Diets for Pregnant Dry Cows
Michigan State University
Cooperative Extension Service
Farm Science Series
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October 1969
4 pages

Extension Bulletin E-667
Farm Science Series
October, 1969

Too much hi-energy feed made this dry cow too fat — and more susceptible to diseases, appetite and milk loss during lactation.

Diets for Pregnant Dry Cows

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Rations for pregnant dry cows must provide both nutrients for maintenance of the cow and development of the unborn calf. Failure to balance the ration to meet energy, protein, mineral and vitamin requirements may increase the incidence of milk fever, or infectious complications associated with mastitis, retained placenta (afterbirth), or enterotoxemia. Similarly, poor nutrition of the pregnant dry cow can result in calves that are weak at birth and susceptible to disease.

CONTROL ENERGY INTAKE

Dry cows should be in reasonably good condition at freshening but should not be fat. Feeds that supply excessive energy during the late part of lactation and during the dry period result in fat cows that tend to have more difficulties at calving. Excessively fat cows may become weak and unsteady and are likely to slip and fall. Known as "downer" cows, they are unable to rise or stand. Fat-cow problems can be prevented or reduced by feeding low-energy rations which are composed primarily of quality hay, haylage or limited amounts of corn silage. During lactation, grain should be fed according to milk production requirements and the quality of forage being fed (Table 1). If grain is fed in the lot, cows should be grouped and fed according to production requirements. Dry cows must be separated from the milking herd when grain is fed in the lot, or when corn silage is fed free choice. The quantity of corn silage fed to dry cows must be limited to avoid excessive fattening as shown in Tables 3 and 4. While grain is not provided in these diets (other than protein supplement), 4 to 6 pounds of grain per head, daily, may be desirable if hay is poorly eaten due to rain damage.

Protein supplements are needed when dry cows receive less than 10 pounds of legume hay with corn silage or when low protein timothy or bromegrass hay is fed. Protein deficiency can result in deterioration of muscles, low feed consumption and poor nutrient utilization.

Table 1 — Daily Energy and Protein Requirements for Milk Production and Maintenance* of a 1200-1400 Pound Cow.

Milk† produced	Daily Requirements			Grain needed with medium quality forage to meet reqts.
	Total crude protein	TDN‡	Net Energy	
lbs./day	lbs.	lbs.	megacalories	lbs./day
10	2.0	12	13.6	0
20	2.6	15	16.8	0
30	3.3	18	19.9	5
40	4.0	21	23.0	10
50	4.6	24	26.1	15
60	5.2	27	29.2	20
70	6.0	30	32.3	25
80	6.6	33	35.5	30
90	7.2	36	38.6	33§
100	8.0	39	41.8	36§

* Daily requirement includes 10.5 megacalories or 9 lbs. TDN for maintenance.

† Milk — Pounds of 3.5% fat milk; net energy for milk: 1 megacalorie = 1 therm.

‡ TDN — Total Digestible Nutrients — see Table 5 for value of feedstuffs.

§ Cow must consume 1.0 to 1.5 lbs. air-dry forage per 100 lbs. body weight. Limit grain to about 2.5 lbs. per 100 lbs. body weight and reduce grain as milk production declines.

Table 2 — Daily Nutrient Requirements for a Pregnant Dry Cow.*

Body Weight	Energy		Protein	Calcium	Phosphorus
	TDN	Net†			
lbs.	lbs.	megacalories	lbs.	- - - - grams‡ - - - -	
800	12	9-10	2.0	19	15
1000	14	10-11	2.3	23	18
1200	16	12-13	2.4	28	22
1400	17	13-14	2.6	30	24
1600	18	14-15	2.7	32	26

* Requirements based on normal body weight of cows. An average body weight can be used as a guide for group feeding. For energy and protein value of feedstuffs, see Table 5.

† NE — Net Energy allowance, 1 megacalorie = 1 therm = 1 million calories. Estimated from U.S.D.A. data, Beltsville, Md.

‡ 454 grams = 1 pound.

MINERAL SUPPLEMENTS

SALT — Cattle should have salt available at all times. They require about 1.5 to 2.0 ounces per head, daily, or 1 pound of salt per day for each 8 to 10 dry cows. Lactating cows may need 2 to 3 ounces or 1 pound for each 5 to 8 cows. Including 1 percent salt in the grain mixture assures that milking cows get enough salt.

IODINE — Should be contained in the salt or mineral mixture to prevent goiter (enlarged thyroid glands) in newborn calves.

COBALT — Feeds from some soils are deficient in cobalt. Mature cows may appear healthy, but calves fed milk from cobalt-deficient cows lack appetite and grow poorly. The problem is corrected by feeding trace mineralized salt or mineral supplements containing cobalt.

CALCIUM AND PHOSPHORUS MINERAL SUPPLEMENTS

Calcium is plentiful in legumes such as alfalfa and most grasses. Occasionally, grasses grown on acid soils are low in calcium while corn silage, sorghum and sorghum-sudan hybrids are borderline-to-low in calcium. When such forages are fed, a calcium supplement is desirable.

Alfalfa, when fed as the only forage to dry cows, may induce milk fever. This is believed to be due to an excess of calcium relative to the amount of phosphorus in the diet. Because alfalfa contains 6 to 7 times as much calcium as phosphorus, mineral supplements containing a wide Ca:P ratio (such as 30% Ca and 5% P) should be avoided. A mineral supplement containing a low level of calcium and high level of phosphorus is recommended to balance the calcium from the alfalfa. Monosodium phosphate has reduced milk fever when used instead of calcium supplements in dry cow diets. It should be used only if milk fever is associated with feeding primarily alfalfa to dry cows. Usually, dicalcium phosphate, steamed bonemeal, or a commercial supplement containing similar percentages of calcium and phosphorus is desirable.

Table 3 — Daily Diets for a 1200-1400 Pound Pregnant Dry Cow Fed Medium Quality Alfalfa (15% protein) and Corn Silage With and Without Urea.*

Forages		44% Protein Supplement‡		Mineral Supplements§		
		If corn silage contains:				
Hay equiv.†	Corn silage	No urea	10 lbs. urea/T	Monosodium phosphate	Dicalcium phosphate	T.M. salt
- - - - - - - - - - lbs. - - - - - - - - - -				- - - - - - oz. - - - - - -		
30	0	0	0	4	0	2
25	10	0	0	4	0	2
20	20	0	0	4	0	2
15	30	0	0	4	0	2
10	40	0	0	3	0	2
5	50	.5	0	–	3	2
0	55	2.0	1.0	–	3	2

* Estimated net energy: 12-14 megacalories; 2.4 lbs. of protein.

† Hay-equivalent (air dry) 1 lb. = 1.8 lbs. 50%; 2.25 lbs. 40%; or 3.0 lbs. 30% dry matter haylage. Corn silage based on 32% dry matter silage.

‡ Protein Supplement = soybean meal or equivalent amount of other supplements. Supplement should not contain urea when urea corn silage is the only forage fed.

§ Mineral should provide equivalent amount of calcium and phosphorus. Monosodium phosphate = 0% Ca and 22% P; dicalcium phosphate = 26.5% Ca and 20% P.

Table 4 — Diets for a 1200-1400 Pound Pregnant Dry Cow Fed Medium Quality Legume-Grass (12% protein) or Grass Hay (8% protein) and Corn Silage With and Without Urea.

Hay equivalent*	Corn silage only	Forage Combinations†		
		Corn silage without urea:		Corn silage with 10 lbs. urea/ton (legume-grass mixture or grass hay)
		& Legume-grass hay	& grass hay	
- - - - lbs./day - - -		lbs. 44% prot. suppl. req'd./head/day		
30	0	0	.0	0
25	10	0	.25	0
20	20	0	.50	0
15	30	0	.75	0
10	40	0	1.00	0
5	50	.7	1.20	0
0	55	2.0	2.00	1.0

* See Footnotes, Table 3.

† Mineral supplements: 3 ounces dicalcium phosphate or equivalent and 2 ounces trace mineralized salt, per head, daily.

Rations containing from 2.3 to 2.5 parts calcium to 1 part phosphorus are most desirable to avoid milk fever. Grass hay, a grass-legume mixture, or limited alfalfa and corn silage diets provide the best calcium to phosphorus balance and are excellent feeds for dry cows.

VITAMIN A

Green and well-preserved forages normally contain adequate amounts of carotene, which animals convert to vitamin A. Forages that are badly damaged (or bleached) by weather, leaf loss or excessive heating in storage, may be low in carotene. Cattle fed only such forages may require additional vitamin A. Corn stover, straw and corn cobs are poor sources of vitamin A.

If forages are suspected of being low in carotene, cattle should receive 20,000 to 30,000 international units of vitamin A per head daily. Symptoms of vitamin A deficiency are: nightblindness (inability to see in dim light), muscular incoordination and weakness, rough hair, slow growth, diarrhea, respiratory infections, abortions pre-term and edema or swelling of the brisket and forelegs.

VITAMIN D

Vitamin D is obtained from exposure of cattle to sunshine and from sun-cured forages. Green forages without sun-curing may be low in vitamin D. However, at the stage of maturity when most crops are harvested for silage, some of the leaves have turned brown and are good sources of vitamin D. Dairy cattle usually receive sufficient vitamin D from these sources. Occasionally, rickets occur in calves fed poor quality forages and housed in dark quarters.

Vitamin D aids in the absorption of calcium and phosphorus. Deficiency of the vitamin results in rickets in calves, or soft, deformed and easily broken bones and teeth. Signs of vitamin D deficiency in cattle are swelling of the pasterns, lameness, arched back and knobs at the ends of ribs.

The daily requirement of vitamin D is approximately 400 I.U. per 100 pounds of body weight, but two to three times this amount may be desirable when deficiency symptoms occur. Vitamin D_2, the plant form found in feeds and irradiated yeast, is satisfactory for livestock.

VITAMIN E AND SELENIUM

Vitamin E (alpha tocopherol) and selenium are important for maintaining muscle soundness. A deficiency can result in white muscle disease in calves, or nutritional muscular dystrophy in cattle and sheep. This muscle degeneration leads to stiffness of gait and incoordination of movement. When chest and heart muscles are involved, it can be fatal. Forages normally contain a good supply of vitamin E. Damage by weather or storage (heating) results in a notable reduction in vitamin E content of feeds.

Under some conditions, an injectable mixture of selenium and vitamin E has been effective in preventing the birth of dead or weakened calves and reducing the incidence of retained placentas in cows. The effectiveness of this treatment for cows in late pregnancy is unknown under Michigan conditions.

There is some evidence that feeds grown on some Michigan farms are borderline or deficient in selenium (less than .06 parts per million). Since selenium is very toxic (above 3 ppm) it is not approved as an additive to trace mineral supplements. Linseed meal and wheat bran or middlings from the Great Plains, and most soybean meals, are good sources of selenium. It may be beneficial to provide selenium by including 10 to 15% linseed meal or wheat bran in the grain ration or in one-third to one-half of the protein supplement.

SUPPLEMENTING VITAMINS A, D AND E

Vitamins A, D and E are inexpensive and if there is doubt about the adequacy of these vitamins in natural feeds, the ration should be supplemented approximately as follows:

Vitamin	per head daily
A	30,000 to 50,000 International Units
D	5,000 to 10,000 U.S.P. Units
E	30 to 50 International Units

The vitamins must be protected from moisture and can best be supplied by including in the grain ration or protein supplement. Injectable mixtures are also available.

FEEDING ACCORDING TO REQUIREMENTS

The nutrient value of feedstuffs is shown in Table 5. To determine the amount of energy furnished by a given amount of feed, simply multiply: pounds of feed x TDN (or Net Energy) value for the feed available, as best described in Table 5. Use the same process to find the amount of protein, calcium and phosphorus furnished by the feed. If the amount of feed offered does not provide the nutrients required, the ration must be supplemented with a source of feed which will meet the requirements.

Table 5 — Nutrient Value of Common Feedstuffs

ROUGHAGES	*Dry matter* %	*Protein* %	*TDN** %	*Net energy* Mcal/lb**	*Ca* gram/lb	*P* gram/lb
Alfalfa hay Bud-1/10 bloom	90	17.5	52	.50	7.3	1.1
Haylage	50	9.7	29	.27	4.4	.6
Haylage	40	7.7	23	.22	3.6	.5
Grass silage	30	5.8	17	.16	2.2	.3
Alfalfa hay-1/2 to full bloom	90	15.0	50	.47	5.1	.9
Haylage	50	8.3	28	.26	3.0	.5
Haylage	40	6.7	22	.21	2.5	.4
Silage	30	5.0	17	.15	1.5	.3
Alfalfa hay, stemmy	90	12.3	46	.40	4.8	.8
Bromegrass hay, flower stage	90	7.6	52	.49	4.8	.6
Bromegrass hay, mature	94	5.9	48	.36	2.7	.6
Clover, red, average	88	12.0	52	.50	5.8	.9
Corn silage, early dough	28	2.6	20	.22		
Corn silage, late dough	32	2.9	22	.24	.4	.3
Corn silage with urea	32	4.3	22	.24	.4	.3
Corn cobs, ground	90	2.3	46	.40	.5	.2
Oat silage, early flower	30	4.2	18	.18		
Oat silage, dough stage	30	3.6	16	.14	.4	.3
Timothy hay, early bloom	89	9.7	57	.57	1.8	.9
Timothy hay, full bloom	89	6.4	51	.48	1.6	.7
Timothy hay, early seed	89	6.1	48	.43		
Timothy hay, late seed	89	5.3	42	.34	.6	.6
Sorghum silage, headed	25	1.6	15	.13	.4	.2

CONCENTRATES	*Dry matter* %	*Protein* %	*TDN** %	*Net energy* Mcal/lb**	*Ca* gram/lb	*P* gram/lb
Barley, common feed grain	89	11.8	76	.88	.3	2.0
Beet pulp, dried	91	8.8	69	.77	.1	1.5
Brewers grains, dried	93	23.3	61	.63	.5	2.2
Brewers grains, wet	24	5.7	16	.17	.8	2.2
Corn shelled #2	85	8.7	80	.96	.1	1.2
Corn shelled, 25% moisture	75	7.6	70	.85	-.1	1.0
Corn shelled, 30% moisture	70	7.1	66	.80	-.1	1.0
Corn and cob meal	86	7.4	73	.85	.2	1.0
Corn and cob meal, 30% moisture	70	6.0	60	.69	.1	0.9
Cottonseed meal (solvent)	93	41.6	65	.70	.9	4.5
Linseed meal (hydr. proc.)	91	35.2	75	.86	1.9	3.8
Linseed, solvent proc.	91	36.6	70	.78	1.8	3.7
Molasses, cane	73	3.0	54	.59	3.0	0.4
Molasses, beet	78	7.8	60	.67	.5	0.1
Oats, ground	90	12.0	70	.78	.4	1.5
Oats, light	89	12.0	61	.65	.4	1.5
Soybean meal 44%	90	45.7	78	.91	1.3	2.9
Soybean meal 50%	92	50.4	79	.92		
Wheat, soft	89	10.2	80	.95	1.3	2.9
Wheat bran, hard wheat	90	17.4	67	.74	.6	1.3
Wheat bran, soft wheat	90	14.6	67	.74	.2	1.3

* *TDN - Total Digestible Nutrients.*
***Net energy - Mega (Million) calories per pound of feed.*

Issued in furtherance of cooperative extension work in agriculture and home economics, acts of May 8, and June 30, 1914, in cooperation with the U. S. Department of Agriculture. George S. McIntyre, Director, Cooperative Extension Service, Michigan State University, E. Lansing, Mich. 48823.

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