SILAGE AND ALFALFA FOR DAIRY COWS AND THEIR VALUES AS COMPARED TO OTHER CROPS.

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Alfalfa was grown in Rome more than 2,000 years ago and valued very highly then as a forage crop. It has been grown in all parts of Europe for hundreds of years, but it is only recently that the American farmer began to value it as our greatest forage crop. Probably the slowness with which this product has come to the front is due to the lack of understanding its value, the difficulty under which a stand is obtained,—unless proper methods are used in preparing the soil,—and the diseases which prevent its development.

More than fifty years ago some of the German settlers in Carver county, Minn., began growing alfalfa from seed brought with them from Germany, and it has been grown ever since in that county. It has became locally known as "Everlasting" Clover. The name indicates its persistence when once established. Seed has been saved in that county and has been quite well distributed throughout the United States but the general value of alfalfa is not generally known even at the present time.

For seven years it has been my good opportunity to note the success Hoard's Dairyman farm has had in growing alfalfa. About fifteen years ago, former Governor Hoard began to experiment with the growing of alfalfa. W. A. Henry, then Dean and Director of the Wisconsin Experiment Station, also made some atttempts to grow this plant. The results were discouraging, and the conclusions were that it was almost useless to attempt to grow this plant under Wisconsin conditions. But Ex-Governor Hoard did not dispair and as he had a number of vacant lots in Fort Atkinson, he began a detailed study of the plant. Finally, after mastering a few of the fundamental principles, he was successful in growing it on his farm. It is now grown with as much assurance, if not more, than red clover. At the present time the farm is growing 60 acres. For a while wood ashes, as well as manure, were used freely upon land on which alfalfa was to be sown, but after we learned what Dr. Hopkins of the Illinois Experiment Station had to say of the value of ground limestone and phosphorus for alfalfa, these materials have been used according to his directions. It is the practice now on Hoard's Dairyman farm to apply eight or ten loads of manure to an acre, using 40 to 50 pounds of raw rock phosphate to each load. Where it is possible, the land is plowed in the fall, turning the manure under. In the spring

before seeding alfalfa, about two tons of either ground limestone or marl are applied per acre.

The feeding value of alfalfa depends to no small degree upon the process of curing. If it is permitted to dry in the swath, the sun dries the leaves and bleaches the alfalfa which carries off some of its nutrients or at any rate makes them less usable and makes it less palatable. In handling it, after it is cured in the swath, a large amount of the leaves are lost and the leaves are the most nourishing part of the alfalfa.

On Hoard's Dairyman farm, alfalfa is cured in cocks weighing from 70 to 80 pounds each. It is cut in the forenoon and raked up into windrows and put into cocks in the afternoon. The cocks are then covered with a quality of "A" sheeting, torn into strips 40 inches square; to each corner of the square or cap is tied a small weight which may be made of cement, or nuts weighing 4 ozs. may be used. These weights are attached to the corners of the cap to prevent the wind from blowing them off and to hold them firmly over the top of the cock of hay so that it will shed water. It will take from two to three days to cure it sufficiently in this manner. An hour before it is time to draw the hay to the barn the cap should be removed and the cock opened up to permit the air and the sun to take up the surplus moisture. Alfalfa cured in this way produces the very best quality of hay. If it rains the cocks do not become soaked and the sun does not destroy any of the nutrients.

When we come to consider the composition of alfalfa, we at once begin to realize its value to the dairy industry. On land that would yield fifty to sixty bushels of corn per acre, it is not unreasonable to expect it to produce from three to four tons of alfalfa hay. In four tons of alfalfa hay there are 4,000 lbs. digestible nutrients of which 880 lbs. are digestible protein.

Professor Fraser, of the Illinois Experiment Station, found by experience that alfalfa hay was practically equal to bran. The cows fed on alfalfa were in better physical condition than those receiving bran. Of course, he fed a very high grade of alfalfa hay. It was cut at the right time and cured properly. It should be observed that alfalfa hay is rich in the element protein and therefore supplements corn silage very well which is comparatively rich in the element carbohydrates. An acre of land that will produce fifty to sixty bushels of corn will yield in the neighborhood of ten tons of green corn per acre. In ten tons of corn silage there are 3440 lbs. of digestible nutrients of which 280 lbs. are digestible protein. It should be observed that the alfalfa produced 4,000 lbs. digestible nutrients of which 880 lbs. were digestible protein. For a moment let us consider these crops

with a few others. It requires pretty good land to produce 1½ tons of timothy hay per acre. In 1½ tons of timothy hay there are 1443 lbs. nutrients, and 84 lbs. digestible protein. It is not unreasonable to expect that an acre of alfalfa will produce 10 times more protein than an acre of timothy.

Perhaps it will be interesting to learn the kind of a ration that may be made of silage and alfalfa. It has been found that an animal fed nothing but these feeds will consume about 40 lbs. of silage daily and 16 lbs. of alfalfa hay. In the following, I tabulate the pounds of feed used, dry matter and digestible nutrients in them.

Name of Feed.	Lbs.	Dry Matter.	Protein Lbs.	Carbohydrates. Lbs.	Fat Lbs.
Silage..	40	10.6	.56	5.6	.28
Alfalfa.....	16	14.8	1.77	6.3	.10
Total nutrients....	.....	.....	2.33	11.9	.38

According to Professor Haecker's feeding tables, a cow producing 25 lbs. of 4 per cent milk requires 1.9 lbs. digestible protein, 12.82 lbs. digestible carbohydrates and .5 lb. digestible fat.

It will be noted that a ration of silage and alfalfa supplies more protein than necessary for 25 lbs. of 4 per cent milk and not quite as much carbohydrates or fat as the animal needs, but since protein will take the place of carbohydrates, the ration contains enough nutrients to produce 25 lbs. of 4 per cent milk.

There is no question when there is an abundance of grain at reasonable prices, that it pays to feed some when cows are producing 20 lbs. or more of milk per day, but when less than this is produced, it is very doubtful whether it pays to feed any concentrates when there is plenty of good silage and alfalfa at the farmer's command.

There is another point which we might consider. One acre of ground yielding four tons of alfalfa will support an animal with 16 lbs. a day for 500 days. In other words 1.37 acres of land on which is grown corn and alfalfa will produce enough feed to keep a cow 365 days; 1.37 acres of blue grass pasture supports an animal on the average but 78 days.

The severe drought of the past summer is not so long ago but that most of us remember the difficulty of supplying cows with succulent feed during that period, but farmers who had grown alfalfa and provided themselves with silage, did not notice the effects of the drought like those who were depending entirely upon pasture to feed their animals.

The question may be asked: Will cows do well if fed the entire year upon silage and alfalfa? To this it may be said that in experiments carried on by the Illinois Experiment Station cows fed entirely upon silage and alfalfa for a year were at the end of that itme in good physical condition and produced creditable yields of milk.

Cow No. 1 produced 8,735 lbs. of milk containing 351 lbs. of fat; she consumed 14,880 lbs. of silage and 1,672 lbs. of green crops and 6,396 lbs. of alfalfa. In other words for each 100 lbs. of milk produced she consumed 170 lbs. corn silage, 19 lbs. of green crops and 73 lbs. alfalfa hay. Cow No. 2 produced in one year 7,434 lbs. of milk containing 259 lbs. of fat. She ate 14,862 lbs. of silage, 1,612 lbs. green crops and 5,588 lbs. of alfalfa hay.

In comparing the relative value of timothy hay and alfalfa it was found that when milk was worth $1.30 per hundred and timothy hay valued at $10.00 per ton, that alfalfa was worth $20.86 per ton and gave a return per acre of $68.44 more than an acre of timothy.

In briefly summing up this subject, I can say:

First: There are no crops grown upon the farm more important to the dairy farmer than alfalfa and corn.

Second: Alfalfa will produce more digestible nutrients per acre than any other agricultural crop. A yield of 4 tons of alfalfa hay per acre produces 4,000 lbs. of digestible nutrients, 880 lbs. of which are digestible protein.

Third: Corn comes next to alfalfa in the production of nutrients for the cow. An acre yielding ten tons of green corn will produce 3,440 lbs. of digestible nutrients, 280 lbs. of which are digestible protein.

Fourth: No crops compliment each other better for feeding the dairy cow than silage and alfalfa. The silage furnishes succulence for the cow and a large amount of heat producing elements. Alfalfa provides the dry roughage; is rich in the element protein and mineral matter which are so important to the growing of animals and to cows producing milk.

In short: Alfalfa and silage have a productive feeding value that cannot be excelled by any other combination of roughage grown on the farm.

Fifth: When alfalfa is used properly in a rotation, it is beneficial to the soil but it is a mistaken idea to think that the alfalfa plant enriches the soil. It must be fed to live stock on the farm if the greatest value is to be obtained as a soil improver.

DISCUSSION.

A Member: How is alfalfa for horse feed?

Mr. Glover: Horses may be fed alfalfa in limited amounts. In the West, livery horses, work horses, both farm and city, receive alfalfa hay entirely. But if you attempt to feed them as much alfalfa as you do timothy, you are apt to have kidney trouble.

Mr. Goodrich: My oldest son's horses have had no other roughage than alfalfa for as much as ten years and their grain is corn, and now the horses have all the alfalfa they want to eat.

Mr. Everett: I don't like the way the growing of alfalfa has been left before the farmers in this convention. The farmers of Rock county want to know how to grow alfalfa. They are not going to Kansas for soils or into the quarries for lime. They can do it without cost, right on their own farms. You can tell them how to do it without sending away for any special preparation for inoculating the soil.

Mr. Glover: I did speak of sweet clover. Undoubtedly there is soil right here that will grow alfalfa without doing anything to it.

When I speak about adding lime to your soil, I assume that the soil is acid and acid soil needs lime. I have simply mentioned what must be done to put the soil in the right condition for growing alfalfa. You can't grow alfalfa on land unless it is inoculated. I will qualify that. If your land is very rich in nitrogen the plant will live on the nitrogen that is in the soil, but to force the alfalfa to receive its nitrogen from the soil is not wise. You want the plant to bring the nitrogen out of the air and enrich the soil. If your land is not already inoculated, and you have sweet clover in your neighborhood, I would advise you to put four or five hundred pounds on an acre and disk it in just before seeding. I would not take the chances of trying to get along without inoculation, and I would not take the chances of the soil being sour.

A Member: How deep do you have to dig with the shovel to get the inoculation?

Mr. Glover: You can go down a foot, but if you take off the first six inches it will be better.

Mr. Emery: I know of a farm where the soil is clay loam, it has been well fertilized by barnyard manure. The young man, in sowing timothy and clover, has mixed in from year to year a small amount of alfalfa seed. This year being very dry I have observed on this field of about fifteen acres where there was only one crop taken off, that, in the latter part of the season all over this field were alfalfa plants from a foot to a foot and a half high,—scattered plants, not enough

to make a crop, but it was uniform and those plants were green and vigorous. Now, if I have stated the facts correctly, would you infer that if that field were sown to alfalfa that a good crop should be expected?

Mr. Glover: You might get a good crop. The practice of adding a little seed with clover for a year or two before you seed it entirely to alfalfa is a good one. In that way you get your ground inoculated, because these seeds carry some nitrogen gathering bacteria.

Mr. Dougan: We are trying out a little experiment at my place. We sowed one strip that was inoculated and another that wasn't. On the strip that we did not inoculate we could not find a single nodule. not one,—while on that which we did inoculate we could not find a plant that was not inoculated. I am trying an experiment for the University. I have put on lots of cow manure and it is doing all right but I am sure the land needs phosphorus. We have plants about two feet high but there are no nodules on the roots.

A Member: Which one of the crops do you use for seed?

A Member: Where is the best seed to be obtained for our use here?

Mr. Glover: Seed for this latitude should be secured from people growing seed in this latitude and it is desirable not to use seed grown upon irrigated land. Montana seed would be good where it is grown without being irrigated.

A Member: In feeding alfalfa hay wouldn't that inoculate the manure?

Mr. Glover: Yes. They don't know exactly how long the inoculation will stay in the ground, but it is safe to say four or five years.

Mr. Everett: The alfalfa seed should be submitted in all cases to the Wisconsin Agricultural Station. They will examine it without expense.

Adjourned to meet at 1:30 P. M.

Met at 1:30 P. M. Friday, Nov.17, 1911.

President Griswold in the chair.