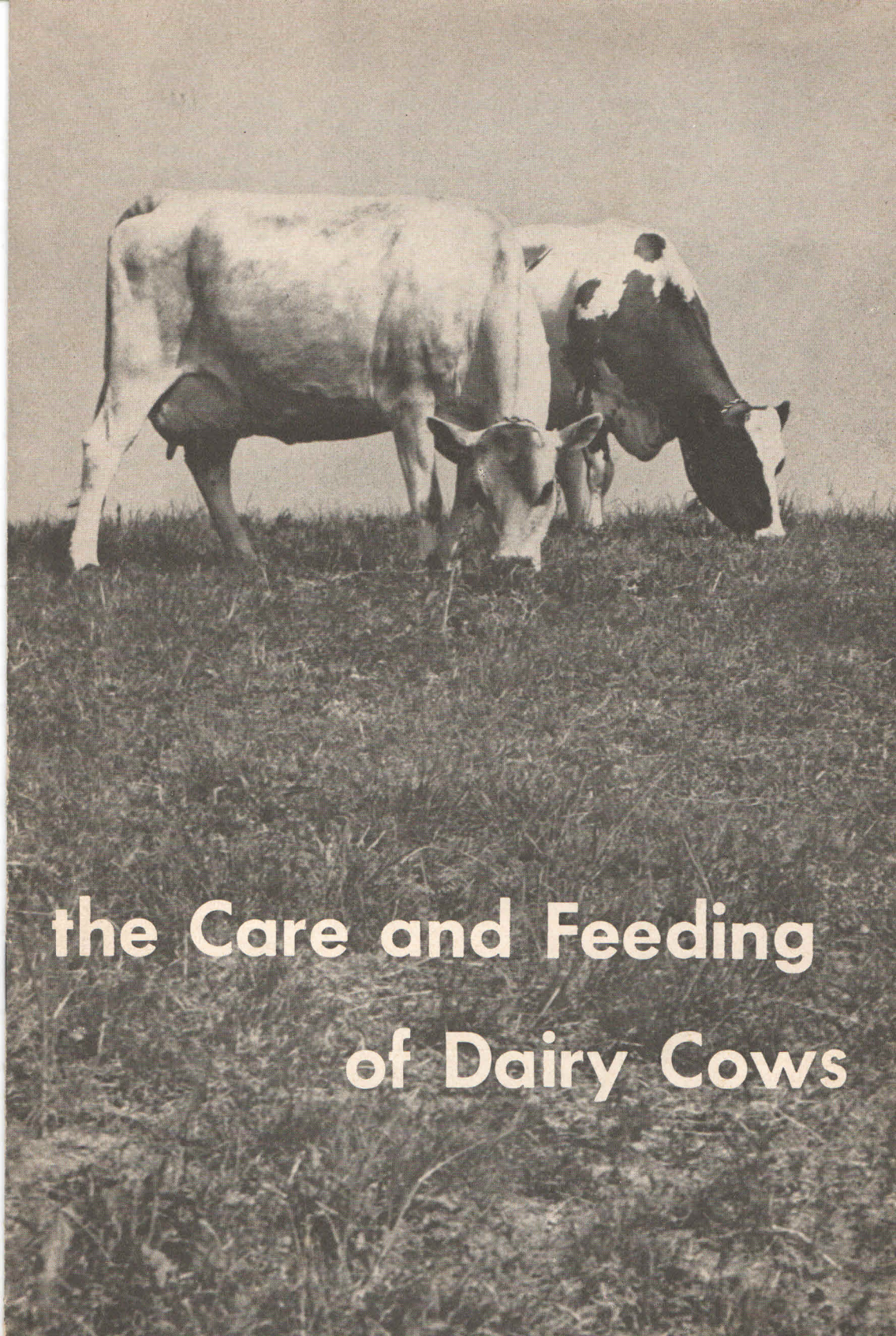


the Care and Feeding of Dairy Cows

Successful dairy farming depends largely upon the kind of feed and care which the cows receive. It is true that cows must have inherited ability for milk production before they can produce economically. However, in this state where under-feeding is so prevalent, due to lack of home grown feeds, the authors wish to emphasize good feeding and care as they relate to economical milk production.

Information derived from 25 years of Dairy Herd Improvement Association work in North Carolina proves conclusively that the low unprofitable production of many cows in this State is largely due to poor feed and care rather than a lack of inherited ability to produce milk. Many instances could be cited to show how both production and profits have been increased by good feed and care. Here is one example.

During 1917 complete feed and milk production records were kept on a herd of 11 mature Jerseys at Willard, N. C. The cows received only a medium amount of feed, but were fed better than nearby herds. Average milk production for the year was 4,240 pounds of milk containing 206 pounds of fat. During 1918 these same cows were given a full ration of feeds like those used in 1917. Feeding and milking was done twice daily in both years. On this full ration average production was 7,125 pounds of milk containing 352 pounds of fat, or an increase of 68 per cent in milk and 70 per cent in fat.

Although more feed was consumed during the second year the feed cost of producing 100 pounds of milk was 27 per cent less than that during the first year, due to the greater milk production.

The average North Carolina cow produces only about 196 pounds of butterfat annually. If by good feeding and care this could be increased 70 per cent or to 342 pounds it would amount to a total increased production of 50,619,000 pounds of butterfat annually by the 359,000 dairy cows in the State.

August, 1952 (Reprint) Extension Cir. No. 193

Published By
THE NORTH CAROLINA AGRICULTURAL EXTENSION SERVICE

North Carolina State College of Agriculture and Engineering of the University of North Carolina and the U. S. Department of Agriculture, Cooperating. State College Station, Raleigh, N. C., D. S. Weaver, Director. Distributed in furtherance of the Acts of Congress of May 8 and June 30, 1914.

Feeding and Care of Dairy Cows

By J. A. AREY and A. C. KIMREY
Dairy Extension Specialists

HOW THE DAIRY COW USES HER FEED

A knowledge of the many uses which a cow makes of her ration will aid in showing the necessity for adequate feeding.

Approximately one-half of the ration is used in repairing worn out tissue and maintaining body heat and energy. This is known as the maintenance ration and for it the dairyman receives no direct return. It must be supplied, however, before the cow can perform the functions for which she is kept.

The unborn calf receives its food from the mother. Although the amount needed for its development is not large, it must come from the feed consumed. The immature cow requires feed for growth in addition to that for maintenance. If this feed is not available the good immature cow will draw on her own body to provide materials for milk and thereby slow down her growth.

During the dry period and the latter part of the lactation period, a part of the ration is used to store up a reserve of body fat which is used immediately after calving. There is a short period after calving during which a good cow produces more milk than the feed nutrients contained in the ration will justify. Unless a reserve is available to be used during this period the cow will deplete her body to provide material for milk production. After meeting all body requirements the remainder of the ration is used for milk production. The cow can not do her best in milk production unless she is provided with sufficient feed to adequately meet all her requirements.

NEED FOR A FULL RATION

In this State where underfeeding of dairy cows is so general, too much emphasis can not be placed on the feeding of a full ration. By this is meant feeding each cow to her full capacity for milk production. The dairy cow resembles a factory in that she produces most economically when operating at full capacity. A cow capable of producing around 260 pounds of butterfat in a year uses about 50 per cent of a full ration to maintain the body. The other 50 per cent of the ration is used for producing milk. Since

she must maintain her body out of her feed before any milk can be produced it is poor economy not to give her enough feed, in addition to that required for maintenance, so that she can make full use of her milk producing ability. For a dairyman to feed less would mean that he would be cheating himself by stinting on the only part of the ration used for milk production.

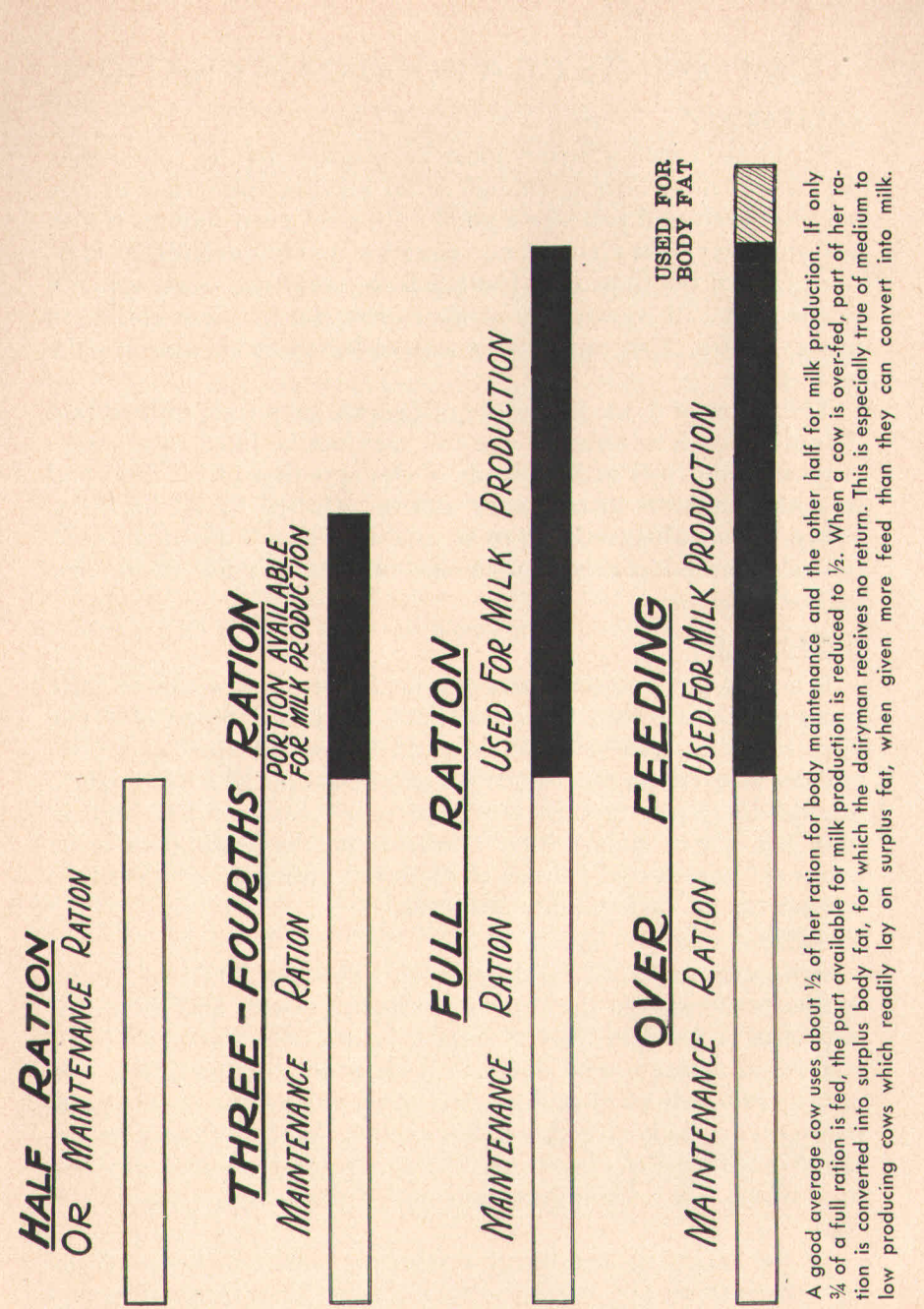
In determining the capacity of a cow to convert feed into milk she is fed all the roughage, including hay and silage, that she will eat. The grain, however, is fed in proportion to the amount of milk produced and it is necessary to make one or more trials, in order to determine the amount that she can profitably use. For example, a cow may be producing 32 pounds of milk daily and receiving only 10 pounds of grain. The feeder desires to know if an increase in grain would result in a profitable increase in milk. In order to determine this he should gradually increase the amount of grain to 15 pounds and at the same time watch the milk sheet. If a satisfactory increase in milk production takes place, it shows that the cow was not being fed to full capacity and the increased feed should be continued.

On the other hand, if there is no increase in milk the grain allowance should be reduced to the original amount, since the cow was receiving all the feed she could convert into milk.

Feeding a full ration does not mean over-feeding, which is occasionally done and which is not an economical practice. It just means the feeding of each cow according to her ability to produce milk economically. The diagram on page 5 illustrates the importance of feeding a full ration and the loss which may result from over-feeding.

FEED HOME-GROWN FEEDS

Feed for the dairy cow, in so far as practical, should be produced on the farm. Commercially speaking, the cow is a marketing agent for farm feeds, and if her feed is grown on some other farm or in a distant section transportation and handling costs are involved and the cow is handicapped from the start in converting such feed into profitable milk and butterfat. North Carolina farms will produce legume hay, silage crops, corn, cotton seed, soybeans, peanuts, small grains and good pasture—all the necessary feeds for profitable milk production.



A good average cow uses about ½ of her ration for body maintenance and the other half for milk production. If only ¾ of a full ration is fed, the part available for milk production is reduced to ½. When a cow is over-fed, part of her ration is converted into surplus body fat, for which the dairyman receives no return. This is especially true of medium to low producing cows which readily lay on surplus fat, when given more feed than they can convert into milk.

COMPONENTS OF A GOOD DAIRY RATION

PALATABILITY

To be palatable a ration must be pleasing to the cow's taste. A cow will not consume enough of an unpalatable ration to support her body and produce a good milk flow, even though it may contain every food element necessary for maximum milk production. One of the objects in feeding is to tempt the cow's appetite so that she will consume feed up to the limit of her ability to produce milk. This can only be accomplished by the use of palatable feeds.

The tastes of cows, like those of people, vary with individuals. A feed which is relished by one cow may not be liked by another. A good feeder will make a study of the appetites of his cows and combine his feeds so that they will be relished by all his cows. When unpalatable feeds are to be used they should be mixed with palatable ones. Molasses is often used on feeds to make them more palatable.

DIGESTIBILITY

It is only the digestible part of a feed that the cow uses in milk production. Any feed that contains a high percentage of crude fiber is low in feed value and should be looked upon as a filler and not a real dairy feed. Corn is a good example of a feed high in digestibility while cereal straws represent feeds or fillers high in fiber but low in digestibility. The table on the inside back cover shows the number of pounds of digestible nutrients contained in 100 pounds of various common feeds.

VARIETY

Variety in the cow's ration adds to its palatability and insures against a shortage in the supply of mineral matter and the different forms of proteins. A cow in good health never fails to relish a ration containing several different feeds while she tires of one containing only a limited number and often refuses to eat enough to maintain her body and a good flow of milk. Variety is more important in the ration of a heavy producing cow than in one of medium production, since the former consumes a much larger quantity of feed.

In the ration of the heavy producing cow (when on official test) there should be at least seven different feeds in which would be included a succulent feed, a legume hay and five or more different concentrate feeds.

A ration composed of a succulent feed, legume hay, and at least three, preferably four, different concentrate feeds contains sufficient variety to meet the needs of a cow producing a good medium flow of milk such as would be expected in a commercial herd.

SUCCULENCE

A succulent feed is one with a high water content. Good examples are pasture, silage and soiling crops. Such feeds furnish a cheap source of feed nutrients and because of their succulence tend to keep the digestive system in good order. One should be included in the ration throughout the year.

VITAMINS

If cows are on pasture during the summer months and are fed good legume hay during the winter months, together with a grain ration made up of at least three ordinary grains, there will be no lack in the ration of any known vitamin that is essential to the production of milk or the maintenance of health in the animal.

BALANCE

When a ration supplies the right amounts of food nutrients necessary for body maintenance and milk production it is balanced. The different feeds in a ration have definite functions to perform in the body and no one can wholly replace the other. For example, carbohydrates can not perform the functions of proteins; however, to a limited extent, protein can take the place of carbohydrates. Therefore, it is important that all rations contain the right ratio of protein to carbohydrates, or else milk production will be reduced in proportion to the shortage of protein in the ration. In the milking cow's grain ration, the ratio of protein to carbohydrates should be about 1:4.

BULK

Bulk in the grain ration is desirable because it aids in digestion. A loose bulky grain mixture is more easily penetrated by the digestive juices than is a heavy mixture unless the heavy mixture is fed on the silage.

Bulky grain mixtures are especially desirable for heavy producing cows since heavy producers eat large quantities of grain. A grain mixture containing bulky feeds such as corn and cob meal, wheat bran, ground oats, ground barley or beet pulp and weighing about one pound per quart has enough bulk.

COMMON CONCENTRATE FEEDS CLASSIFIED ACCORDING TO BULKINESS

Bulky	*Compact or Heavy*
Corn and cob meal	Gluten meal
Wheat bran	Cotton seed meal
Ground oats	Soybean meal
Dried beet pulp	Peanut meal
Dried brewer's grains	Corn meal
Ground barley	

COST

In making up a ration, cost is an important factor. Good grazing and home grown legume hays and grains are feeds which can be used as a basis for a good low cost ration. Where the herd is large enough to justify a silo the ration can also be cheapened by the addition of silage. In purchasing concentrates, those should be selected which will balance with the roughage available.

With this in mind and with due consideration given to variety and bulk, grain feeds should be selected which will give the greatest amount of digestible nutrients at the lowest possible cost. To do this, the relative cost of each item in the different concentrates should be considered. For example the cost of a pound of digestible protein in cotton seed meal should be compared with that in linseed meal and other high protein concentrates.

The table on the inside back cover can be used to determine the relative cost of a pound of digestible protein in different feeds. The same should be done to determine the relative cost of carbohydrates in the feeds high in this nutrient.

FEEDING DURING SUMMER

PASTURE

Pasture is the most important single factor in the economy of dairying. This is true because it touches in a vital way every phase of dairying. It enables more acres on the dairy farm to be profitably used. Young dairy stock can not be economically grown out without pasture. The health and long life of the herd depends largely upon the kind and amount of grazing provided.

Without succulent green grazing the milk produced by the cows will not be of the highest nutritive value and dairying is seldom profitable unless abundant pasture is used. These are but a few of the facts about pasture and its place on the dairy farm.

The average sized cow can eat in a day only enough grass to maintain her body and produce about two gallons of milk. If her ability to produce is greater, she must have her fill of grass supplemented with nutrients in a concentrated form such as ground grains, or else she can not maintain her body weight and produce her maximum flow of milk.

Cows grazing on good pasture and producing more than 17 pounds of milk per day should be fed a grain mixture containing 13 to 16 per cent digestible protein, depending somewhat on the proportion of legumes in the pasture. This should be fed at the rate of one pound for each four to six pounds of milk they will produce in a day. This amount will usually be sufficient as a supplement to good pasture to maintain the flesh of the cow and permit highest milk production.

Good pasture furnishes one of the cheapest and best dairy feeds.

SUPPLEMENTARY GRAZING

On most dairy farms the grazing season can be greatly lengthened by the use of supplementary grazing crops. This grazing can also be used to advantage during the mid-summer season when permanent pastures are often not adequate to meet the requirements of milking cows.

The most commonly used crops for this kind of grazing are cereal grains, crimson clover, lespedeza, rye grass, sudan grass and German millet. These crops furnish excellent grazing at those

times of the year when the milk supply is usually low and the demand great. There is also evidence that when milking cows are supplied with lush grazing they tend to better assimilate the feed nutrients contained in their other feeds. In addition, no better source of vitamins and minerals is available to the dairy cow than is furnished by such grazing.

SILAGE

Silage has its place in summer feeding as a supplement to short pasture. On farms where silage crops yield well, they will furnish a cheap and more convenient supplement to short pasture than will soiling crops. It is well to feed a reasonable feed of silage in the morning for the first several days that the cows are turned on pasture in the spring. This prevents gorging on the tender watery grass, which tends to scour the cows.

HAY

The main use for hay in summer feeding is to supplement short pasture where neither temporary crops nor silage is available.

FEEDING DURING THE WINTER

Successful winter feeding means imitating early summer conditions as near as possible. The dairy cow is by nature a roughage consuming animal and does her best when supplied with plenty of roughage. In winter this roughage should be a legume hay and a succulent feed. The better the quality, the more of the required nutrients will be received from this roughage and the smaller the amount of grain that will be needed.

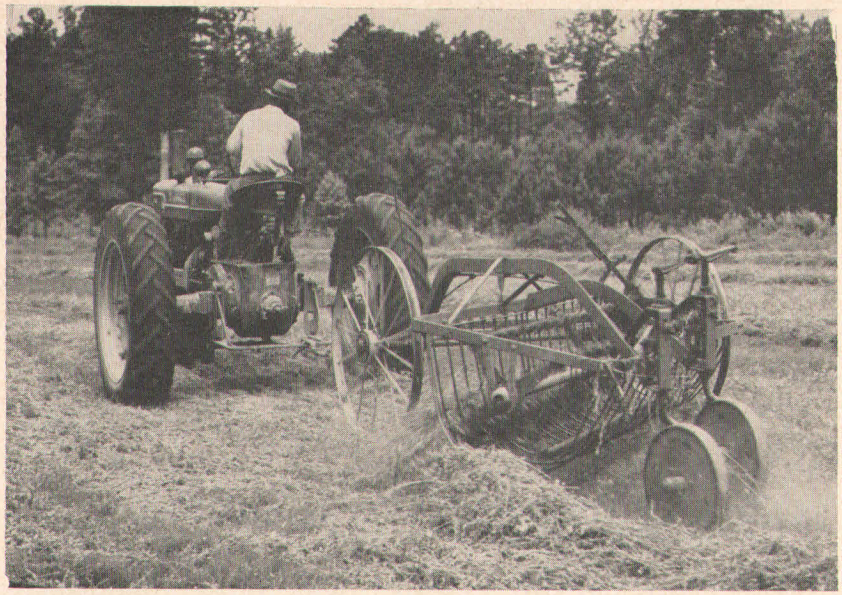
COMMON ROUGHAGE

In addition to legume hay, cows may profitably consume a certain amount of common roughage, such as grass hay and straw from threshed grain. This may best be fed during the day in racks placed in the lounging shed or other places where the cows are accustomed to spend the time between milking periods.

SILAGE

The use of silage as a source of succulence in winter feeding is widespread and the economy of its use is rarely questioned. The crop to be used for silage sometimes constitutes a question, however, the most commonly used crop is corn and it is the most widely adapted one. The yield on good land is greater than with most other crops and the total feed nutrients produced per acre is probably greater than any other crop.

Silage should be fed liberally during the winter. Cows will eat about three pounds per day for each 100 pounds of live weight. A 1,000-pound cow will eat about 30 pounds of silage during the day. The grain ration is often mixed in the manger with the silage.



Good legume hay is one of the necessities for economical milk production.

LEGUME HAY

The amount of legume hay that each cow will need will depend upon size of the cow, length of the grazing season and amount of succulent roughage available for winter feeding. Under average conditions in this State around two tons of good legume hay should be provided for each mature cow.

Alfalfa makes our best legume hay for the dairy cow, and when properly seeded on well-prepared, fertile soil, it can be grown all over the state. In fact almost every legume commonly grown for hay in the United States grows well over the greater part of North Carolina.

ROOT CROPS

When silage is not provided, root crops such as mangel-wurzels and turnips may be grown and fed much in the same way as silage. In feeding root crops they should be chopped in long strips, in order to prevent choking. Roots should be fed at about the rate that is recommended for silage. If turnips are used they should be fed after milking to avoid undesirable flavors in milk.

BEET PULP

Dried beet pulp, when soaked in three times its weight of water for about 12 hours, makes a fine succulent feed, but is usually rather high priced as compared to silage and other succulent crops. It is an excellent succulent feed for high producing cows that are receiving a heavy grain ration containing a high per cent of protein. It is palatable and seems to have a cooling effect on the cow. It is regarded very highly by most feeders for cows that are on production tests and may be fed at the rate of four to eight pounds of dry pulp per day, depending upon the size of the cow.

GRAIN

Grain feeding should always be considered as a supplement to available roughage. Many feeders rely too much upon concentrates to produce their milk. This boosts feed costs and often weakens the cow's health due to over feeding of concentrates.

The following feeding practice is suggested by the Beltsville Experiment Station: Feed each cow about three pounds of silage for each 100 pounds of live-weight. A cow weighing 800 pounds would receive 24 pounds of silage. Twice a day give each cow all the legume hay she will eat exclusive of stems and weeds. To Jersey cows yielding less than 10 pounds of milk daily, give no grain, but for every pound over 10 give 0.6 of a pound of grain. For example, a Jersey cow giving 20 pounds of milk would receive six pounds of grain; one giving 30 pounds of milk would receive 12 pounds of grain. Guernseys should receive about 0.55 of a pound of grain for each pound of milk above 12, Ayrshires about 0.45 of a pound of grain for each pound of milk above 14, and Holsteins 0.4 of a pound of grain for each pound of milk above 16.

On this basis, a Holstein cow producing 30 pounds of milk would receive 5.6 pounds of grain, whereas one giving 40 pounds would receive 9.6 pounds of grain. When the quality of the hay fed is poor the cow will eat less of it. Therefore, more grain will be required. On the other hand if the hay is of the best quality the cows will eat more of it and less grain than that specified will be required.

Different cows have different capacities for consuming feed and making it into milk. So the various rules for grain feeding can at best serve only as an indicator for the inexperienced feeder.

The successful feeder quickly recognizes the cow that has natural capacity for producing large quantities of milk and sees to

it that she has feed enough to permit maximum production. He is just as alert to notice the cow that has little ability as a milk producer, and takes care that she does not receive more feed than she can profitable utilize, thus preventing useless fattening which results in feed waste.

If each cow is studied as an individual it is easy to determine the point beyond which an increase in the grain ration would be unprofitable.

FEEDING THE DRY COW

All good dairymen agree that cows should have a rest between lactation periods as they will then produce more milk annually than if milked continuously. There may be some disagreement as to how long the rest period should be, but it is generally thought that six weeks is sufficient if the cow is in good flesh. Otherwise the period should be longer.

During the dry period, if plenty of good pasture is available and the cow is in good flesh, no other feed will be necessary; however, the dry cow should have free access to a suitable mineral mixture, unless the grazing is legume crops or legume hay is being fed. Care should be taken that the cow does not lose flesh due to unexpected shortage in pasture.

If pasture is short or the cow is in medium flesh enough concentrate should be fed to put the cow in good flesh before freshening. However, all high protein grains and most of the corn is removed from the grain ration by many good feeders about two weeks before freshening. A good grain mixture to feed during this period is composed of equal parts of wheat bran and ground oats.

In winter only sufficient concentrates should be fed the dry cow to put her in good flesh. Possibly no better practical winter ration for the dry cow can be had than legume hay and corn silage together with three to five pounds of a ration containing around 16 per cent protein, with most of the protein coming from either linseed meal or soybean meal.

For the last two weeks before freshening the grain ration should be restricted to laxative grains such as wheat bran and oats and be reduced in amount, if it has been fed heavily during the dry period. This ration is slightly laxative. Many good herdsmen make it a custom to give the cow one pound of epsom salts a day or two before she is due to freshen.

FEEDING THE FRESH COW

The feed for the first few days after freshening should be very limited in amount. The first day the grain feed should be restricted to bran mash, for the following four days feed a mixture of wheat bran and ground oats, equal parts. A reasonable amount of legume hay and a small amount of silage may be fed at all times during the freshening period. On or about the 5th day after freshening the cow may be started on the regular milking ration and gradually brought to full feed over a period of around three weeks from the freshening date. The length of this period should be regulated according to the physical condition of the cow.

OTHER FEEDING INFORMATION

CALCULATING A GRAIN MIXTURE

In calculating the per cent of protein in a grain mixture take the number of pounds of protein in each grain contained in the mixture and add all together, then divide this total by the number of hundred pounds in the mixture. This will give the per cent of protein contained.

Example:

	Digestible Protein in 100 Lbs.	*Total Digestible Protein*
400 lbs. crushed corn	7.5 lbs.	30 lbs.
300 lbs. cotton seed meal	31.6 lbs.	94.8 lbs.
200 lbs. ground oats	9.7 lbs.	19.4 lbs.
100 lbs. wheat bran	12.5 lbs.	12.5 lbs.
10 hundred		156.7 lbs.

156.7 ÷ 10 hundred = 15.67% digestible protein.

Grain mixtures suitable for feeding in connection with good quality legume hay, with or without silage:

(16% Crude Protein)
13% Digestible Protein
500 lbs. corn meal
200 lbs. cottonseed meal
200 lbs. ground oats
100 lbs. wheat bran

(16% Crude Protein)
13% Digestible Protein
200 lbs. corn and cob meal or barley
100 lbs. ground oats
100 lbs. cottonseed meal

(14% Crude Protein)
11% Digestible Protein
500 lbs. corn meal
200 lbs. ground oats
100 lbs. cottonseed meal or ground soybeans
100 lbs. ground soybean hay

(16.4% Crude Protein)
13.7% Digestible Protein
300 lbs. ground barley
100 lbs. cottonseed meal
100 lbs. ground oats
100 lbs. wheat bran

Grain mixtures suitable for feeding in connection with mixed hay and with or without silage:

(18.7% Crude Protein)
15.6% Digestible Protein
400 lbs. corn meal
300 lbs. cottonseed meal
200 lbs. ground oats
100 lbs. wheat bran

(18.4% Crude Protein)
15% Digestible Protein
500 lbs. corn and cob meal
300 lbs. cottonseed meal
200 lbs. wheat bran

(20% Crude Protein)
17% Digestible Protein
100 lbs. corn meal
100 lbs. cottonseed meal
100 lbs. wheat bran

(18.7% Crude Protein)
15.3% Digestible Protein
400 lbs. ground barley
200 lbs. cottonseed meal
200 lbs. wheat bran

(18.4% Crude Protein)
15.3% Digestible Protein
200 lbs. ground barley
300 lbs. corn meal
300 lbs. cottonseed meal
200 lbs. ground oats

(18.5% Crude Protein)
15.4% Digestible Protein
100 lbs. corn meal
100 lbs. ground soybeans
100 lbs. ground oats
100 lbs. ground soybean hay

Grain mixtures suitable for feeding in connection with grass hay and with or without silage:

(24% Crude Protein)
20.5% Digestible Protein
100 lbs. corn cob meal
100 lbs. cottonseed meal
100 lbs. soybean meal
200 lbs. wheat bran

(22.8% Crude Protein)
19.3% Digestible Protein
300 lbs. corn meal
300 lbs. cottonseed meal
100 lbs. soybean meal
300 lbs. wheat bran

(23.4% Crude Protein)
19.9% Digestible Protein
200 lbs. corn meal
200 lbs. cottonseed meal
100 lbs. soybean meal
100 lbs. wheat bran
100 lbs. ground oats

(23.8% Crude Protein)
20.3% Digestible Protein
200 lbs. ground barley
200 lbs. cottonseed meal
100 lbs. soybean meal
100 lbs. wheat bran

(24% Crude Protein)
20.9% Digestible Protein
100 lbs. crushed corn
100 lbs. ground barley
100 lbs. ground oats
200 lbs. cottonseed meal
100 lbs. peanut meal
100 lbs. soybean meal
100 lbs. wheat bran

COMMERCIAL GRAIN MIXTURES

There are a number of good ready mixed concentrate feeds on the market. When using any of these one should keep in mind the kind of roughage with which it is to be fed. For example, if the roughage is a good legume hay, with or without silage, the grain

mixture purchased should contain about 16 per cent crude protein. When the roughage consists of mixed hays such as soybean and grass, with or without silage, the grain mixture should contain about 20 per cent crude protein. When the roughage is non-legume feeds like grass hays, corn stover, corn silage, etc., the grain mixture should contain about 24 per cent crude protein.

The analysis of all ready mixed feeds as shown on the bag or attached tag refers to crude content instead of digestible. It is important that one should know the digestible content of the feed which he uses since different feeds vary in their digestibility and it is only the digestible part of a feed which a cow can convert into milk. To determine the digestibility of any mixed feed, you need to know the kinds and amounts of individual feeds used in making it up. With these facts and by using the table on the inside back cover, you can determine the exact number of pounds of digestible nutrients in a ton of feed and the cost per pound of these nutrients.

MINERAL REQUIREMENTS

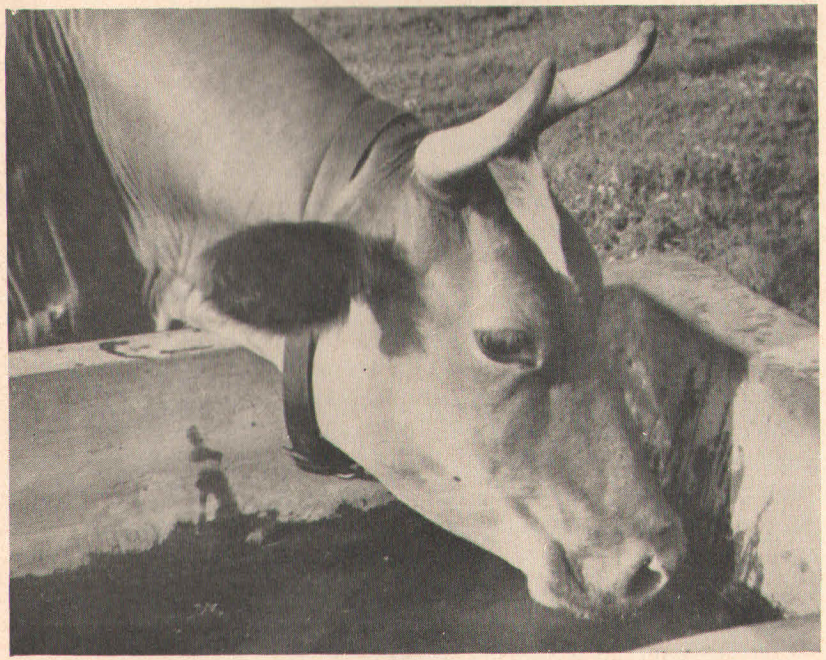
Mineral matter is necessary in the ration of dairy cattle for growth, milk production and to aid in the proper functioning of the various body organs. Those that are used most by the cow and therefore most likely to be lacking in the ration are common salt, calcium and phosphorus.

With the exception of salt a sufficient quantity of mineral matter is usually contained in a good ration. Legume hays, such as cow pea, soybean, clover and alfalfa, are rich in calcium and will supply a sufficient amount of this mineral for average producing cows. An adequate supply of phosphorus for such cows can be secured from the grain ration if it contains as much as 30 per cent of feeds which are rich in this mineral, such as wheat bran, cottonseed meal and soybean meal.

Since a good producing cow, during the early part of the lactation period, often draws on the mineral reserve stored in her bones, it is advisable to add to each 100 pounds of the concentrate ration one to two pounds of steamed bone meal. This together with the minerals carried in the hay and grain will enable her to restore the calcium and phosphorus taken from her skeleton. This will not take place in a high producing cow until she is in the latter half of her lactation; hence the need of feeding her a good ration, including minerals, during her dry period. A poor ration, low in minerals during this period, will likely cause low milk

production during the next lactation period. The up-take of minerals takes place best when the cow is on pasture.

It is not advisable to use a limestone in the mineral mixture which contains much magnesium as such may be injurious instead of beneficial. If one high in calcium and low in magnesium is not available it is advisable to use a mixture composed of one part salt and four parts steamed bone meal.



Provide cows with an ample water supply.

WATER

A good dairy cow requires a large quantity of water. The milking cow needs considerably more than the dry cow. Milk contains about 87 per cent water and a cow producing a large quantity of milk must have a large quantity of water. A cow producing 40 pounds of milk in a day needs approximately 120 pounds of water, or about three pounds of water for each pound of milk.

The supply of water should be pure, fresh, of a medium temperature and convenient so that the cow's production will not be restricted by under consumption. Watering once a day is not sufficient. A heavy producing cow can not drink enough water at

one time to supply her needs for a day. This is especially true in the winter when the water is cold. Probably no investment in barn equipment pays greater dividends than that made for individual drinking cups or a good concrete water trough located conveniently where cows can get fresh water as often as they want.

SALT

The dairy cow needs about one ounce of salt per day. It is a good practice to add one pound of common salt to each 100 pounds of the grain mixture and also allow free access to it in the exercise lot or pasture.

COMMERCIAL MINERAL COMPOUNDS

There are many commercial mineral compounds on the market of which extravagant claims are often made. There is no evidence, however, that better results can be secured from these expensive mixtures than from steamed bone meal and common salt.

CARE OF THE DAIRY COW

Many cows with inherited ability to produce milk and getting plenty of feed fail to produce well because of poor care.

Main factors in the care of dairy cows are comfort and kindness. In certain sections of North Carolina there is a general opinion, that due to our comparatively mild winters, we do not need to pay much attention to housing. But we are subject to rather sudden changes of weather and should provide more comfortable barns so the cows will not have to go through these sudden changes unprotected, which always results in a lowered milk flow.

Comfortable barns need not be expensive. One that will protect cows from cold winds and rains and provide them comfortable clean stalls will meet all requirements regardless of the cost. Comfort and convenience with a minimum of expenditure should be the policy.

Kind treatment is also of very great importance in the care of the dairy cow. All the other requirements of a good producing cow may be met, but if she is roughly handled she will not produce well and may be unprofitable, whereas with gentle handling she would produce well and profitably. It seems to be true that the greater the inherent ability of the cow to produce, the more attention must be given to her care.

Protection from excessive summer heat and flies is important. The pasture should be accompanied by shade where the cows can lounge in comfort after they have received their fill of grass.

NUTRIENTS IN 100 POUNDS OF COMMON FEEDS

From *Feeds and Feeding*, by Morrison, 20th edition.

Feeds	Total Pounds Protein	Pounds Digestible Crude Protein	Total Pounds Digestible Nutrients
Concentrates Low in Protein:			
Barley, ground	11.8	9.3	78.7
Beet Pulp, dried	9.0	4.8	71.8
Cane Molasses	2.8	0.9	56.6
Corn and Cob Meal	8.2	6.0	75.9
Corn, ground	9.4	7.1	80.6
Oats, ground	12.0	9.4	71.5
Rye, ground	12.3	10.3	80.1
Wheat, ground	13.1	11.3	83.6
Concentrates Medium in Protein:			
Middlings, Wheat Std.	17.1	13.7	75.6
Bran, Wheat	16.1	13.2	69.5
Concentrates High in Protein:			
Cottonseed Meal, 41%	41.9	33.9	73.6
Cottonseed Meal, 36-38.5%	37.1	29.3	69.2
Corn Gluten Feed	26.4	22.7	77.4
Linseed Meal O. P.	35.3	30.7	78.4
Soybeans	36.9	32.8	86.2
Soybean Oil Meal	40.9	34.8	80.5
Peanut-Oil-Meal O. P. 43-45% Protein	43.4	38.6	80.9
Dry Roughages Low in Protein:			
Corn Fodder	6.7	3.5	54.6
Corn Stover	5.7	2.1	46.2
Oat Hay	8.3	4.5	46.3
Straw, Oat	4.0	0.9	44.1
Sudan Hay	8.8	4.3	48.5
Timothy Hay	6.2	2.9	46.9
Dry Roughages High in Protein:			
Alfalfa Hay	14.7	10.6	50.3
Pea Hay	14.9	11.6	56.9
Lespedeza Hay	12.8	9.2	52.2
Clover Hay, Red	11.8	7.0	51.9
Soybean Hay	14.8	11.1	50.6
Succulent Feeds:			
Alfalfa in bloom	4.4	3.3	14.7
Corn Silage well matured	2.3	1.3	18.7
Mangels	1.4	1.0	7.3

Good Dairy Feeding in Brief

- Feed all the roughage a cow will consume without waste. This should contain a legume hay and a succulent feed. Grain should be fed in proportion to the milk produced.

- Pasture represents one of the cheapest and best dairy feeds. Two acres should be provided for each mature cow in the herd.

- Grain should always be ground for dairy cows, however, it seldom pays to grind hay or other roughage.

- Always feed highly flavored feeds just after milking.

- Immediately after a cow has calved give her a small feed of warm bran mash.

- Tonics fed indiscriminately do no good. A healthy cow needs only good care, feed and water to keep her body organs functioning properly. A sick cow needs the services of a good veterinarian.

- Regularity and kindness are important factors in successful feeding.

- Allow free access to water and salt.

- Feed each cow to her full capacity for milk production.