IMPROVING THE QUALITY OF ROUGHAGE AS AN AID TO WARTIME FEEDING OF DAIRY CATTLE

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Wartime demand for increased production of animal food products has caused an acute shortage of protein feeds. During the winter feeding season of 1942-43, suitable protein supplements were sometimes unobtainable by dairy farmers as well as by the feeders of other classes of livestock. It is likely that a similar condition may continue throughout the war period. What procedures can the dairy farmer follow to reduce the need for protein feeds and still maintain a high level of milk production?

One of the answers to this question is that improving the quality of the roughage part of the ration will not only increase the amount of protein which the roughage contributes, but will also furnish (a) more total nutrients (through increased consumption of more appetizing feed), (b) more vitamins, (c) more minerals, and (d) will enchance the thriftiness of the animal.

Increasing the fertility level of the soil is one of the effective ways of improving the protein content of forages. In experiments conducted at the University of Illinois, it was found that heavy applications of barnyard manure to bluegrass pastures during four consecutive years not only more than doubled the yields of dry matter, but increased the protein content to such an extent that the yields of protein from the fertilized plots were nearly three times as great as from the unfertilized areas. The percentage of protein in the fertilized forage was about one-sixth higher than that in the forage from the check plots. In subsequent experiments it was found that samples of forage harvested at monthly intervals from bluegrass plots heavily fertilized with a nitrogen fertilizer during four seasons contained 17.6 per cent protein in the dry matter, while forage from an untreated plot contained only 12.1 per cent protein. Applying these results to feeding practice, it means that a satisfactory supplement to well-fertilized pastures which supply ample forage may consist of a mixture of ground farm grains without the use of any high protein feeds. It also means that nitrogen fertilization of grass meadows will enhance the protein content of hay crops and thus lessen the need for purchased protein in winter feeding.

Fertilization also increases the protein and mineral content of corn. Snider reports these differences in the protein content of corn grown recently on the Morrow plots at the University of Illinois: 4.5 pounds of protein per bushel of grain from the plot planted continuously to corn without soil treatment since 1876; 6 pounds of protein, or one-third more, per bushel of grain from plots used in a corn-oats-clover rotation and treated with manure, lime, and phosphate. Even the stalks and cobs from the fertilized areas were higher in protein and mineral.

Higher quality hay than is usually produced can be made by (a) harvesting at an earlier stage; (b) using greater care in conserving leaves; and (c) using forced ventilation to remove excess moisture after the hay has been placed in the mow.

Red Clover in Illinois is commonly harvested for hay after one-half to two-thirds of the heads have turned brown. At this stage the hay is usually dark colored (low in carotene), stemmy, and relatively low in protein. These conditions can be corrected to a considerable extent by harvesting at the half-bloom to full-bloom stages and before the heads turn brown. It is likewise true of most other hay crops that early harvesting aids in the production of a more leafy, higher-vitamin, and higher-protein roughage.

The leaves of hay contain from two to three times as much protein per pound as the stems. Practices which aid in saving leaves are (a) windrowing soon after mowing, or at the time of mowing by the use of a windrower attachment;

(b) turning the windrows for curing only when the leaves are still sappy or the crop is damp from dew; (c) using well-designed and carefully-operated machines which pick up the windrow with a minimum loss of leaves.

Forced ventilation experiments at the University of Illinois have shown that air forced through cheaply-constructed wooden ducts on the floor of the hay mow by means a motor-operated blower will permit shortening of the field-curing period and storage of the hay while it still contains enough moisture for the retention of most of the leaves. Hay cured in this manner is higher in protein, mainly because of a greater retention of leaves, and is also higher in carotene levels and in palatability. The feeding of hay of this kind results in increased consumption and thus aids in reducing the needed amounts of purchased protein feeds. The feeding of four extra pounds of high-quality legume hay supplies as much protein as one pound of a protein supplement such as linseed meal or soybean meal. Increasing the quality of hay, therefore, means not only a higher protein content in the hay, but a much greater protein intake from the roughage portion of the ration because more of the hay will be consumed.

Harvesting of crops such as alfalfa and soybeans for silage to replace corn for this purpose is a further step toward the saving of purchased protein feeds. This procedure also has the advantage of making a better-quality roughage from these legume crops than can be done when attempts are made to cure them for hay under extremely adverse weather conditions. When legume silage is fed, the protein content of the grain mixture may be less to the extent of 1 to 2 per cent than when corn silage is fed.

[1]Snider, H. J., Feeding Value also Declines. Hoard's Dairyman, 88, No. 8, p. 250, 1943.