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1963

Computing Dairy Cattle Rations

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Recommended Citation

Kurtz, Ervin, "Computing Dairy Cattle Rations" (1963). *SDSU Extension Fact Sheets*. 1244.
https://openprairie.sdstate.edu/extension_fact/1244

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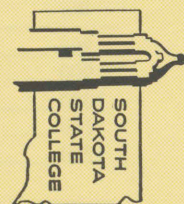
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Cooperative Extension Service

computing dairy cattle rations

dairy cattle rations

Dairymen have a choice of various feeds to make up rations for their animals. In deciding which will be the most economical to use, they must consider the amounts of nutrients the different feeds supply and how much these nutrients cost on a unit basis. The least costly source of total digestible nutrients (TDN) can mean considerable savings in feed costs.

Good roughage will provide enough nutrients for body maintenance, but milk production requires grain, which is usually the most expensive. The amount of grain in the total ration can be increased as long as the returns from the extra milk produced are greater than the amount paid for the extra concentrates.

TOTAL FEED REQUIREMENTS FOR DAIRY CATTLE

Roughage Requirements. Dairy cattle will consume at least 2 pounds of roughage (hay-equivalent basis) for each 100 pounds of body weight—20 pounds per day for a 1,000 pound cow. "Hay-equivalent basis" means that, if hay and silage are fed together, 3 pounds of silage will replace 1 pound of hay.

Grain Requirements. Feed 1 pound of grain for each 3 to 4 pounds of milk. The dairy cow requires at least 4 pounds of grain daily for maintaining body weight and for pregnancy requirements. Six-tenths pound of grain will furnish as much TDN as 1 pound of hay or 3 pounds of silage.

Protein Requirements. Dairy animals require digestible protein (see table 1) for body maintenance

By Ervin Kurtz, Extension dairyman

and for milk production (see table 2). Protein fed in excess of the requirements would not harm the animal; however, it would increase the cost of the ration.

Mineral Requirements. Dairy animals need minerals, salt being the most important. The dairy cow's minimum salt requirement per day is 0.75 ounce for each 1,000 pounds of live weight, and 0.3 ounce additional for each 10 pounds of milk produced. Salt can be mixed with the grain ration or fed loose, free choice. Don't force the dairy cow to eat other minerals to get the necessary amount of salt.

As a rule, complex mineral mixtures are not necessary. The following mixture fed free choice, or in the grain ration at the rate of 1% of the grain ration should prove adequate.

3 parts.....	steam bonemeal
2 parts.....	ground limestone
1 part.....	trace mineralized salt

Regardless of how the mineral mixture is fed, additional loose salt should be fed free choice.

BALANCING RATIONS

Tables have been prepared to assist producers in balancing rations and to determine if the particular ration they are feeding is adequate.

Table 1 shows the amount of feed on a dry-matter basis and the nutrients required for daily maintenance.

Table 1. Daily Maintenance Requirements for Dairy Cows

Wt. of Cow lbs.	Dig. protein lbs.	Total dig. nutrients lbs.	Wt. of Cow lbs.	Dig. protein lbs.	Total dig. nutrients lbs.
800	0.54	6.5	1300	0.82	10.0
900	0.59	7.2	1400	0.87	10.6
1000	0.65	7.9	1500	0.92	11.3
1100	0.71	8.6	1600	0.98	11.9
1200	0.76	9.3	1700	1.03	12.6
			1800	1.08	13.2

Table 2. Requirements for Milk Production

Milk production	Dig. protein lbs.	Total dig. nutrients lbs.
For each 1 lb. of 3.0% milk	0.043	0.28
For each 1 lb. of 3.5% milk	0.046	0.30
For each 1 lb. of 4.0% milk	0.049	0.32
For each 1 lb. of 4.5% milk	0.052	0.35
For each 1 lb. of 5.0% milk	0.056	0.37
For each 1 lb. of 5.5% milk	0.059	0.40
For each 1 lb. of 6.0% milk	0.062	0.42

Table 3 is a work sheet showing the average composition and digestible nutrients of some of the most common feeds used in the dairy rations of South Dakota. If other feeds, not listed here, are to be used, please refer to South Dakota Extension Circular 612 "Feeding the Dairy Herd." These feeds may be inserted in lines 21 and 22 in this table.

USING THE WORK SHEET

Step 1. Refer to table 1 for the daily maintenance requirements listed for the weight of the animal. Copy this in the blank space on Work Sheet (table 3), line 24 "Minimum maintenance requirements" (digestible protein in column D, total digestible nutrients in column F.

Step 2. Refer to table 2 and find the requirements for milk production. Multiply the requirements by the pounds of milk being produced and copy the results in the blank space on line 25, as in step 1.

Step 3. Add the maintenance and milk requirements together on the work sheet—this is the amount of digestible protein and TDN required.

Step 4. In the work sheet (table 3) locate the kind of feed to be fed (column B). In column A write in the pounds fed daily for each kind of feed.

Step 5. To calculate the digestible protein for each feed in column D, multiply pounds of each feed in Column A times percent in column C.

Step 6. Calculate the total digestible nutrients in column F by multiplying pounds of feed in column A times percent TDN in column E.

Step 7. After the amounts of nutrients furnished by each feed have been calculated add column A and place results in line 23. Repeat this procedure for columns D and F.

Step 8. Compare these totals with total requirements to determine if minimum requirements have been met or if there are excesses or deficiencies in digestible protein or TDN.

If the ration is high or low in digestible protein the ration can be changed by decreasing or increasing the amount of high protein feeds.

If the ration lacks TDN it will be necessary to increase the grain and cut back on hay or silage.

When you multiply with percentages (steps 5 and 6) remember to move the decimal two places to the left when removing the percent sign.

COMMERCIAL SUPPLEMENTS

No attempt was made to list the commercial protein supplements. Fairly accurate results will be obtained by using the crude protein as listed on the label and converting it to digestible protein. Digestible protein is equal to about 75% of the crude protein value. The TDN value in good quality protein supplements is about 70 to 75%. Some rations may not need a supplement, the protein and TDN requirements may be supplied in the roughage and grain.

Table 3. Work Sheet

Column	A Lbs. of feed daily	B Kinds of feed	C % dig. protein	D Lbs. dig. protein	E % total dig. nutrients	F Lbs. total dig. nutrients
1.		Corn, No. 2	6.7		80.1	
2.		Corn and cob meal	5.4		73.2	
3.		Corn, high moisture	5.7		64.2	
4.		Oats	9.4		70.1	
5.		Barley	10.0		77.7	
6.		Sorghums	8.5		79.4	
7.		High moisture sorghums	6.6		62.5	
8.		Corn silage	1.2		18.3	
9.		Grass silage	2.0		15.5	
10.		Alfalfa haylage	7.0		37.0	
11.		Oat silage	1.4		16.9	
12.		Oat silage, low moisture	2.4		29.0	
13.		Sorghum silage	0.8		15.2	
14.		Alfalfa hay	10.9		50.7	
15.		Alfalfa-brome hay	7.6		47.9	
16.		Brome hay	5.3		49.3	
17.		Prairie hay	2.0		45.1	
18.		Soybean oil meal	37.0		78.0	
19.		Linseed oil meal	29.5		71.0	
20.		Commercial supplement				
21.						
22.						
23.		Totals	xx		xx	
24.		Minimum maintenance requirements	xx		xx	
25.		Milk requirements	xx		xx	
26.		Total requirements	xx		xx	
27.		Excesses	xx		xx	
28.		Deficiencies	xx		xx	

