

# Beet-Leaf Silage

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One of the more difficult problems in connection with the sugar beet harvest has been the proper harvesting and most efficient conservation of the sugar beet tops for livestock feed. A brief review of some of the attempts made in this direction during the past 40 years should be of interest in connection with a discussion of this latest conservation method which seems to have especially intrigued the popular fancy of many farmers and livestock feeders at the present time.

The pasturing of field-cured, dried beet tops by cattle or sheep has been a common practice throughout the West for many years. Especially in arid climates, field-cured, dried beet tops have been wind-rowed or gathered into small piles in the field in order to help retain sufficient moisture, in such piles, to avoid excessive drying and shattering of the beet leaves. Piling the tops in such a manner avoids trampling by livestock and also keeps the piles accessible in the event of occasional snow storms. In many instances, too, such small piles or windrows have eventually been hauled in from the field and have been stored dry in ricks or stacks adjacent to the feed lot to further reduce surface exposure and where they become more readily accessible for feeding. It is safe to say that, over our entire beet growing area today, the above-mentioned practices in handling beet tops are still, by far, the most common and widespread.

And through the years, too, there have been established some pretty definite values for beet tops handled in such a manner even though it is perfectly obvious that such values can, in the end, only represent average approximations for any feed crop, subject to such vagaries of weather and climate. At any rate, these approximations have given us something to "tie to" in the past, and should be given consideration in evaluating any new harvesting methods suggested for adoption in the future.

For instance: According to results secured in 27 separate feeding tests conducted at Western Agricultural Experiment Stations, the amount of field-cured, dried tops recovered per ton of beets harvested, produced 10 percent of the weight of beets in dry substance and replaced, or was equal in feeding value to, 46 pounds of corn plus 150 pounds of alfalfa hay, or was equivalent to 112.3 pounds of digestible nutrients. These figures then, have made it possible to satisfactorily demonstrate the relatively high feeding value of field-cured, dried tops, that is of course, dried tops which have been given reasonable care at harvest time. But it is also evident that, with such a perishable crop, there are also many chances for heavy nutritive losses to occur with such methods of handling. Consequently, from the start, it has been recognized that some satisfactory system for gathering and siloing the green beet tops would insure a significantly greater recovery and better conservation of their nutritive value.

That this is a fact has been amply demonstrated by tests conducted over a number of years at the Scottsbluff Experiment Station of the Nebraska Agricultural Experiment Station. Exhaustive studies there have proved that

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the tops, from beets grown in a manured rotation with alfalfa hay and siloed in a pit silo, have produced, on the average, 1000 pounds of edible beet-top silage per ton of beets harvested. This silage, fed to lambs or cattle in feeding tests conducted there, has proved equal, pound for pound, in feeding value to good corn silage produced from corn yielding 100 bushels per acre. Obviously then, this properly made beet-top silage is significantly higher in feeding value than the field-cured, dried beet tops. By the same nutritive standards, beet-top silage has provided 181 pounds of digestible nutrients per ton of beets harvested, a 61 percent greater return than that recorded for the field-cured, dried tops.

However, it is also a well-recognized fact that, with the nearly universal acceptance of machine harvest of sugar beets, there have been serious drawbacks to the satisfactory recovery of clean beet tops for siloing. Experience has also demonstrated that beet tops, with a high dirt content, produce a very poor quality silage which gives unsatisfactory results as a livestock feed.

Digressing from the immediate topic for a moment, consider the present attitude of beet growers toward their beet tops. It has been observed that, during the late war years and with the abnormally large profits experienced for livestock feeding operations during that period, many beet growers came to believe that the proper place for their beet tops was under ground; that is, plowed under for fertilizer.

This reminds the author of the time some years ago when some eastern packers were out to see, for the first time, the "wonder crop" beet tops, in the Prospect Valley of Colorado. The fall preceding had been extremely stormy and everyone was hustling to get their beet crop out. In the field they visited, most of the tops had been run over by trucks and had been well mashed into the dirt. A few of the tops were dug out to show the eastern packers what beet tops looked like, whereup one of them said, "Do the cattle have to burrow for them?"

During the past two years, however, there seems to have developed a feeling that this "livestock feeding honeymoon" we have been experiencing is over—at least for the present. There is a crying need to pare feeding costs to the quick and that is where beet tops are quite apt to come back into their own again. This observation has been amply demonstrated by the renewed interest and action in putting up beet-leaf silage during these past two seasons.

This rather circuitous route has been taken to deal with the beet-leaf silage subject because there is not sufficient evidence available to give a final stamp of approval to beet-leaf silage. It can be said, however, that there are, at present, enough field tests and experiments in progress to demonstrate, by this next spring, just how efficient this product is going to be. In the Great Western Sugar Company's territory alone, there are over 50 separate and distinct beet-leaf silage feeding operations in progress at present covering the leaves harvested from some 2,000 acres or 34,000 tons of sugar beets. The company is keeping definite records on these operations.

One of the questions involved with the production of beet-leaf silage has been, "What about the crown?" If, according to the Colorado researchers, the leaf contains only 45 percent of the dry substance of the entire top,

even though it does contain 85 to 92 percent of the carotene and 55 percent of the protein, can we afford to sacrifice the rest of the top? This is a real present day challenge to the manufacturers of beet harvesting machinery because it is not believed there is a single beet harvester on the market today that can do a satisfactory job of harvesting clean green tops for silage along with the harvest of the roots. Furthermore, discerning beet growers are no longer interested in picking up dirty beet tops from a windrow for siloing. The fact is that, the calcareous nature of our western soils is a natural deterrent to the normal fermentation required in silage production and, after all, too much dirt is always detrimental in livestock rations. For this reason, many beet growers have already come to like their beet-leaf silage produced from the leaves and petioles cut from 1 to 4 inches above the crown, even though the ultimate recovery of silage fed is nearer  $\frac{1}{3}$  than  $\frac{1}{2}$  the weight of beets harvested. These beet leaves, by the way, produce a silage with an average crude analysis of 82 percent moisture, 3.9 percent ash, 2.7 percent crude protein, 3.3 percent crude fiber, 0.7 percent fat, and 7.6 percent nitrogen free extract.

Beet growers like the increased efficiency of their mechanical beet harvest after the leaves and weeds have been removed by late models of forage harvesters. One operator claims that, with nothing to interfere with a clear view of the beet row, he has saved an additional  $\frac{1}{2}$  to  $\frac{3}{4}$  of a ton of beets per acre and, with the feed saved, has more than paid for his entire harvesting operation.

Beet-leaf silage is a very attractive and healthful feed when produced in any kind of a silo, provided that the silo has free drainage, which for the production of any silage, but especially for this, is essential. Beet-leaf silage can definitely become spoiled when there is not adequate drainage. The run-off juice has relatively little value containing only about six percent dry substance. While it is possible to absorb and retain a part of this run-off juice with some absorbent material such as dried pulp, corn fodder, or straw, most beet growers have preferred to silo the straight beet leaves. Bean straw has proved to be a very poor absorbent material. Beet-leaf silage can be produced in piles on top of the ground, but due to its high moisture and low fiber content, it has a tendency to pancake without the benefit of some type of retaining walls.

While beet-leaf silage cannot be fed in quite as heavy amounts as corn silage, due to slightly more laxative tendencies, it is being fed to all classes of ruminants with good results and has proved especially valuable where there is need for additional protein in the ration. The only adverse comment heard to date has been from the colder regions. Some have found that its high moisture content has caused some freezing in the silo and in the feed bunk.

The present consensus would seem to indicate that, until such time as some beet harvesting machinery comes up with a better method for the recovery, field forage harvesters will continue to be used in a separate operation to recover the leaves for siloing just ahead of beet harvest. The crowns will be left in the field to be pastured or plowed under for manure.

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