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By

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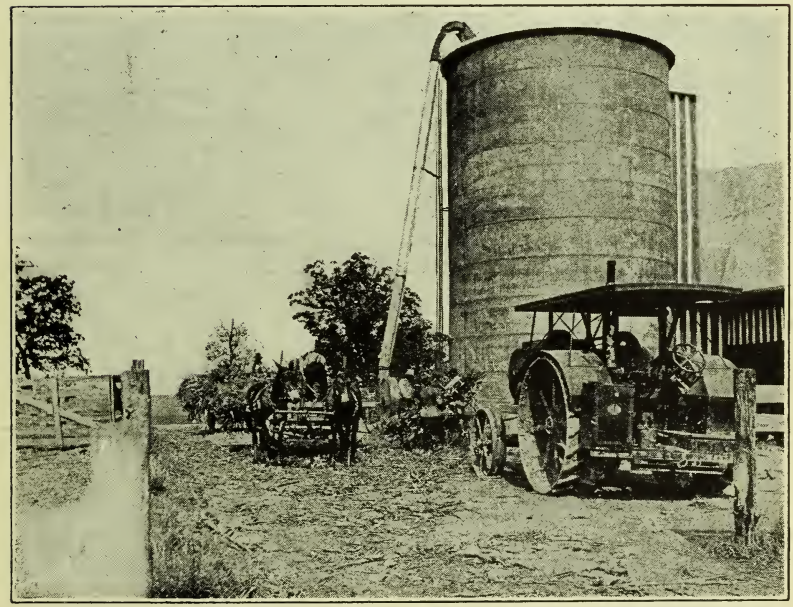

Filling Silo at Beef Cattle Barn, Mississippi Experiment Station

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*In co-operation, Bureau Animal Industry, U. S. Department of Agriculture.

A STUDY OF SILAGE COSTS IN MISSISSIPPI

SUMMARY

The average yield per acre of corn silage on the farms studied in this survey was 6.1 tons. The average yield per acre of sorghum silage was 8 tons.

The amount of corn that could be produced per acre on the land used for silage purposes with the same labor as was given to the production of silage was estimated at 25.5 bushels. According to these estimates the same land and labor required to produce one ton of corn silage would produce 4.2 bushels of corn. Similarly, the land and labor required to produce one ton of sorghum silage would produce 3.2 bushels of corn.

From data secured in this survey and on the Mississippi Experiment Station farm, it would seem that silage produced on rich land, well tended, will contain a considerably higher proportion of grain than that grown on ordinary good land with average methods of cultivation.

An average of 5.1 man hours and 2.8 horse hours were required for the harvesting of one ton of silage.

Where available for this purpose, the hiring of ensilage cutter and power was considered more economical than owning except where tractors were needed for other farm work.

The custom charge of fifty cents per ton compared closely to machinery and fuel costs for filling silos on the Experiment Station farm.

ESTIMATING COST OF CORN SILAGE

The following method is recommended for calculating corn silage costs where data are to be used in connection with the choice of farm enterprises:

Charge		Amount
4.2 Bushels of Corn at $1.00	$4.20	
Less Cost of Cribbing 4.2 Bushels of Corn	.25	
	$3.95	$3.95
5.1 Man Hours at 10 cents		.51
2.8 Horse Hours at 10 cents		.28
Machinery Charge		.50
Total		$5.24

The charge of one dollar per bushel for corn is based on the average farm price in Mississippi over a period of ten years, as given by the United States Department of Agriculture. The cost of gathering corn from the field was estimated at six cents per bushel.

COST OF SORGHUM SILAGE

The cost of sorghum silage should be estimated in similar manner except that a charge of the value of 3.2 bushels of corn should be made.

Charge		Amount
3.2 Bushels of Corn at $1.00	$3.20	
Less Cost of Cribbing 3.2 Bushels of Corn	.19	
	$3.01	$3.01
5.1 Man Hours at 10 cents		.51
2.8 Horse Hours at 10 cents		.23
Machinery Charge		.50
Total		$4.30

As these estimates are based on the average costs on twenty-five farms, farmers or others using these methods of calculating silage costs should substitute figures adapted to their individual cases.

From this study it would seem that filling costs could be reduced by more cooperation on the part of silo owners, both in the exchange of labor and in the ownership of machinery.

More rapid filling should lead to reduction of man and horse hour requirements.

The use of the corn binders and underslung wagons might reduce costs where the tonnage justifies such special equipment.

Costs of producing the crop could probably be reduced by the increased yields which would be secured from better cultivation and fertilization of land used for the growing of silage crops.

INTRODUCTION

The present upward trend of livestock prices, it is generally agreed, is the beginning of a gradual relative rise which will continue over a number of years. As the low prices of the past few years resulted in a decreased interest in livestock, the advance will result in an impetus that should be intelligently used in establishing the livestock industry of the state upon a permanent foundation.

Mississippi has a large percentage of unused land, best suited for pasture purposes, which must be taken into consideration in any plan for farm organization. Competing with cotton production perhaps less than any other supplementary enterprise, at the same time showing larger returns from labor expended, grazing offers one of the most promising means of increasing farm revenues. For this reason, grazing animals such as cattle and sheep may fit into the average farm plan better than grain consuming livestock such as hogs, as the latter class competes with cotton for grain needed to feed work stock.

The greater portion of the expense of a beef herd is for feed during the three or four winter months. With cottonseed meal available the problem of the beef producer is more the selection of economical roughages than concentrates. To a lesser degree this is also true of the dairyman.

FEED CHARGES BASED ON MARKET VALUES

Where farm prices are known and there are sufficient data at hand as to their feeding value for the particular class of stock, a comparison of the economy of different feeds is simple. In such cases feeds will be charged against a livestock enterprise at the farm value which will be based on the market price. In communities where a surplus of the particular feed is produced on farms and the feed customarily sold, the feed will be charged against the livestock to which fed at the market price less the cost of marketing. On the other hand, where the feed is customarily purchased it should be charged, whether produced on the farm or not, at the prevailing farm price which is usually the market price plus transportation charges therefrom.

CHARGING SILAGE AGAINST LIVESTOCK ENTERPRISE

While in the case of concentrates and hay these rules can be readily applied, they are not as easy of application in the case of silage, where no market value exists. Silage usually competes directly with corn for the factors of production: land, labor, and capital. Corn silage on land which will produce corn for grain profitably should, therefore, be charged against livestock enterprises at the value of the corn contained plus the difference between the cost of ensiling or harvesting and the amount which it would have cost to gather and crib the corn. Similarly, sorghum silage should be charged on the basis of the corn that, according to estimate, would have been produced on the area used for silage purposes. Up to the present no uniform method has been used in charging silage against livestock enterprises. In some instances attempts were made to estimate roughly the cost of production, but, though surveys have shown the cost of producing both corn and sorghum, little accurate data have been available on the cost of filling the silo after the crop was made. The weakness of any method of calculating silage costs, ignoring the value of the corn which could have been produced on the same land with the same labor, is at once apparent when such data are to be used in connection with the selection of farm enterprises.

SILO CONSTRUCTION AT STANDSTILL

The excellence of silage for both dairy and beef animals has been experimentally proved and the results generally sustained by demonstration and farm practice; yet in spite of a perennial shortage of farm roughages, silo construction has been at a standstill in the state for the past five years. A preliminary report issued in April, 1923, by D. A. McCandliss, Agricultural Statistician, showed only seven hundred and forty-seven silos in the state. This report, while admitted to be incomplete, indicates that even after several years of effort to introduce them into the state, silos still bear in number an insignificant ratio to farms on which are maintained dairy and beef herds. Of concern also in this connection has been the considerable number of silos during the past few years that have remained unfilled. Where of

wood construction, many of these have been so neglected as to be of little or no value at the present time. These conditions may have been due in part to the recent depression in livestock values and in part to excessive costs. A careful study of these conditions was made by the Agricultural Economics Department in the fall of 1923.

SURVEY OF FILLING COSTS

As data were available on other points essential to the calculation of silage costs, a survey was planned to determine the basic expenditure in connection with harvesting the crop. This was accomplished in most instances by means of personal visits to farms. With the assistance of the farmer, blanks were filled out giving information in regard to the following points:

Crop used
Acreage in crops
Dimensions and kind of silo
Distance of hauling
Kind and size of cutter used
Kind of power used
Man and horse hours required for setting up cutter, pipes, etc.
Man and horse hours required for cutting crop in the field.
Man hours required for loading from the field
Man and horse hours required for hauling from the field
Man hours required for putting crop into cutter
Man hours required for running engine
Man hours required for tramping in silo
Man hours required for sharpening knives
Miscellaneous labor required

Where possible, information was also secured on the cost of labor, the amount of fuel and lubricating oil, and the depreciation of machinery.

All data collected were checked in the field as carefully as possible under the conditions of the survey. Where necessary, measurements were made of the size of field and dimensions of silos. The amount of silage harvested in each instance was calculated by the use of tables published jointly in Missouri Bulletin 164 and Kansas Circular 89.

The work was also checked by carefully kept records of filling costs on the College and Station farm. In some of these instances the crop was weighed into the silo. Yields of corn were determined on the Station farm by counting and averaging the number of ears on fiftieth acre strips (250 feet of row) in representative portions of the field. Weights of a hundred representative ears were secured from portions of rows left in different parts of the field ungathered until sufficiently dry for harvesting and cribbing. From these data estimates were made of the yield of feed corn which would have been secured. These data are herein used only in support of that collected in the field.

ACKNOWLEDGEMENT

Acknowledgement is hereby made to the farmers supplying this information and to county agents, J. V. Pace and R. M. Lancaster, for their assistance in connection with the making of this survey.

SUMMARY OF FILLING TWENTY-FIVE SILOS—MISSISSIPPI

No.	Crop	Tonnage	Yield per acre. (Tons)	Labor	
				Man Hours	Horse Hours
1	Corn and Soybeans	60	5.5	4.93	2.40
2	Corn, Sorghum, and Johnson Grass	85	7.73	6.01	2.42
3	Sorghum	90	10.0	6.33	1.78
4	Sorghum	150	10.0	3.00	2.00
5	Sorghum	94	10.0	6.91	2.55
6	Corn	61	3.4	6.13	3.93
7	Sorghum	115	9.0	3.40	1.95
8	Sorghum	140	4.0	8.50	2.57
9	Corn	240	6.0	2.03	1.83
10	Corn	80	6.1	3.94	2.45
11	Corn and Sorghum	95	9.5	6.31	3.16
12	Sorghum	45	3.0	3.56	4.00
13	Sorghum	100	10.0	5.60	3.20
14	Corn and Soybeans	100	4.2	1.43	1.80
15	Corn	95	8.0	4.42	2.53
16	Corn and Soybeans	80	12.3	4.68	3.75
17	Corn	87	6.0	3.86	3.31
18	Sorghum	63	10.0	7.62	4.44
19	Corn	80	5.9	4.90	3.44
20	Corn and Sorghum	100	5.5	5.29	3.00
21	Sorghum	40	6.2	5.50	2.80
22	Corn and Sorghum	95	4.75	5.68	3.37
23	Sorghum	120		4.17	2.91
24	Corn	100	7.5	6.75	2.80
25	Corn and Sorghum	45	3.75	7.58	2.44

It will be noted from this table that in fifteen of the twenty-five instances sorghum was used.

The average yield of sorghum silage was 8 tons per acre as compared with 6.1 tons in the case of corn silage, the former yielding thirty-one percent more than the latter. In the case where corn and sorghum were mixed in the silo the average yield was 7.7 tons.

The average yield of corn which might have been expected from the land in silage was estimated at 25.5 bushels. This estimate is based on a comparatively small number of instances and might be revised as the result of a more extensive survey. From these data a charge of the field value of 4.2 bushels of corn should be made against each ton of corn silage. Likewise, a charge of the value of 3.2 bushels of corn should be made against each ton of sorghum silage. As the data herein are based almost wholly on a single year's work, these results may fail to adequately show the greater dependability of sorghum

than of corn. Agriculturists generally have estimated that sorghum will out-yield corn by nearer fifty than thirty percent.

On the Station farm a careful estimate showed that each ton of corn silage put into the concrete silo at the steer barn contained seven bushels of corn. These data indicate that silage produced on rich land, well tended, will contain a considerably higher proportion of corn than that grown on ordinary good land with average methods of cultivation.

The average time required for setting up cutter, pipes, etc., was 9.7 man hours. The average man hours required for harvesting one ton of silage was 5.1, while the average horse hours was 2.8. The distribution of man labor in the different operations was as follows:

Cutting Crop	26.8%
Loading	14.2%
Hauling	20.2%
Feeding Cutter	13.8%
Tramping	15.8%
Overseeing and Miscellaneous	9.2%

ESTIMATE OF TIME REQUIRED AND DISTRIBUTION OF LABOR IN FILLING 100 TON SILO

According to this study the harvesting of a hundred tons of ensilage required on an average the labor of nineteen men for about twenty-seven hours, or nearly three days.

The distribution of labor was approximately as follows:

1 man, overseeing
5 men, cutting crop in field
3 men, loading on wagons
4 men, hauling
3 men, at the machine, feeding cutter, tending machine, etc.
3 men, tramping in silo.

MACHINERY

The cutters used in the majority of instances were of the radial knife type with ten to twelve inch throat.

Power was supplied by tractors ranging from 6-12 H. P. to 15-30 H. P., 10-20 H. P. being the most common.

With one or two possible exceptions the cutters were not run nearly up to their normal capacity of three-fourths to one ton per hour for each inch in width of throat.

In about half of the instances the cutters and power were owned by the farmer, while in the rest these were hired. The owner of the engine and cutter in all instances had purchased the machinery primarily for his own use.

Where custom work was done the charge was generally about fifty cents per ton where the owner of the machinery furnished engine,

cutter, fuel, oil, and one man. In some instances the owner of the machinery furnished the engine, cutter, fuel, oil, a corn binder, two men and three horses, charging for these seventy-five to eighty cents per ton. The cost of cutters where ascertained was about $350.00.

Corn binders were used in only four instances. Where given, the cost of the corn binder was $175.00.

The cost of tractors showed more variation than that of other silage machinery as the kind and horse power was dependent largely on their general farm use. As tractor prices are readily available in all parts of the state these data are not given.

The average oil and fuel requirements per hundred tons were approximately three gallons of cylinder oil and fifty gallons of gasoline or kerosene, the latter being used in most instances.

Machinery charges were not calculated, owing to the variation in the number of silos filled by different machines and to the variation in the number filled by the same machine in different years, also because the tractors were used in all cases for other than silo filling purposes.

The custom charge of fifty cents per ton is considered sufficiently accurate to cover such costs, for while including the labor of one man it does not include the instances of binder charges and other costs. This compares very closely to the machinery and fuel cost of fifty-three cents per ton for filling silos on the Experiment Station farm.* In the majority of cases where silage machinery can be hired, this method is preferred to owning and is probably more economical, especially on small jobs. The average length of haul was estimated at seventy-two rods or a little less than a quarter of a mile.

The amount which the farmer can afford to invest in silage machinery can be readily figured by estimating the saving as a result of ownership, subtracting expense for repairs, etc., and dividing by the current interest rate.

SILAGE YIELDS AND MAN AND HORSE HOUR REQUIREMENTS FOR FILLING SILOS IN OTHER STATES

(These figures were secured from the Year Book of the United States Department of Agriculture.)

	Yield	Labor Requirements per ton of Silage put in Silo.	
		Man Hours	Horse Hours
Minnesota—Average of 30 Records	7.1 Tons	1.44	2.21
Wisconsin—Average of 97 Records	9.4 "	1.66	2.07
Iowa—Average of 55 Records	9.8 "	1.53	2.04
New York—Average of 83 Records	13.0 "	1.97	1.51

*Thesis prepared for M. S. Degree, Mississippi A. & M. College, by I. P. Trotter.

A comparison of the results secured in this survey with those reported from the states listed above shows that silage yields in Mississippi are lower in most instances and that the labor requirements are greater per ton of silage put into silo.

The yields in Mississippi can be greatly increased by limiting the production of silage to the soils best adapted to its production and by improving these better adapted fields by returning the manure and by growing leguminous cover crops. On most farms in the state, there is a limited amount of good corn land that will compare favorably in production with lands in any section of the country. Sufficient instances of high yields have been recorded to show the possibilities of silage production in this state. Better cultivation and fertilization would have increased the yields on probably all of the farms studied.

Some of the reasons for high labor requirements are the character and training of the labor, double handling of the crop, the scattering number of silos, and long hauls from the field to the silo.

Practices which will tend to decrease the time and expense required in filling are: keeping the corn or sorghum up to the machine, unloading directly on to the feeding table; and feeding the bundles of corn or sorghum into the machine, butts foremost and stalks parallel and overlapped, in such a manner as to have at all times the steadiest possible load on the engine.

With a 10-20 H. P. engine and a twelve inch cutter, at least fifty tons of silage should be put in the silo in ten hours under favorable conditions.

Hauling corn or sorghum from the field to the cutter will require from four to six teams, or even more, depending upon the distance. The teamsters should help load, though it will usually require two additional hands loading in the field. The hauling of full sized loads, especially in the case of long hauls, will help in lowering the man and horse hours required. Where the tonnage justifies such special equipment, low-down or underslung wagons will reduce labor.

One or possibly two men will be required at the machine to feed the cutter, look after the engine, and tend to other odd jobs.

Where the distributor is used, two good hands should be sufficient in the average silo to mix and tramp the silage. It is important that this work be thoroughly done in order to prevent spoilage and as supervision is difficult reliable help should be used. The distributor is made of jointed steel sections and extends down into the silo fifteen or twenty feet from the end of the blower pipe. By means of a rope attached to the end of this distributor, the latter may be pulled around and the silage placed where desired by one of the trampers.

In the field the number of men required for cutting the crop with knives will vary considerably with the yield of the crop. Where they start a half day in advance of the cutter, four men should be sufficient, though it may be safer to have a lead of a day. A corn binder will reduce the man hour requirements. The advisability of purchasing a

binder will depend of course on the acreage to be cut each year. Six acres is probably a good day's work for a binder and three mules. The amount which the farmer can afford to pay for a binder can be calculated as for other silage machinery.

Fields for silage crops should be located as close as possible to the silo in order to reduce the expense of handling the crop and make easier the restoration of fertility. As silage removes a large amount of plant food from the soil, these fields should not only receive regular applications of manure but should be planted to leguminous cover crops.

GENERAL INFORMATION

Silage provides one of the most convenient, satisfactory, and palatable roughages available to Mississippi farmers. Its beneficial effect on the general thrift and health of the stock to which it is fed makes it popular with livestock producers.

Crops likely to be lost as the result of either frost or drouth can frequently be saved by ensiling.

The silo should be located and constructed with the idea of permanence and convenience. The walls must be impervious to air and moisture and must be strongly reinforced to resist the outward pressure exerted by the silage in settling. They should be smooth to permit even settling of the silage. The silo should be cylindrical in form as this construction permits of strongest reinforcement of wall and does not allow corners or pockets for the collection of air. The door frame should be perpendicular, strongly built and should allow no weakness in the reinforcement of the silo walls. It should also permit of air tight door fittings.

SIZE OF SILO NEEDED

The diameter of the silo, while it should be ample for needs, should be small enough to allow the feeding out of about three inches per day, otherwise spoilage will occur.

The following tabulation secured from Farmers' Bulletin 589 of the United States Department of Agriculture indicates the relation of the size of the herd to the diameter of the silo:

Inside Diameter of Silo	Quantity of Silage in Depth of 3 Inches	Number of Animals that may be fed, allowing		
		40 lb per Head	30 lb per Head	20 lb per Head
10	785	19	26	39
12	1131	28	37	56
14	1539	38	51	77
16	2011	50	67	108

The height of the silo should be at least twice the diameter as the taller the silo, the greater the capacity of each cubic foot of space contained. Other conditions the same, there is a larger percentage of waste in a shallow silo than in one that is deep.

In the survey just completed, the silo diameters ranged from twelve to sixteen feet and the heights from twenty-seven to forty-one feet. Of the twenty-five silos, eight were of concrete, three of tile, and fourteen of wood construction.

COST OF BUILDING SILOS

A survey made in 1914 by the Mississippi Experiment Station, cooperating with the United States Department of Agriculture, on seventy-five selected farms in the prairie and brown loam sections of the state provides the following data in regard to silos at that time.*

Number	Kind	Average Capacity	Cost of Construction per Ton Capacity
40	Stave	162 Tons	1.84
15	Concrete	195 "	2.23
1	Brick	180 "	1.80
2	Gurler	170 "	1.36
9	Underground	94 "	.94

Examination of the index figures on price trends would indicate that construction costs are at least eighty percent higher at this time than they were at the time of the building of the silos listed.

Underground or pit silos are only suited to localities where the soil is very firm and where the water table is down several feet.

The monolithic concrete silo seems to be gaining in popularity in the South. Where properly constructed, though the first cost is usually more than for the wood, they are more satisfactory than the less permanent types and the cost for each year of service is smaller. For concrete silos the sand used must be clean, otherwise the walls will not be impervious to moisture and the silage will not keep.

Tile and metal silos where not too expensive are generally satisfactory. Tile or brick silos like all others must be properly reinforced.

Wood silos will last from five to perhaps fifteen or twenty years, depending on the kind of wood and the care taken of them. They should be strongly anchored, kept well painted, and in the case of the ordinary stave silos the hoops must be kept tightened.

The silos should be conveniently located with regard to both filling and feeding. Space should be provided about the silo for placing of the engine and cutter and for getting the teams and loads to the machine without backing or sharp turning.

The doors of the silo should commence at the ground and should be close enough together to prevent the necessity of excessive lifting of the silage in feeding out.

Blue prints and specifications for the building of silos, as well

*Unpublished data collected by the late S. S. Jerdan.

as other information on silo construction, can be secured by writing to the Agricultural Engineering Department of the Mississippi A. & M. College.

Corn should be harvested for silage when the grains are dented and glazed and the leaves are still green, or the bottom leaves just commencing to turn brown. Where sorghum is used the seed should be well glazed.

Where corn has become dry, water must be run into the silo in order to secure proper packing. This can be accomplished best by running a hose from a barrel or tank into the blower and blowing the water up into the silo. Where the silage is very dry, enough water cannot be carried into the silo in this way and additional means should be employed. The cut corn or stover should be sufficiently moist to pack well on tramping.

The corn or sorghum should be cut into pieces one-half to one inch in length to permit of sufficient packing to exclude air.

The blower pipe should be as nearly perpendicular as possible.

During the filling operation the silage should be well mixed. The silage in the center should be kept rounded up and that around the walls should be thoroughly tramped to exclude air.

With slow filling, more silage is put into the silo because of the settling which takes place during the operation. The disadvantage of slow filling is increased costs.

Refilling is frequently practiced and in such instances any spoiled silage should be removed from the top before starting to fill the second time.

In silo filling there is the possiblity of danger from the formation of carbon dioxide gas. This can be avoided by leaving all doors open above the silage or in case of pit silos by lowering a lighted lantern into the pit before entering. If the light continues to burn there is no danger from this source. If the light is extinguished the gas in the silo may be driven out by setting up a circulation of air by letting the cutter run a few minutes before entering the silo.

There is always some spoiled silage at the top of the silo. Where the silage is properly packed this will probably not exceed one or two tons. Loss from this source may be reduced in the case of corn by removing the ears from the last few loads run into the silo. Straw or weeds are sometimes cut and run into the silo for the purpose of sealing the top. Two or three barrels of water poured over the top will assist in sealing. Oats are sometimes sowed over the top for the same purpose.

Texas seeded ribbon cane is one of the most common and valuable silage crops in Mississippi. Its yield is generally considerably greater and as a crop it is more dependable than corn. Its feeding value ranges from seventy-five to eighty-five percent of that of corn.

FEEDING

On opening the silo all spoiled silage at the top should be removed and the silage should be kept level at all times. Silage should not be thrown down from the silo and allowed to remain in piles to spoil between feeds. Spoiled silage should not be fed to any kind of animals. The feeding of spoiled silage to horses and sheep is especially dangerous. Even slight spoilage of silage may be detected by the moldy odor when a double handful is examined.

Silage gives best results when fed in connection with a small amount of some dry roughage. It is well suited to a ration in which cottonseed meal composes part of the concentrate portion. Because of the higher moisture content, about three times as much silage should be fed as would be fed of dry roughage.

The following silage rations recommended by the Animal Husbandry and Dairy Divisions of the Mississippi A. & M. College have proved satisfactory under Mississippi conditions:

For an eight hundred pound cow producing twenty-five pounds of four percent milk:

30 pounds Corn Silage
12 pounds Soybean or Lespedeza Hay
3 pounds Corn and Cob Meal
1 pound Cottonseed Meal

For wintering two-year old beef heifers and mature cows:

25 pounds Corn Silage
10 pounds low grade Johnson Grass Hay
1 pound Cottonseed Meal

For wintering yearling beef heifers:

25 pounds corn silage
8 pounds low grade Johnson Grass Hay
1.5 pounds Cottonseed Meal

For wintering beef calves:

15 pounds Corn Silage
5 pounds Johnson Grass Hay
1 pound Cottonseed Meal

For fattening two-year old steers:

40 pounds Corn Silage
3 pounds Johnson Grass Hay
5 to 7 pounds Cottonseed Meal

With the latter ration, care should be taken to bring the steers gradually up to a full feed of cottonseed meal. A very satisfactory rule to follow is to start with two pounds of cottonseed meal daily for each steer and increase one-half pound every second or third day until they are getting five pounds for each head per day. Further raises may be made in accordance with the increase in weight of the steers.

ESTIMATED WEIGHT OF SETTLED SILAGE

From Bulletin 164, Missouri Agricultural Experiment Station
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Depth of Silage feet	Estimate weight of Silage to the Cubic Foot at This Depth	Average weight of Silage to the Cubic Foot to This Depth	10 Feet Diameter	12 Feet Diameter	14 Feet Diameter	16 Feet Diameter	18 Feet Diameter
	Lbs.	Lbs.	Tons	Tons	Tons	Tons	Tons
1	32.0	32.0	1.3	1.8	2.5	3.2	4.1
2	32.7	32.4	2.5	3.7	5.0	6.5	8.2
3	33.4	32.7	3.9	5.5	7.6	9.9	12.5
4	34.1	33.1	5.2	7.5	10.2	13.3	16.8
5	34.8	33.4	6.6	9.5	12.9	16.8	21.2
6	35.4	33.7	7.9	11.4	15.6	20.3	25.7
7	36.0	34.1	9.4	13.5	18.4	24.0	30.3
8	36.6	34.4	10.8	15.6	21.2	27.7	35.0
9	37.4	34.7	12.3	17.7	24.0	31.4	39.7
10	38.0	35.0	13.7	19.8	27.0	35.2	44.5
11	38.4	35.3	15.3	22.0	29.9	39.0	49.3
12	38.8	35.6	16.8	24.1	32.9	42.9	54.3
13	39.2	35.9	18.3	26.4	35.9	46.9	59.3
14	39.6	36.2	19.9	28.7	39.0	50.9	64.4
15	40.0	36.4	21.4	30.9	42.0	54.9	69.3
16	40.2	36.7	23.1	33.2	45.2	59.0	74.6
17	40.4	36.9	24.6	35.5	48.3	63.0	79.7
18	40.6	37.1	26.2	37.8	51.4	67.1	84.8
19	40.8	37.3	27.8	40.1	54.6	71.2	90.0
20	41.0	37.5	29.5	42.4	57.8	75.4	95.3
21	41.2	37.6	31.0	44.7	60.8	79.4	100.3
22	41.4	37.8	32.7	47.0	64.0	83.6	105.6
23	41.6	38.0	34.3	49.4	67.3	87.8	110.5
24	41.8	38.1	35.9	51.7	70.4	91.9	116.1
25	42.0	38.3	37.6	54.2	73.7	96.2	121.6
26	42.2	38.4	39.2	56.5	76.9	100.3	126.8
27	42.4	38.6	40.9	58.9	80.2	104.7	132.4
28	42.6	38.7	42.6	61.3	83.4	108.9	137.6
29	42.8	38.9	44.3	63.8	86.9	113.4	143.3
30	43.0	39.0	45.9	66.1	90.1	117.6	148.6
31			47.6	68.5	93.4	121.9	154.1
32			49.3	70.9	96.7	126.2	159.5
33			51.0	73.4	100.0	130.5	165.0
34			52.7	75.8	103.3	134.8	170.5
35			54.4	78.2	106.6	139.1	175.9
36			56.1	80.7	110.0	143.5	181.4
37			57.8	83.1	113.3	147.8	186.9
38			59.5	85.5	116.6	152.1	192.4
39			61.1	87.9	119.9	156.4	197.8
40			62.8	90.4	123.2	160.7	203.3

The table in Bulletin 164 of the Missouri Agricultural Experiment Station does not give the estimated weights of silage or capacities of silos below thirty feet, but the authors state that there is very slight increase in weight per cubic foot below this depth. The estimated capacities below thirty feet in depth are based on the weight of a cubic foot of silage at that depth.

The estimates in this table are based on Kansas and Missouri conditions. As the amount of grain and also the amount of moisture in the silage influence its weight, considerable variation may be expected from the figures given. Silage in Mississippi will usually contain less grain than that in Missouri and Kansas, which would mean a lowering of the capacities of the silos in this state.

Recommendations in Missouri Bulletin 164 in connection with this table are as follows:

1. When the corn is put into the silo in a less mature condition than usual, for example, in the milk stage, or at the beginning of the dough stage, add ten to fifteen percent to the weights given in the table.

2. If the grain is unusually heavy in proportion to the stalk, add five to ten percent to the figures as found by the table.

3. If the corn is considerably past the usual stage of maturity and clearly contains less water than usual, deduct ten to fifteen percent.

4. If very little or no grain is present, deduct ten percent.