

Farming will never be a success unless the farmer  
had more voice in the disposal of  
his produce—P. Morrel.

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**On Silage Making.**

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Silage making is the art of preserving green fodder in a succulent state for a considerable length of time. It is usually a provision against green-fodder scarcity during summer. During the hot weather in parts where irrigation facilities are not on hand to enable fodder crops like cholam, maize, etc., to be grown owing to the absence of wells or water in tanks, the only way in which a farmer can manage to feed his stock with succulent material is by having recourse to silage.

2. It is almost impossible to keep up the condition of the farmer's stock, especially the milch cattle, during the hot weather with feeding of straw or hay or both. Unlike other seasons, the cattle require for maintaining their condition some green fresh fodder or other succulent bulky material in addition to the hay or straw which are usually given in many parts of the Presidency. It is only in a few places like Coimbatore and parts of Tinnevely and Deltaic tracts, that ryots are able to grow fodder crops during summer by irrigation from wells and feed them green to cattle. In such places, silage is not a necessity. But in places where rainfall is uncertain and the summer severe, it would be advantageous for a ryot to grow as much fodder crops as possible during seasons

of rainfall and cut them and preserve them in pits as silo, to be used during summer when green fodder is generally not available. Thus, the object of silage making, it would appear, is to replace green fodder where this cannot be grown in summer by a suitable succulent fodder material grown during the seasons of rainfall and preserved in pits.

3. This green fodder preserved in pits as succulent material is a very good substitute for actual green fodder freshly cut. With regard to the feeding value, there is practically no difference between green fodder as such and the silage prepared out of it. In the chemical sense the nutritive value in a fresh green fodder may be a little higher than silage prepared out of it. But there are certain points in favour of the latter, viz., its softness and palatability and its aromatic smell which induces the animal accustomed to silage to show a certain amount of partiality towards it exclusively sometimes.

4. The need for silage or other succulent fodder is most felt by stock owners of high class milch cows which have to be carefully looked after during summer. It has often been the experience of many ryots that when once the milk yield of a high class cow is brought down by careless management and bad feeding it is almost impossible to bring it back to its normal again even by the most strenuous and scrupulous attention to feeding. So dairy stock owners would do well to continue to feed their dairy stock with ample succulent fodder during summer also and this is possible in places of green fodder scarcity at such times by having recourse to silage. Heavily worked drought animals also require special attention during summer and silage feeding in the absence of fresh green fodder will not only maintain their condition even under over worked conditions, but also improve their appearance.

The site for digging silage pits must be a fairly high level ground so that the portion is well drained without any chance of water-logging. The shape of the pit may be rectangular or circular (the sides must be as far as possible vertical to facilitate close packing of material). The pit may be dug to any depth, provided there is no spring or water percolating through the sides. If there is any chance of water percolating, say below 5 feet depth, that pit may be conveniently dug up to 4 feet or less and the surface dimensions extended to increase the capacity. Any green fodder may be converted into silage, viz., cholam, maize, cowpea, or any green grass. The maize forms the best silage. It is pre-

ferred to cholam chiefly because of its high yielding capacity. A rain-fed cholam crop under good conditions gives an acre yield of 10,000 to 15,000 lbs. whereas a maize crop gives 25,000 to 30,000 lbs. Whereas we can half fill a pit with cholam from a given area, we can complete the pit with maize grown from the same area. Secondly, maize is of shorter duration in the field than cholam and hence the preference to it.

The crop for silage must be cut green while it is in the flowering stage, or just about the milk-stage. It is at this stage the fodder is supposed to be rich in valuable nutrients; if cut earlier, the full weight of crop is not obtained; if cut after the flowering stage, all the valuable ingredients are transported from the stalks to the seeds, and the stalks are not very valuable for feeding. In the case of maize, the milk stage is usually a pretty long period and as such the cobs may be allowed to develop for sometime. At any rate, the grains should not harden. They must be in the milk stage. The cobs should not be removed from the stem while pitting but should be cut wholesale and put into the pit.

With regard to the size of the pit it must be designed according to the number of head of cattle in stock. It must be of such dimensions that the material from it may be fed to cattle and exhausted in a period of 2 to 3 weeks. Ordinarily a pit,  $25 \times 15 \times 8''$  will hold 55 tons of cholam material which evenly pressed tight and after conversion into silage will just fill in the pit and thus occupy the volume of the pit; in other words, 1 cubic foot of compressed cholam silage will weigh roughly 30 lbs. (This weight will differ somewhat with different crops.) Thus for every 100 cubic feet of the pit we may require roughly 3,000 lbs of fresh green material to fill in. Thus, an acre of fodder cholam grown under rainfed conditions and estimated to have an yield of 12,000 lbs., will fill a pit whose capacity is 400 cubic feet i.e., a pit  $12' \times 8' 4" \times 16''$  will suffice. The size of the pit can thus be judged according to the area of the crop or rather the quantity of stuff available.

*Method of Filling* :— The crop may be cut and put as whole plants or chaffed into bits and then thrown into the pit. The latter is preferred because it ensures good packing. Also greater quantity of stuff may be put into the pit. Sometimes the silage is chaffed after removal from the pits, since it is always advantageous to feed chaffed material instead of whole plants.

The silo pit must be filled as quickly as possible, but due caution must be observed to see that every fresh layer we put in gets a little heated before a succeeding layer is put on. This ensures a certain amount of fermentation and the heating of the stuff which seems to be a necessary preliminary process before the whole stuff is covered with earth. This heating of the material is caused by a certain amount of regulated air which oxidises it. If the stuff is well pressed and little or no air is admitted, fermentation is slow and the stuff gets heated leisurely and as such the process of filling can go on slowly. This is generally the case with Guinea grass and other grasses with high percentage of moisture which settle evenly and tightly and allow little aeration. Here the stuff can be filled slowly. If in this case the material is filled quickly, the silage resulting from it is a little too acid in taste and is sometimes slushy and the material goes by the name of 'sour-silage.' If, on the other hand, as in the case of cholam where packing is not so even as in Guinea grass, the material gets heated very quickly, it would mean that too much of air is being admitted and as such the material should be filled in quickly and every layer should be pressed as compact as possible, either by driving in cattle or by engaging a gang of dozen men to walk over the material. If filling is delayed, silage gets charred in some portions and is not valuable. If the required quantity of air is admitted, just to heat the stuff to the required degree, and not over-heat it, we get what is known as 'sweet silage.' The amount of heating that is taking place during the process of filling, can be ascertained by fixing an iron rod about 5 feet long (a long crow-bar will do) into the material and raising it as layer after layer is being put up. The heat may be felt by the hand and it must be only to such an extent that one can bear without pain. The rod is kept up throughout the process of filling and is a sure guide as to the rapidity or slowness with which the material is to be filled in.

The bottom of the pit is usually spread with some dry straw or waste hay or even weeds to act as a bedding for the fodder to be put in. The material intended for silage must be evenly spread on this bedding and filling in the early stages should commence along the sides of the pit all round, rather than the centre. After the stuff occupies to about three-fourths of the pit, the centre should be filled up and well pressed. This pressing at the centre in the later stages secures good packing of the material against the sides. At this stage a breeding bull or other heavy

working animal may be allowed to walk into the pit. This operation will greatly compress the material and ensure good packing and thus minimise aeration. But great care should be taken while walking the animal to see that no urine or dung mixes with the fodder whenever animal passes urine or dung. The urine must be collected as often as it is necessary in a small tin vessel and the dung also collected along with a portion of the fodder on which it has dropped and thrown away.

When the material rises flush with the ground level, it should be extended 6 inches extra on all sides and filling of material should commence again, above the ground level. This extra 6 inches is intended to allow for lateral shrinkage, which would otherwise cause air to enter and turn the silage mouldy. The material should be raised up as far above the ground level as it is below it. After it rises 2 feet above ground level it will not be possible to allow cattle to walk over and over and in that case packing may be done by getting people to walk over. The whole material is arranged in the form of a stack or a semi circular dome and then covered with dry straw or waste hay first, and then with green leaves and finally with earth.

The earth should be thrown loose to a layer of about  $2\frac{1}{2}$ ' minimum and shaped like a roof. This will act as weight and press the material within sufficiently well to keep it air-tight. In the course of a few days, the material inside will sink and the top surface of the earth will in turn go down and cracks will be formed in places. The pit should be watched at least thrice a week, for the first month and the cracks worked over with mammutties and closed and the surface smoothened. The surface is never mud plastered as with the shrinkage of material within the cracks will be induced greatly. Once a fortnight or so, cattle may be driven over the pit and any undue depressions or sinking covered over with fresh earth. This treading by cattle is important because, there is usually a hollow created between the roof of the earth and the compressed material within, and this hollow will contain air which is detrimental to the silage. If air is admitted the silage turns mouldy.

The silage fermentative process is supposed to be over within 3 weeks and we may safely take it that the silage is ready for opening at any time after two months. But it is usually kept until the next dry season and never opened earlier. It is opened only when necessity arises.

The pit is never opened wholesale. The top surface, to the extent of roughly one square yard, is removed and the silage is dug out to the very bottom. Only such portion of the top is uncovered as would give stuff just necessary for one day's consumption. If the pit is kept opened for more than three weeks there is every chance of the remaining silage getting mouldy and unfit for feeding.

*Feeding*:—The silage may be fed to cattle long or chaffed and then given to them. For cattle unaccustomed to silage, it is better to feed them chaffed silage mixed with hay or straw. At first the cattle may not have a fancy to silage, but can soon be trained to take to it. When once the animal picks up silage, though in small quantities at first, it very soon acquires a greedy habit of eating the stuff so much so that after sometime, it shows a certain amount of partiality for it to the exclusion of even some good succulent fodders.

Work cattle, not only maintain their condition by taking silage, but also improve in appearance. There is a shining and attractive appearance of coat which is rarely seen by feeding with any other fodder.

For sheep during summer, when generally grass is not available, it forms a very valuable substitute for grass. So also for horses. In the latter case, it may not exactly replace green grass or hay but is a valuable addition to them.