is made at about 130 degrees (F.) and is neither sweet nor sour; silage made below 90 degrees (F.) is inclined to be too sour and is unpalatable to stock, whilst that made above 160 degrees (F.) is burnt and also unpalatable to animals.

THE FEEDING OF SILAGE

Silage can be made in all kinds of weather and is capable of affording a succulent and nutritious feed to stock at all seasons of the year; it may be fed at any time after it has been placed in the silo and will keep good for years if well secured and sealed in whatever type of silo is used.

Well made silage may be regularly used by the stock breeder in addition to other feeding stuffs, but care should be taken to prevent scouring, which may occur if too liberal amounts are included in the ration. A good rule to observe is to give 3 lb. of silage a day for each 100 lb. live weight of the animal, in the case of dairy stock; yearling heifers consume about half as much as mature stock. For horses and mules the amount fed should not usually exceed 10 to 15 lb. per head daily, whilst fattening bullocks may receive as much as 4 lb. per 100 lb. live weight.

The United States Department of Agriculture states that no cheaper or better roughage can be fed to a breeding flock of sheep than good maize silage, which furnishes the succulence so necessary to the health and vitality of the ewes. A good quality of silage is very palatable and quantities ranging from 1 to 5 lb. per head per day have been fed in different feeding trials with good results.

Silage is especially useful in supplying the bulky portion of the ration, when hay, straw and green food is scarce.