

# Evaluating a Ration

Using Your Nutrition Skills with AminoCow



# Evaluating a Ration

- ❁ **Work with realistic production levels.**
- ❁ **A real dairy has feed on hand that will be fed. Work with what you have.**
- ❁ **If the quality is poor, you can improve the ration with additional ingredients.**
- ❁ **Dry Matter Intake rules everything!**
  - **Prediction of AA flow depends upon DMI.**

# Evaluating a Ration

- ⊗ **Your job is to feed the best possible ration at the lowest cost.**
- ⊗ **Don't focus too much on feed costs or you will end up presenting a cheap ration that limits production.**
- ⊗ **If the forage quality is poor, REALLY poor, there is little you can do to fix the ration.**

Holstein Lactating Lact # 2 Weight 1450 Milk 115 % Fat 3.5 % Protein 3.1 DIM 60 BCS 2.5  
 Ration: Current Dairy Ration Current Dairy Ration NEI Calculation: User ReCalc All  
 Units lb-Mcal/lb Currency \$ User Defined Requirements  Adjst MCRP RDP View Notes

Nutrient Information																			
Feeds					Feed Ingredient Profile														
Mi	Feed Name	Ty	AsFed	DM	DM%	NEI	CP	RDP	RUP	ADF	NDF	NFC	\$/DM	Fat	MP	Met	Lys	Ca	P
						Mcal/lb	%DM	% CP	% CP	%DM	%DM	%DM		%DM		%DM	%DM	%DM	%C
0	Alfa hay barn 2	F	5.0000	4.5000	90.00	0.58	16.00	72.00	28.00	37.00	48.00	24.30	0.064	2.60	0	0.237	0.768	1.4	
0	Alfa sil bag	F	29.0000	12.7600	44.00	0.61	18.25	78.00	22.00	32.00	44.00	25.35	0.071	3.00	0	0.245	0.723	1.4	
0	Corn sil proc	F	60.0000	20.4000	34.00	0.70	8.50	70.00	30.00	23.00	44.00	39.50	0.078	3.00	0	0.129	0.207	0.2	
0	Wheat straw	F	1.0000	0.9000	90.00	0.40	4.00	50.00	50.00	53.90	77.90	8.50	0.026	1.80	0	0.050	0.135	0.2	
0	Corn grain grou	G	12.0000	10.6800	89.00	0.91	9.30	50.00	50.00	3.20	9.50	75.30	0.066	4.30	0	0.201	0.274	0.0	
0	Soybean meal 4	G	6.5000	5.7850	89.00	0.91	55.00	70.00	30.00	6.00	10.00	27.50	0.117	1.00	0	0.755	3.285	0.2	
0	Urea 45%	G	0.1000	0.0990	99.00	0.00	281.00	100.00	0.00	0.00	0.00	0.00	0.243	0.00	0	0.000	0.000	0.0	
0	Molasses black	G	1.0000	0.7500	75.00	0.77	5.80	90.00	10.00	0.00	0.00	82.20	0.042	0.50	0	0.016	0.047	1.0	
0	Animal fat	BP	0.7500	0.7420	99.00	2.05	0.00	0.00	0.00	0.00	0.00	0.00	0.225	99.50	0	0.000	0.000	0.0	
0	Beet pulp dehy	BP	0.5000	0.4550	91.00	0.81	9.70	60.00	40.00	31.00	55.30	30.00	0.053	0.60	0	0.160	0.608	0.6	
0	Wheat midds	BP	0.7500	0.6680	89.00	0.74	18.40	70.00	30.00	10.00	38.30	33.20	0.052	4.90	0	0.281	0.704	0.1	
0	VitMinMix	M\	0.8500	0.8320	97.86	0.00	0.00	0.00	0.00	7.53	10.76	9.68	0.148	0.00	0	0.000	0.000	11.	
0	Soybean hulls	BP	1.7500	1.5920	91.00	0.76	12.10	70.00	30.00	48.90	65.20	15.50	0.047	2.10	0	0.138	0.746	0.5	
	Concentrations					Mcal/lb	--%DM--	--%CP--	--%CP--	--%DM--	--%DM--	--%DM--	\$/lbDM	--%DM--		--%MP--	--%MP--	--%C	
			--lbs--	lb DM	--%DM--	--Mcal--	--lbs--	--lbs--	--lbs--	--lbs--	--lbs--	--lbs--	---	--lb---	---	---	---	---	---
	Totals		119.2000	60.1600	50.47	44.19	9.68	6.86	2.82	12.66	20.68	23.40	4.670	2.46	2459	51.000	181.000	0.4	
	Requirements			58.8000		47.47	10.64	7.31		10.88	16.46	21.76		2.94	2433	66.000	200.000	0.4	
	Difference			1.3600		-3.28		-0.45		1.78	4.22	1.64		-0.48	26	-15.000	-19.000	-0.0	

**Current Dairy Ration. This is what the dairy tells you they are feeding and the description of their cows.**

**Holstein**   **Lactating**   Lact # **2**   Weight **1450**   Milk **115**   % Fat **3.5**   % Protein **3.1**   DIM **60**   BCS **2.5**  
 Ration: **Current Dairy Ration**   **Current Dairy Ration**   **NEI Calculation: User**   ReCalc All  
 Units **lb-Mcal/lb**   Currency **\$**    User Defined Requirements    Adjst MCRP RDP   View Notes

**Nutrient Information**

Feeds					Feed Ingredient Profile															
Mi	Feed Name	Ty	AsFed	DM	DM%	NEI	CP	RDP	RUP	ADF	NDF	NFC	\$/DM	Fat	MP	Met	Lys	Ca		
						Mcal/lb	%DM	% CP	% CP	%DM	%DM	%DM		%DM		%DM	%DM	%C		
0	Alfa hay barn 2	F	5.0000	4.5000	90.00	0.58	16.00	72.00	28.00	37.00	48.00	24.30	0.064	2.60	0	0.237	0.768	1.4		
0	Alfa sil bag	F	29.0000	12.7600	44.00	0.61	18.25	78.00	22.00	32.00	44.00	25.35	0.071	3.00	0	0.245	0.723	1.4		
0	Corn sil proc	F	60.0000	20.4000	34.00	0.70	8.50	70.00	30.00	23.00	44.00	39.50	0.078	3.00	0	0.129	0.207	0.2		
0	Wheat straw	F	1.0000	0.9000	90.00	0.40	4.00	50.00	50.00	53.90	77.90	8.50	0.026	1.80	0	0.050	0.135	0.2		
0	Corn grain grou	G	12.0000	10.6800	89.00	0.91	9.30	50.00	50.00	3.20	9.50	75.30	0.066	4.30	0	0.201	0.274	0.0		
0	Soybean meal 4	G	6.5000	5.7850	89.00	0.91	55.00	70.00	30.00	6.00	10.00	27.50	0.117	1.00	0	0.755	3.285	0.2		
0	Urea 45%	G	0.1000	0.0990	99.00	0.00	281.00	100.00	0.00	0.00	0.00	0.00	0.243	0.00	0	0.000	0.000	0.0		
0	Molasses black	G	1.0000	0.7500	75.00	0.77	5.80	90.00	10.00	0.00	0.00	82.20	0.042	0.50	0	0.016	0.047	1.0		
0																		0.000	0.0	
0																			608	0.6
0																			704	0.1
0																			0.000	11.
0																			746	0.5
0																			%MP--	%C
0																			360	0.7

**Look at the description of the cow. Does this match the herd? Are the cows really milking at this level? Do they have a body score of 2.5? Get outside, look at the cows and production records.**

		--lbs--	lb DM	%DM	--Mcal--	---lbs---	---lbs---	---lbs---	---lbs---	---lbs---	---lbs---	---lbs---	----\$---	---lb---	----g---	----g---	----g---	---lb---
Totals		119.2000	60.1600	50.47	44.19	9.68	6.86	2.82	12.66	20.68	23.40	4.670	2.46	2459	51.000	181.000	0.4	
Requirements			58.8000		47.47	10.64	7.31		10.88	16.46	21.76		2.94	2433	66.000	200.000	0.4	
Difference			1.3600		-3.28		-0.45		1.78	4.22	1.64		-0.48	26	-15.000	-19.000	-0.0	

Nutrient Information																			
Feeds					Feed Ingredient Profile														
Mi	Feed Name	Ty	AsFed	DM	DM%	NEI	CP	RDP	RUP	ADF	NDF	NFC	\$/DM	Fat	MP	Met	Lys	Ca	P
						Mcal/lb	%DM	% CP	% CP	%DM	%DM	%DM		%DM		%DM	%DM	%DM	%DM
0	Alfa hay barn 2	F	5.0000	4.5000	90.00	0.58	16.00	72.00	28.00	37.00	48.00	24.30	0.064	2.60	0	0.237	0.768	1.4	0.1
0	Alfa sil bag	F	29.0000	12.7600	44.00	0.61	18.25	78.00	22.00	32.00	44.00	25.35	0.071	3.00	0	0.245	0.723	1.4	0.1
0	Corn sil proc	F	60.0000	20.4000	34.00	0.70	8.50	70.00	30.00	23.00	44.00	39.50	0.078	3.00	0	0.129	0.207	0.2	0.1
0	Wheat straw	F	1.0000	0.9000	90.00	0.40	4.00	50.00	50.00	53.90	77.90	8.50	0.026	1.80	0	0.050	0.135	0.2	0.1
0	Corn grain grou	G	12.0000	10.6800	89.00	0.91	9.30	50.00	50.00	3.20	9.50	75.30	0.066	4.30	0	0.201	0.274	0.0	0.1
0	Soybean meal 4	G	6.5000	5.7850	89.00	0.91	55.00	70.00	30.00	6.00	10.00	27.50	0.117	1.00	0	0.755	3.285	0.2	0.1
0	Urea 45%	G	0.1000	0.0990	99.00	0.00	281.00	100.00	0.00	0.00	0.00	0.00	0.243	0.00	0	0.000	0.000	0.0	0.1
0	Molasses black	G	1.0000	0.7500	75.00	0.77	5.80	90.00	10.00	0.00	0.00	82.20	0.042	0.50	0	0.016	0.047	1.0	0.1
0	Animal fat	BP	0.7500	0.7420	99.00	2.05	0.00	0.00	0.00	0.00	0.00	0.00	0.225	99.50	0	0.000	0.000	0.0	0.1
0	Beet pulp dehy	BP	0.5000	0.4550	91.00	0.81	9.70	60.00	40.00	31.00	55.30	30.00	0.053	0.60	0	0.160	0.608	0.6	0.1
0	Wheat midds	BP	0.7500	0.6680	89.00	0.74	18.40	70.00	30.00	10.00	38.30	33.20	0.052	4.90	0	0.281	0.704	0.1	0.1
0	VitMinMix	M\	0.8500	0.8320	97.86	0.00	0.00	0.00	0.00	7.53	10.76	9.68	0.148	0.00	0	0.000	0.000	11.0	0.1
0	Soybean hulls	BP	1.7500	1.5920	91.00	0.76	12.10	70.00	30.00	48.90	65.20	15.50	0.047	2.10	0	0.138	0.746	0.5	0.1
	Concentrations					Mcal/lb	%DM	%CP	%CP	%DM	%DM	%DM	\$/lbDM	%DM		%MP	%MP	%C	
	Totals		119.2000	60.1600	50.47	44.19	9.68	6.86	2.82	12.66	20.68	23.40	4.670	2.46	2459	51.000	181.000	0.1	
	Requirements			58.8000		47.47	10.64	7.31		10.88	16.46	21.76		2.94	2433	66.000	200.000	0.1	
	Difference			1.3600		-3.28		-0.45		1.78	4.22	1.64		-0.48	26	-15.000	-19.000	-0.0	

Looking at the ration. Study the differences and concentrations (%) found with this ration.

# Evaluating a Ration

- ❁ **Be realistic. Make a ration that will work for these cows.**
- ❁ **Don't formulate a ration for 115 lbs. milk, if the group can only make 95 lbs.**
  - **Use a lead factor of 5 lbs. MAXIMUM**
- ❁ **Look at the herd, the feed, the milk records, and use your knowledge to develop a ration.**

Nutrient Information																		
Feeds					Feed Ingredient Profile													
Mi	Feed Name	Ty	AsFed	DM	DM%	NEI	CP	RDP	RUP	ADF	NDF	NFC	\$/DM	Fat	MP	Met	Lys	Ca
						Mcal/lb	%DM	% CP	% CP	% DM	%DM	%DM		%DM		%DM	%DM	%DM
0	Alfa hay barn 2	F	5.0000	4.5000	90.00	0.58	16.00	72.00	28.00	37.00	48.00	24.30	0.064	2.60	0	0.237	0.768	1.1
0	Alfa sil bag	F	29.0000	12.7600	44.00	0.61	18.25	78.00	22.00	32.00	44.00	25.35	0.071	3.00	0	0.245	0.723	1.1
0	Corn sil proc	F	60.0000	20.4000	34.00	0.70	8.50	70.00	30.00	22.00	44.00	39.50	0.074	3.00	0	0.129	0.207	0.2
0	Wheat straw	F	1.0000	0.9000	90.00	0.40	4.00	50.00	50.00	53.90	77.90	8.50	0.020	1.80	0	0.050	0.135	0.2
0	Corn grain grou	G	12.0000	10.6800	89.00	0.91	9.30	50.00	50.00	32.00	9.50	75.30	0.060	4.30	0	0.201	0.274	0.0
0	Soybean meal 4	G	6.5000	5.7850	89.00	0.91	55.00	70.00	30.00	62.00	10.00	27.50	0.117	1.00	0	0.755	3.285	0.2
0	Urea 45%	G	0.1000	0.0990	99.00	0.00	281.00	100.00	0.00	0.00	0.00	0.00	0.241	0.00	0	0.000	0.000	0.0
0	Molasses black	G	1.0000	0.7500	75.00	0.77	5.80	90.00	10.00	0.00	0.00	82.20	0.042	0.50	0	0.016	0.047	1.0
0	Animal fat	BP	0.7500	0.7420	99.00	2.05	0.00	0.00	0.00	0.00	0.00	0.00	0.221	99.50	0	0.000	0.000	0.0
0	Beet pulp dehy	BP	0.5000	0.4550	91.00	0.81	9.70	60.00	40.00	32.00	55.30	30.00	0.051	0.60	0	0.160	0.608	0.5
0	Wheat midds	BP	0.7500	0.6680	89.00	0.74	18.40	70.00	30.00	10.00	38.30	33.20	0.051	4.90	0	0.281	0.704	0.7
0	VitMinMix	M\	0.8500	0.8320	97.86	0.00	0.00	0.00	0.00	7.53	10.76	9.68	0.144	0.00	0	0.000	0.000	11.0
0	Soybean hulls	BP	1.7500	1.5920	91.00	0.76	12.10	70.00	30.00	44.90	65.20	15.50	0.047	2.10	0	0.138	0.746	0.5
	Concentrations					0.73	16.08	70.85	29.15	27.05	34.37	38.89	0.080	4.08		2.080	7.360	0.7
	Totals		119.2000	60.1600	50.47	44.19	9.68	6.80	2.82	12.66	20.68	23.40	4.670	2.46	2459	51.000	181.000	0.4
	Requirements			58.8000		47.47	10.64	7.30		10.88	16.46	21.76		2.94	2433	66.000	200.000	0.4
	Difference			1.3600		-3.28		-0.45		1.78	4.22	1.64		-0.48	26	-15.000	-19.000	-0.0

Differences: ADF, NDF and NFC levels are high.

RDP, methionine and lysine levels are low.

Ration DM total is higher than predicted for this cow. She may not eat all of this feed.

Holstein Lactating Lact # 2 Weight 1450 Milk 115 % Fat 3.5 % Protein 3.1 DIM 60 BCS 2.5

Ration: Current Dairy Ration Current Dairy Ration NEI Calculation: User ReCalc All

Units lb-Mcal/lb Currency \$ User Defined Requirements  Adjst MCRP RDP View Notes

Feeds					Nutrient Information													
Mi	Feed Name	Ty	AsFed	DM	DM%	NEI	CP	RDP	RUP	ADF	NDF	NFC	\$/DM	Fat	IP	Met	Lys	C
						Mcal/lb	%DM	% CP	% CP	%DM	%DM	%DM		%DM		%DM	%DM	%C
0	Alfa hay barn 2	F	5.0000	4.5000	90.00	0.58	16.00	72.00	20.00	37.00	48.00	24.30	0.064	2.00	0	0.237	0.768	1.4
0	Alfa sil bag	F	29.0000	12.7600	44.00	0.61	18.25	78.00	22.00	32.00	44.00	25.35	0.071	3.00	0	0.245	0.723	1.4
0	Corn sil proc	F	60.0000	20.4000	34.00	0.70	8.50	70.00	30.00	23.00	44.00	39.50	0.078	3.00	0	0.129	0.207	0.2
0	Wheat straw	F	1.0000	0.9000	90.00	0.40	4.00	50.00	50.00	53.90	77.90	8.50	0.026	1.80	0	0.050	0.135	0.2
0	Corn grain grou	G	12.0000	10.6800	89.00	0.91	9.30	50.00	50.00	3.20	9.50	75.30	0.066	4.30	0	0.201	0.274	0.0
0	Soybean meal 4	G	6.5000	5.7850	89.00	0.91	55.00	70.00	30.00	6.00	10.00	27.50	0.117	1.00	0	0.755	3.285	0.2
0	Urea 45%	G	0.1000	0.0990	99.00	0.00	281.00	100.00	0.00	0.00	0.00	0.00	0.243	0.00	0	0.000	0.000	0.0
0	Molasses black	G	1.0000	0.7500	75.00	0.77	5.80	90.00	10.00	0.00	0.00	82.20	0.042	0.50	0	0.016	0.047	1.0
0	Animal fat	BP	0.7500	0.7420	99.00	2.05	0.00	0.00	0.00	0.00	0.00	0.00	0.225	99.50	0	0.000	0.000	0.0
0	Beet pulp dehy	BP	0.5000	0.4550	91.00	0.81	9.70	60.00	40.00	31.00	55.30	30.00	0.053	0.60	0	0.160	0.608	0.6
0	Wheat midds	BP	0.7500	0.6680	89.00	0.74	18.40	70.00	30.00	10.00	38.30	33.20	0.052	4.90	0	0.281	0.704	0.1
0	VitMinMix	M\	0.8500	0.8320	97.86	0.00	0.00	0.00	0.00	7.53	10.76	9.68	0.148	0.00	0	0.000	0.000	11.
0	Soybean hulls	BP	1.7500	1.5920	91.00	0.76	12.10	70.00	30.00	48.90	65.20	15.50	0.047	2.10	0	0.138	0.746	0.5
	Concentrations					0.73	16.08	70.85	29.15	21.05	34.37	38.89	0.080	4.08		2.080	7.360	0.7
	Totals		119.2000	60.1600	50.47	44.19	9.68	6.86	2.82	12.66	20.68	23.40	4.670	2.46	2.59	51.000	181.000	0.4
	Requirements			58.8000		47.47	10.64	7.31		0.88	16.46	21.76		2.94	2.83	66.000	200.000	0.4
	Difference			1.3600		-3.28		-0.45		1.78	4.22	1.64		-0.48		-15.000	-19.000	-0.0

Requirements are based upon the animal we described.  
**IMPORTANT: Cows do not have a requirement level for RUP or Fat.**  
 The value listed as "Requirement" for Fat is actually a **MAXIMUM LEVEL** of Fat.

**Nutrient Information**

Feeds					Feed Ingredient Profile													
Mi	Feed Name	Ty	A Fed	DM	DM%	NEI	CP	RDP	RUP	ADF	NDF	NFC	\$/DM	Fat	MP	Met	Lys	Ca
						Mcal/lb	%DM	% CP	% CP	%DM	%DM	%DM		%DM		%DM	%DM	%C
0	Alfa hay barn 2	F	5.0000	4.5000	90.00	0.58	16.00	72.00	28.00	37.00	48.00	24.30	0.064	2.60	0	0.237	0.768	1.4

You could also look at the nutritional ratios of this ration for further information. From the menu, click "NutritionalInformation", "NutritionalRatios".

0	Animal fat	BP	0.7500	0.7420	99.00	2.05	0.00	0.00	0.00	0.00	0.00	0.00	0.225	99.50	0	0.000	0.000	0.0
0	Beet pulp dehy	BP	0.5000	0.4550	91.00	0.81	9.70	60.00	40.00	31.00	55.30	30.00	0.053	0.60	0	0.160	0.608	0.6
0	Wheat midds	BP	0.7500	0.6680	89.00	0.74	18.40	70.00	30.00	10.00	38.30	33.20	0.052	4.90	0	0.281	0.704	0.1
0	VitMinMix	M\	0.8500	0.8320	97.86	0.00	0.00	0.00	0.00	7.53	10.76	9.68	0.148	0.00	0	0.000	0.000	11.
0	Soybean hulls	BP	1.7500	1.5920	91.00	0.76	12.10	70.00	30.00	48.90	65.20	15.50	0.047	2.10	0	0.138	0.746	0.5
	Concentrations					Mcal/lb	--%DM--	--%CP--	--%CP--	--%DM--	--%DM--	--%DM--	\$/lbDM	--%DM--		--%MP--	--%MP--	--%C
			--lbs--	lb DM	--%DM--	--Mcal--	----lbs--	----lbs--	----lbs--	----lbs--	----lbs--	----lbs--	----\$---	----lb---	----g---	----g---	----g---	----lb
	Totals		119.2000	60.1600	50.47	44.19	9.68	6.86	2.82	12.66	20.68	23.40	4.670	2.46	2459	51.000	181.000	0.4
	Requirements			58.8000		47.47	10.64	7.31		10.88	16.46	21.76		2.94	2433	66.000	200.000	0.4
	Difference			1.3600		-3.28		-0.45		1.78	4.22	1.64		-0.48	26	-15.000	-19.000	-0.0



## Changes to Consider

- ❁ **To lower fiber levels, we will pull out some of the forage feeds.**
- ❁ **To optimize the rumen environment and microbial protein production, we want to meet RDP requirements.**
- ❁ **Pay attention to the total dry matter in the ration. Currently, we are higher than the described cow may be able eat.**

Holstein Lactating Lact # 2 Weight 1450 Milk 115 % Fat 3.5 % Protein 3.1 DIM 60 BCS 2.5  
 Ration: First Changes Altered Dairy Ration NEI Calculation: User ReCalc All  
 Units lb-Mcal/lb Currency \$ User Defined Requirements  Adjst MCRP RDP View Notes

Nutrient Information																			
Feeds						Feed Ingredient Profile													
Mi	Feed Name	Ty	AsFed	DM	DM%	NEI	CP	RDP	RUP	ADF	NDF	NFC	\$/DM	Fat	MP	Met	Lys	C	
						Mcal/lb	%DM	% CP	% CP	%DM	%DM	%DM		%DM		%DM	%DM	%DM	%C
0	Alfa hay barn 2	F	4.0000	3.6000	90.00	0.58	16.00	72.00	28.00	37.00	48.00	24.30	0.064	2.60	0	0.237	0.768	1.4	
0	Alfa sil bag	F	33.0000	14.5200	44.00	0.61	18.25	78.00	22.00	32.00	44.00	25.35	0.071	3.00	0	0.245	0.723	1.4	
0	Corn sil proc	F	47.0000	15.9800	34.00	0.70	8.50	70.00	30.00	23.00	44.00	39.50	0.078	3.00	0	0.129	0.207	0.2	
0	Wheat straw	F	0.0000	0.0000	90.00	0.40	4.00	50.00	50.00	53.90	77.90	8.50	0.026	1.80	0	0.050	0.135	0.2	
0	Corn grain grow	G	12.5000	11.1250	89.00	0.91	9.30	50.00	50.00	3.20	9.50	75.30	0.066	4.30	0	0.201	0.274	0.0	
0	Soybean meal 4	G	7.0000	6.2300	89.00	0.91	55.00	70.00	30.00	6.00	10.00	27.50	0.117	1.00	0	0.755	3.285	0.2	
0	Urea 45%	G	0.1300	0.1290	99.00	0.00	281.00	100.00	0.00	0.00	0.00	0.00	0.243	0.00	0	0.000	0.000	0.0	
0	Molasses black	G	1.0000	0.7500	75.00	0.77	5.80	90.00	10.00	0.00	0.00	82.20	0.042	0.50	0	0.016	0.047	1.0	
0	Animal fat	BP	0.7500	0.7420	99.00	2.05	0.00	0.00	0.00	0.00	0.00	0.00	0.225	99.50	0	0.000	0.000	0.0	
0	Beet pulp dehy	BP	0.0000	0.0000	91.00	0.81	9.70	60.00	40.00	31.00	55.30	30.00	0.053	0.60	0	0.160	0.608	0.6	
0	Wheat midds	BP	2.0000	1.7800	89.00	0.74	18.40	70.00	30.00	10.00	38.30	33.20	0.052	4.90	0	0.281	0.704	0.1	
0	Soybean hulls	BP	2.0000	1.8200	91.00	0.76	12.10	70.00	30.00	48.90	65.20	15.50	0.047	2.10	0	0.138	0.746	0.5	
0	VitMinMix	MV	0.8500	0.8320	97.86	0.00	0.00	0.00	0.00	7.53	10.76	9.68	0.148	0.00	0	0.000	0.000	11.	
0	SoyPlus	G	1.9000	1.6720	88.00	0.94	48.30	40.00	60.00	8.00	23.60	15.69	0.134	5.11	0	0.681	3.028	0.3	
0	Mepron	VW	0.0360	0.0350	99.00	0.88	85.00	20.00	80.00	2.50	3.50	9.00	4.591	1.00	0	85.000	0.000	0.0	
	Concentrations					0.75	18.30	68.86	31.14	19.67	32.39	38.49	0.080	4.23		2.400	7.340	0.7	
	Totals		112.1700	59.2200	52.79	44.33	10.84	7.46	3.37	11.65	19.18	22.79	4.890	2.50	2705	65.000	199.000	0.4	
	Requirements			58.8000		47.47	10.64	7.12		10.88	16.46	21.76		2.94	2433	66.000	200.000	0.4	
	Difference			0.4200		-3.14		0.34		0.77	2.72	1.03		-0.44	272	-1.000	-1.000	-0.0	

First set of changes. Review the differences displayed.

## Did Not Change Cow Description

- ⊗ **Notice, this is the same cow and production level described in the earlier ration.**
- ⊗ **If you feel a change is needed, make the change in the Ration Worksheet.**
- ⊗ **Balance the ration for the animal eating it.**

# First Changes

- ⊗ **Reduced or removed**: alfalfa hay, corn silage, straw, beet pulp.
- ⊗ **Increased or added**: alfalfa silage, corn, soybean meal, urea, wheat midds, soy hulls.
- ⊗ Also we **added** “Mepron” and “Soy Plus” for Methionine (Met) and Lysine (Lys) requirements, respectively.

Holstein Lactating Lact # 2 Weight 1450 Milk 115 % Fat 3.5 % Protein 3.1 DIM 60 BCS 2.5  
 Ration: First Changes Altered Dairy Ration NEI Calculation: User ReCalc All  
 Units lb-Mcal/lb Currency \$ User Defined Requirements  Adjst MCRP RDP View Notes

Nutrient Information																			
Feeds						Feed Ingredient Profile													
Mi	Feed Name	Ty	AsFed	DM	DM%	NEI	CP	RDP	RUP	ADF	NDF	NFC	\$/DM	Fat	MP	Met	Lys	Ca	P
						Mcal/lb	%DM	% CP	% CP	%DM	%DM	%DM		%DM		%DM	%DM	%DM	%DM
0	Alfa hay barn 2	F	4.0000	3.6000	90.00	0.58	16.00	72.00	28.00	37.00	48.00	24.30	0.064	2.60	0	0.237	0.768	1.4	
0	Alfa sil bag	F	33.0000	14.5200	44.00	0.61	18.25	78.00	22.00	32.00	44.00	25.35	0.071	3.00	0	0.245	0.723	1.4	
0	Corn sil proc	F	47.0000	15.9800	34.00	0.70	8.50	70.00	30.00	23.00	44.00	39.50	0.078	3.00	0	0.129	0.207	0.2	
0	Wheat straw	F	0.0000	0.0000	90.00	0.40	4.00	50.00	50.00	53.90	77.90	8.50	0.026	1.80	0	0.050	0.135	0.2	
0	Corn grain grow	G	12.5000	11.1250	89.00	0.91	9.30	50.00	50.00	3.20	9.50	75.30	0.066	4.30	0	0.201	0.274	0.0	
0	Soybean meal 4	G	7.0000	6.2300	89.00	0.91	55.00	70.00	30.00	6.00	10.00	27.50	0.117	1.00	0	0.755	3.285	0.2	
0	Urea 45%	G	0.1300	0.1290	99.00	0.00	281.00	100.00	0.00	0.00	0.00	0.00	0.243	0.00	0	0.000	0.000	0.0	
0	Molasses black	G	1.0000	0.7500	75.00	0.77	5.80	90.00	10.00	0.00	0.00	82.20	0.042	0.50	0	0.016	0.047	1.0	
0	Animal fat	BP	0.7500	0.7420	99.00	2.05	0.00	0.00	0.00	0.00	0.00	0.00	0.225	99.50	0	0.000	0.000	0.0	
0	Beet pulp dehy	BP	0.0000	0.0000	91.00	0.81	9.70	60.00	40.00	31.00	55.30	30.00	0.053	0.60	0	0.160	0.608	0.6	
0	Wheat midds	BP	2.0000	1.7800	89.00	0.74	18.40	70.00	30.00	10.00	38.30	33.20	0.052	4.90	0	0.281	0.704	0.1	
0	Soybean hulls	BP	2.0000	1.8200	91.00	0.76	12.10	70.00	30.00	48.90	65.20	15.50	0.047	2.10	0	0.138	0.746	0.5	
0	VitMinMix	MV	0.8500	0.8320	97.80	0.00	0.00	0.00	0.00	7.53	10.76	9.68	0.148	0.00	0	0.000	0.000	11.0	
0	SoyPlus	G	1.9000	1.6720	88.00	0.94	48.30	40.00	60.00	8.00	23.60	15.69	0.134	5.11	0	0.681	3.028	0.3	
0	Mepron	VM	0.0360	0.0350	99.00	0.88	85.00	20.00	80.00	2.50	3.50	9.00	0.591	1.00	0	85.000	0.000	0.0	
	Concentrations			0.75	18.30	68.86	31.14	19.67	32.39	38.49	0.080	4.23		2.400	7.340	0.7			
	Totals		112.1700	59.2200	52.75	44.33	10.84	7.46	3.37	11.65	19.18	22.79	0.890	2.50	27.05	65.000	199.00	0.4	
	Requirements			58.8000		47.47	10.64	7.12		10.88	16.46	21.76		2.94	24.3	66.000	200.00	0.4	
	Difference			0.4200		-3.14		0.34		0.77	2.72	1.03		-0.44	27.0	-1.000	-1.000	-0.0	

Differences: Lowered ADF, NDF, NFC levels. Ration DM Total has been reduced. Increased RDP, Met and Lys levels.

ReCalc All  
View Notes

**Nutrient Ratios**

Print Select Printer Restore Quit Help

	Calculated	Recommended
Forage:Concentrate ratio	58 : 42	
Forage NDF as % of NDF	79	70 - 85%
NDF intake as % of BW	1.3	1.1 - 1.3%
Forage NDF as % of DM	25.58	24 - 28%
Total forage ADF	9.65 lbs	8.33 +/- 0.31
Calcium:Phosphorus ratio	1.8	
Potassium:Calcium ratio	2.1	
Calcium:Magnesium ratio	2.7	
Anion:Cation balance	18.71	
The Lysine:Methionine ratio is	3.06	2.9 - 3.1 : 1
<b>Nutritional Notes</b>		
	Total	Requirements
NDF exceeds requirement.	19.18	16.46
NFC exceeds requirement	22.79	21.76
RDP Requirement Exceeded.	7.46	7.12

Restore

**Nutrient Ratios screen:**  
**Values are improving.**  
**NDF and ADF ratios and totals are closer to recommended levels and meeting requirement.**  
**Lys:Met ratio is also in the recommended range.**

---lbs---	---\$---	---lb---	---g---	---g---	---g---	---lt---
22.79	4.890	2.50	2705	65.000	199.000	0.4
21.76		2.94	2433	66.000	200.000	0.4
1.03		-0.44	272	-1.000	-1.000	-0.0

Holstein Lactating Lact # 2 Weight 1450 Milk 115 % Fat 3.5 % Protein 3.1 DIM 60 BCS 2.5

Ration: First Changes Altered Dairy Ration NEI Calculation: User ReCalc All

Units lb-Mcal/lb Currency \$ User Defined Requirements  Adjst MCRP RDP View Notes

Nutrient Information																			
Feeds						Feed Ingredient Profile													
Mi	Feed Name	Ty	AsFed	DM	DM%	NEI	CP	RDP	RUP	ADF	NDF	NFC	\$/DM	Fat	MP	Met	Lys	C	
						Mcal/lb	%DM	% CP	% CP	%DM	%DM	%DM		%DM		%DM	%DM	%DM	%C
0	Alfa hay barn 2	F	4.0000	3.6000	90.00	0.58	16.00	72.00	28.00	37.00	48.00	24.30	0.064	2.60	0	0.237	0.768	1.4	
0	Alfa sil bag	F	33.0000	14.5200	44.00	0.61	18.25	78.00	22.00	32.00	44.00	25.35	0.071	3.00	0	0.245	0.723	1.4	
0	Corn sil proc	F	47.0000	15.9800	34.00	0.70	8.50	70.00	30.00	23.00	44.00	39.50	0.078	3.00	0	0.129	0.207	0.2	
0	Wheat straw	F	0.0000	0.0000	90.00	0.40	4.00	50.00	50.00	53.90	77.90	8.50	0.026	1.80	0	0.050	0.135	0.2	
0	Corn grain grou	G	12.5000	11.1250	89.00	0.91	9.30	50.00	50.00	3.20	9.50	75.30	0.066	4.30	0	0.201	0.274	0.0	
0	Soybean meal 4	G	7.0000	6.2300	89.00	0.91	55.00	70.00	30.00	6.00	10.00	27.50	0.117	1.00	0	0.755	3.285	0.2	
0	Urea 45%	G	0.1300	0.1290	99.00	0.00	281.00	100.00	0.00	0.00	0.00	0.00	0.243	0.00	0	0.000	0.000	0.0	
0	Molasses black	G	1.0000	0.7500	75.00	0.77	5.80	90.00	10.00	0.00	0.00	82.20	0.042	0.50	0	0.016	0.047	1.0	
0	Animal fat	BP	0.7500	0.7420	99.00	2.05	0.00	0.00	0.00	0.00	0.00	0.00	0.225	99.50	0	0.000	0.000	0.0	
0	Beet pulp dehy	BP	0.0000	0.0000	91.00	0.81	9.70	60.00	40.00	31.00	55.30	30.00	0.053	0.60	0	0.160	0.608	0.6	
0	Wheat midds	BP	2.0000	1.7800	89.00	0.74	18.40	70.00	30.00	10.00	38.30	33.20	0.052	4.90	0	0.281	0.704	0.1	
0	Soybean hulls	BP	2.0000	1.8200	91.00	0.76	12.10	70.00	30.00	48.90	65.20	15.50	0.047	2.10	0	0.138	0.746	0.5	
0	VitMinMix	MV	0.8500	0.8320	97.86	0.00	0.00	0.00	0.00	7.53	10.76	9.68	0.148	0.00	0	0.000	0.000	11.	
0	SoyPlus	G	1.9000	1.6720	88.00	0.94	48.30	40.00	60.00	8.00	23.60	15.69	0.134	5.11	0	0.681	3.028	0.3	
0	Mepron	VW	0.0360	0.0350	99.00	0.88	85.00	20.00	80.00	2.50	3.50	9.00	4.591	1.00	0	85.000	0.000	0.0	
	Concentrations					0.75	18.30	68.86	31.14	19.67	32.39	38.49	0.080	4.23		2.400	7.340	0.7	
	Totals		112.1700	59.2200	52.79	44.33	10.84	7.46	3.37	11.65	19.18	22.79	4.890	2.50	2705	65.000	199.000	0.4	
	Requirements			58.8000		47.47	10.64	7.12		10.88	16.46	21.76		2.94	2433	66.000	200.000	0.4	
	Difference			0.4200		-3.14		0.34		0.77	2.72	1.03		-0.44	272	-1.000	-1.000	-0.0	

Your nutritional skills come into play: NFC is higher than requirement, but cows look thinner than on your last visit. RDP is slightly in excess. We will reduce haylage by 3 lbs, add 1 lb of corn and 0.2 lb of soybean meal. The next screen shows the changes. Notice the differences. You make judgment calls for additional changes.

Nutrient Information																			
Feeds					Feed Ingredient Profile														
Mi	Feed Name	Ty	AsFed	DM	DM%	NEI	CP	RDP	RUP	ADF	NDF	NFC	\$/DM	Fat	MP	Met	Lys	Ca	P
						Mcal/lb	%DM	% CP	% CP	%DM	%DM	%DM		%DM		%DM	%DM	%DM	%DM
0	Alfa hay barn 2	F	4.0000	3.6000	90.00	0.58	16.00	72.00	28.00	37.00	48.00	24.30	0.063	2.60	0	0.237	0.768	1.4	0.1
0	Alfa sil bag	F	30.0000	13.2000	44.00	0.61	18.25	78.00	22.00	32.00	44.00	25.35	0.070	3.00	0	0.245	0.723	1.4	0.1
0	Corn sil proc	F	47.0000	15.9800	34.00	0.70	8.50	70.00	30.00	23.00	44.00	39.50	0.076	3.00	0	0.129	0.207	0.2	0.1
0	Wheat straw	F	0.0000	0.0000	90.00	0.40	4.00	50.00	50.00	53.90	77.90	8.50	0.026	1.80	0	0.050	0.135	0.2	0.1
0	Corn grain grou	G	13.5000	12.0150	89.00	0.91	9.30	50.00	50.00	3.20	9.50	75.30	0.066	4.30	0	0.201	0.274	0.0	0.1
0	Soybean meal 4	G	7.2000	6.4080	89.00	0.91	55.00	70.00	30.00	6.00	10.00	27.50	0.118	1.00	0	0.755	3.285	0.2	0.1
0	Urea 45%	G	0.1000	0.0990	99.00	0.00	281.00	100.00	0.00	0.00	0.00	0.00	0.243	0.00	0	0.000	0.000	0.0	0.1
0	Molasses black	G	1.0000	0.7500	75.00	0.77	5.80	90.00	10.00	0.00	0.00	82.20	0.043	0.50	0	0.016	0.047	1.0	0.1
0	Animal fat	BP	0.7500	0.7425	99.00	2.05	0.00	0.00	0.00	0.00	0.00	0.00	0.225	99.50	0	0.000	0.000	0.0	0.1
0	Beet pulp dehy	BP	0.0000	0.0000	91.00	0.81	9.70	60.00	40.00	31.00	55.30	30.00	0.053	0.60	0	0.160	0.608	0.6	0.1
0	Wheat midds	BP	2.0000	1.7800	89.00	0.74	18.40	70.00	30.00	10.00	38.30	33.20	0.052	4.90	0	0.281	0.704	0.1	0.1
0	Soybean hulls	BP	2.0000	1.8200	91.00	0.76	12.10	70.00	30.00	48.90	65.20	15.50	0.047	2.10	0	0.138	0.746	0.5	0.1
0	VitMinMix	MV	0.8500	0.8318	97.86	0.00	0.00	0.00	0.00	7.53	10.76	9.68	0.148	0.00	0	0.000	0.000	11.	0.1
0	SoyPlus	G	1.9000	1.6720	88.00	0.94	48.30	40.00	60.00	8.00	23.60	15.69	0.134	5.11	0	0.681	3.028	0.3	0.1
0	Mepron	VW	0.0354	0.0350	99.00	0.88	85.00	20.00	80.00	2.50	3.50	9.00	4.591	1.00	0	85.000	0.000	0.0	0.1
	Concentrations					Mcal/lb	--%DM--	--%CP--	--%CP--	--%DM--	--%DM--	--%DM--	\$/lbDM	--%DM-		--%MP--	--%MP--	--%C-	
						0.75	18.14	68.28	31.72	19.12	31.74	39.33	0.082	4.25		2.400	7.350	0.7	
	Totals		110.3357	58.933	53.41	44.49	10.69	7.30	3.39	11.27	18.70	23.18	4.824	2.50	2718	65.000	200.000	0.4	
	Requirements			58.8000		47.46	10.64	7.24		10.88	16.46	21.76		2.94	2433	66.000	200.000	0.4	
	Difference			0.1300		-2.98		0.06		0.39	2.24	1.42		-0.44	285	-1.000	0.000	-0.0	

This looks better. Ration evaluation requires adjustments. Continue working until you are satisfied with the results.

**Nutrient Information**

Feeds					Feed Ingredient Profile													
Mi	Feed Name	Ty	AsFed	DM	DM%	NEI	CP	RDP	RUP	ADF	NDF	NFC	\$/DM	Fat	MP	Met	Lys	Ca
						Mcal/lb	%DM	% CP	% CP	%DM	%DM	%DM		%DM		%DM	%DM	%C
0	Alfa hay barn 2	F	4.0000	3.6000	90.00	0.58	16.00	72.00	28.00	37.00	48.00	24.30	0.063	2.60	0	0.237	0.768	1.4
0	Alfa sil bag	F	30.0000	13.2000	44.00	0.61	18.25	78.00	22.00	32.00	44.00	25.35	0.070	3.00	0	0.245	0.723	1.4
0	Corp sil proc	F	47.0000	15.9800	34.00	0.70	8.50	70.00	30.00	23.00	44.00	39.50	0.076	3.00	0	0.129	0.207	0.2

To quickly look at other nutrient levels, right click your mouse on the screen. Select "Carbohydrates". This will give us a bit more information on some of the nutrients available to the rumen microbes.

Remember, optimizing the rumen microbial environment will provide us the best base for profitable milk production.

"Feed the bugs, feed your wallet."

- Home
- End
- Amino Acids
- Energy
- Proteins
- Carbohydrates**
- Fat
- Macrominerals
- Microminerals
- Vitamins
- Cost

	\$/lb	%DM	g	%MP	%MP	%C
18.70	23.18	4.824	2.50	2718	65.000	200.000
16.46	21.76		2.94	2433	66.000	200.000
2.24	1.42		-0.44	285	-1.000	0.000

Ration Name:  Altered Dairy Ration

Second Change - Nutrient Details

Feeds						Feed Ingredient Profile												
Mi	Feed Name	Type	AsFed	DM	DM%	NDF	ADF	NFC	Starch	%Ferm	Sugar	VFA	SoIND	GluPre	EffNDF	Lignin		
						%DM	%DM	%DM	%DM	%Starcl	%DM	%DM	%DM	%DM	%NDF	%DM		
0	Alfa hay barn 2	F	4.0000	3.6000	90.00	48.00	37.00	24.30	1.80	70.00	3.80	0.00	18.70	0.18	46.00	6.70		
0	Alfa sil bag	F	30.0000	13.2000	44.00	44.00	32.00	25.35	3.30	70.00	3.10	3.40	18.95	0.71	42.00	7.30		
0	Corn sil proc	F	47.0000	15.9800	34.00	44.00	23.00	39.50	28.00	75.00	1.30	7.60	10.20	3.56	44.00	2.60		
0	Wheat straw	F	0.0000	0.0000	90.00	77.90	53.90	8.50	0.00	70.00	0.00	0.00	8.50	0.00	85.00	14.00		
0	Corn grain grou	G	13.5000	12.0150	89.00	9.50	3.20	75.30	70.00	70.00	1.10	0.00	4.20	6.02	2.30	0.90		
0	Soybean meal 4	G	7.2000	6.4080	89.00	10.00	6.00	27.50	6.00	50.00	11.00	0.00	10.50	0.90	25.00	0.50		
0	Urea 45%	G	0.1000	0.0990	99.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
0	Molasses black	G	1.0000	0.7500	75.00	0.00	0.00	82.20	0.00	0.00	65.00	0.00	17.20	0.49	0.00	0.00		
0	Animal fat	BP	0.7500	0.7425	99.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
0	Beet pulp dehy	BP	0.0000	0.0000	91.00	55.30	31.00	30.00	1.40	50.00	7.30	0.00	21.30	0.00	13.50	1.60		
0	Wheat midds	BP	2.0000	1.7800	89.00	38.30	10.00	33.20	22.00	70.00	5.00	0.00	6.20	0.36	9.30	4.20		
0	Soybean hulls	BP	2.0000	1.8200	91.00	65.20	48.90	15.50	3.00	50.00	2.00	0.00	10.50	0.06	16.70	2.50		
0	VitMinMix	MVM	0.8500	0.8318	97.86	10.76	7.53	9.68	0.00	0.00	0.00	0.00	9.68	0.00	0.00	0.00		
0	SoyPlus	G	1.9000	1.6720	88.00	23.60	8.00	15.69	2.20	40.00	10.30	0.00	3.19	0.19	2.30	1.50		
0	Mepron	VM	0.0354	0.0350	99.00	3.50	2.50	9.00	8.00	70.00	0.00	0.00	1.00	0.00	0.00	0.00		
						--%DM--	--%DM--	--%DM--	--%DM--	%Starcl	--%DM--	--%DM--	--%DM--	--%DM--	--%NDF	--%DM--		
	Concentrations					31.74	19.12	39.33	24.19	70.88	4.03	2.82	11.11	21.18	11.51	3.23		
			--lbs--	lb DM	-%DM-	---lbs---	---lbs---	---lbs---	---lbs---	---lbs---	---lbs---	---lbs---	---lbs---	---lbs---	---lbs---	---lbs---		
	Totals		110.3357	58.933	53.41	18.70	11.27	23.18	14.26	10.10	2.38	1.66	6.55	12.48	6.79	1.91		
	Requirements			58.8000		16.46	10.88	21.76										
	Difference			0.1300		2.24	0.39	1.42										

**Nutrient Group Worksheet, Carbohydrates: We see fiber and NFC levels. Starch and sugar levels are important to understanding the true value of NFC in the ration. SoIND captures the pectins and glucans, which can influence milk fat test.**

### Carbohydrates Worksheet

The carbohydrate detail columns are accessed by clicking the right mouse button while the cursor is on the "Nutrient Information" section of the "Ration Worksheet" and selecting 'Carbohydrates' from the drop-down menu. The "Carbohydrates" worksheet contains the neutral detergent fiber (NDF), acid detergent fiber (ADF) and non-fiber carbohydrates (NFC). The components of NFC are similarly included as starch, fermentability of the starch (%Ferm), sugar, volatile fatty acids (VFA) and portions of NDF that are soluble in NDF solution (SolND). There is a calculation of how much propionate will be produced to provide glucose precursor (GluPre). The fiber fractions of the diet are further described by the effectiveness of the NDF (effNDF) and lignin content. The NDF, ADF, and NFC columns appear on the "Feed Ingredient Profile" section of the "Ration Worksheet".

#### A Note on the Carbohydrate Fractions

AminoCow includes the carbohydrate fractions sugar, starch, starch fermentability (%Ferm), glucose precursor, effective neutral detergent fiber (effNDF) and lignin, which were not found in earlier versions of the Mepron Dairy Ration Evaluator. This is due to our belief that the relationship between fermentable carbohydrate and degradable protein ultimately determines the amount of microbial protein synthesized, thereby affecting both the productivity of the ration and the total ration cost. This is our attempt to better characterize non-fiber carbohydrates in a meaningful way. No requirements are given for these fractions, and except for lignin, which is used in the calculation of microbial synthesis, these fractions are included for evaluative purposes only. These fractions have no effect on the prediction of energy or protein flow at present.

#### Carbohydrate Columns

- [NDF](#)
- [ADF](#)
- [NFC](#)
- [Starch](#)
- [%Ferm](#)
- [Sugar](#)
- [VFA](#)
- [SolND](#)
- [GluPre](#)
- [effNDF](#)
- [Lignin](#)

**Clicking "Help" from the Carbohydrates screen brings up this page. You can read the overview or link to any of the specific topics to find more details, recommendations, definitions, and cautions for these categories. You can also link to the Nutritional Primer from this screen for more information.**

Also see the discussion on non-fiber carbohydrates in the [Nutritional Primer](#).

# Nutrient Group Worksheets

**You may evaluate the ration further by right clicking the mouse and pulling up other Nutrient Group Worksheets.**

## Evaluating a Ration

- ⊗ **Notice, we didn't focus on NEI or crude protein levels.**
- ⊗ **NEI is only a calculation. In the real world, cows eat until they fill their energy requirements or fill their rumen. Quality forages allow energy needs to be met.**
- ⊗ **Amino acid balance meets the cow's protein requirements.**

# Evaluating a Ration

- ⊗ **Are we through with this ration?**
- ⊗ **Your goals are to meet intake, fiber, fermentable energy and rumen degradable protein requirements first. This optimizes the rumen microbes. Then balance amino acids, vitamins and minerals.**
- ⊗ **Also, you need to work with available feeds and what is realistic on this dairy.**

## Your Skills Blend Nutritional Science with this Dairy

- ⊗ **Can this dairy feed the ration you design?**
- ⊗ **Follow up to be sure the ration on paper is the ration being fed.**
- ⊗ **Study the cows. Changes in their lives show up in manure, body condition, cud chewing, health, reproduction and... MILK PRODUCTION.**