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Programmable Calculator Program: Input Form Michigan State University Cooperative Extension Service John Baer W.C. Search J.W. Thomas Joe Hlubik 12 pages

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Cooperative Extension Service....

John Baer W.C. Search J.W. Thomas Joe Hlubik

TI-59 TelCal 55:1

PROGRAMMABLE CALCULATOR PROGRAM

OBJECTIVE: To balance a ration for a dairy cow given the requirements and feeds available. The program is designed to serve as a teaching aid in understanding Basic Dairy Nutrition.

INSIPULL INCORNI

Part I Getting Started ...



STEP	INPUT DESCRIPTION	INPUT VALUE	PRESS
1.	Turn calculator off, and back on, to clear program.		
2.	Insert side 1 of the card containing TelCal 55:1. If the calculator has read the card successfully, a "1" will appear and remain stationary. If a flashing "O" appears, repeat step 3 & 2.		
3.	Clear Display		 (CLR)
4.	Insert side "2" of the card. If the calculator reads side 2 successfully, a "2" will appear and remain stationary. If a "O" appears, repeat steps 3 & 4.		
5.	Clear Display		 (CLR)
6.	Clear Memory		 (A)

STEP	INPUT DESCRIPTION	VALUE	PRESS	REVISED
7.	Estimated % Moisture of Ration (15% will not affect Dry Matter Intake) From Table 1.		(STO) 09	
8.	Weight of the cow (Cwt)		(STO) 10	
9.	Milk Production (lbs/day) (to nearest whole pound)		(STO) 11	
10.	Butterfat (%)	<u> </u>	(STO) 12	

For Your Farm . . . What is your Forage Program?

	FORAGE I.			
11.	Pounds fed per day (to nearest pound)	<u></u>	(STO)13	
12.	Dry Matter D.M.		(STO) 14	
13.	Total Protein C.P.	·	(STO) 15	
14.	Net Energy N.E. (MCal. lb.)	· <u></u>	(STO) 16	
15.	Calcium	·	(STO) 17	
16.	Phosphorus	·	(STO) 18	
	FORAGE II.			
17.	Pounds fed per day (to nearest pound)		(STO)19	<u> </u>
18.	Dry Matter D.M.	·	(STO) 20	
19.	Total Protein C.P.	·	(STO) 21	
20.	Net Energy N.E. (MCal/lb)	·	(STO) 22	
21.	Calcium		(STO) 23	<u> </u>
22.	Phosphorus	·	(STO) 24	

NOTE: To run program again as a revised ration, re-enter lines 8, 9, and 10, if you have run Part 2. This is not necessary when Part 2 has not been entered.

STEP	INPUT DESCRIPTION	VALUE	PRESS	REVISED RATION
	YOUR GRAI	N CHOICES		
	GRAIN I.			
23.	Enter proportion of Grains I & II, (dry basis) that is, Grain I as a decimal. If only one grain, line 23 is 1.00.	<u></u>	(STO)25	
24.	Dry Matter D.M.		(STO) 26	
25.	Total Protein C.P.	·	(STO) 27	
26.	Net Energy N.E. (MCal/lb)		(STO) 28	
27.	Calcium	<u></u>	(STO) 29	
28.	Phosphorus		(STO) 30	
	NOTE: Grain I + Grain II = 1.0			
	GRAIN II,			
29.	% of Grain II in farm grain mix		(STO) 31	
30.	Dry Matter D.M.	<u></u>	(STO) 32	
31.	Total Protein C.P.		(STO) 33	
32.	Net Energy N.E. (MCal/lb)	<u></u> -	(STO) 34	
33.	Calcium		(STO) 35	
34.	Phosphorus		(STO) 36	
	PROTEIN SUPPLEMENT			
35.	Dry Matter D.M.	<u></u>	(STO) 37	
36.	Total Protein C.P.		(STO) 38	
37.	Net Energy (MCal)	<u></u>	(STO) 39	
38.	Calcium		(STO) 40	
39.	Phosphorus		(STO) 41	

Dry Matter is the Key . . .

STEP	OUTPUT DESCRIPTION	PRESS	VALUE		REVISED RATION
	REQUIREMENTS OF THE COW				
40.	Dry Matter Intake (lbs/day)	В			
41.	Total Protein needs (lbs/day)	R/S			
42.	Net Energy (MCal/day)	R/S			
43.	Calcium (Ibs/day)	R/S			
44.	Phosphorus (lbs/day)	R/S			
45.	Magnesium (Ibs/day)	R/S	100		
46.	Sulfur (lbs/day)	R/S			
	NUTRIENTS FROM FORAGES				
47.	Dry Matter (Ibs/day) Warning: If Dry Matter of forage is greater than Dry Matter Intake (line 40), an error has been made. Re-adjust forages fed.	R/S		•	
48.	Total Protein (lbs/day)	R/S			
49.	Net Energy (MCal/day)	R/S			76 F.
50.	Calcium(lbs/day)	R/S			
51.	Phosphorus (Ibs/day)	R/S			
	SUGGESTED AMOUNTS OF GRAINS TO FEED				
52.	% Protein in grain mix (dry basis)	R/S			
53.	Pounds of supplement/day Ibs/Hd/day	R/S			
54.	Pounds of Grain I/day Ibs/Hd/day	R/S			
55.	Pounds of Grain II/day Ibs/Hd/day	(from n	ext page)		
56.	Pounds of Dry Matter from grains and supplement/day (lbs/day)	R/S			
57.	Total Dry Matter from grains, supplement, and forages	R/S		•	
	Warning: Dry Matter should not be greater than Dry Matter Intake (lines 57 & 40).				

NOTE: Press R/S again. This will cause a O to appear. This signifies the end of this program, DO NOT TURN CALCULATOR OFF OR CLEAR MEMORY (CLR). Go to program card 1a and 1b.

DAIRY RATION BALANCER - 3 & 4

Enter second part of program. Do not turn off calculator or clear memory.

STEP	ENTER PROGRAM	VALUE	PRESS	REVISED
				RATION
1.	Clear Display		(CLR)	
2.	Enter card side 1b	1		
3.	Clear Display		(CLR)	
4.	Enter card side 2b	2		
5.	Clear Display		(CLR)	
6.	If you are feeding two farm grains, lbs/day of Grain II.		(2nd) B'	
7.	To clear calculating memories		(C)	
	YOUR MINE	RAL PROGR	AM!	
STEP	INPUT DESCRIPTION	VALUE	PRESS	
	MINERAL SUPPLEMENT No. 1 (NOTE: Must contain phosphorus)			
8.	Calcium (% Ca)	<u></u>	(STO) 42	
9.	Phosphorus (% P)		(STO) 43	
10.	Salt (%)		(STO) 44	
	MINERAL SUPPLEMENT NO. 2			
11.	Calcium (% Ca)		(STO) 45	

Here's Your Ration . . .

STEP	OUTPUT DESCRIPTION	PRESS	VALUE	
1.	Pounds of mineral I needed/day	D		
2.	Pounds of mineral II needed/day	R/S	•	

STEP	OUTPUT DESCRIPTION	PRESS	VALUE	REVISED RATION
3.	Pounds of salt needed/day	R/S	·	
4.	Pounds of trace mineralized salt/day to include in ration	R/S	· <u>·····</u>	
5.	Pounds of calcium in ration/day	R/S	·—	
6.	Pounds of calcium required/day	R/S	•	
7.	Pounds of phosphorus in ration/day	R/S		
8.	Pounds of phosphorus <u>required</u> /day	R/S	•	
9.	Calcium/Phosphorus ratio	R/S		agricultural (1994)
10.	Pounds of Protein in ration/day	R/S		
11.	Pounds of Protein <u>required</u> /day	R/S		
12.	MCal of net energy in ration/day	R/S		
13.	MCal of net energy required/day	R/S		
14.	Total lbs. of grain mix to feed/day	R/S		<u></u> -
15.	% Protein in grain mix (as fed basis)	R/S	A64 3.0	<u> </u>
		GRAIN MIX		
	Proportion of grains, supplement, and r	ninerals fed/day.		
16.	Grain I (lbs)	R/S		
17.	Grain II (lbs)	R/S		e 1 - 3 <u> </u>
18.	Supplement (lbs)	R/S		G. 348.
19.	Mineral I (lbs)	R/S		
20.	Mineral II (lbs)	R/S		
21.	Trace Mineralized Salt (lbs)	R/S		
22.	Total (lbs)	R/S	<u> </u>	
		TARKE 4		END OF PROGRAM

TABLE 1

Forage Program
Corn silage—minimum hay
Half corn silage—half hay
Haylage
Dry hay
Total Ration
A5 - 50%
A0 - 35%
B15 - 20%

Alfalfa meal - 15%	Feed Description	(1) Dry Matter	(2) Protein	(3) Net Energy MCal	(4) Ca.	(5) Phos.
The meal - 15% - 921	CONCENTRATES:					
The mean 1 - 17%			,			
ra meal - 20%	1	. 921	191.	0.47	.0132	.0024
The meal - 20%	1	.930	.183	0.48	.0143	.0026
Ta meal - 22%	1	.931	.215	0.50	.0162	0000
Navy Solution No. 1933 No. 1933 No. 1934 No. 1934 No. 1934 No. 1934 No. 1934 No. 1937 No. 1937 No. 1937 No. 1938 No. 1937 No. 1938 No. 193	1	.927	.237	0.52	.0159	0030
Navy Soy Soy Soy Soy Soy Soy Soy Sol Shalled S	Barley	68	133	000 0	7000 7000	200
Soy Soy	Beans, Navv	06	05/	102	.000	*0044
raip, 577 0.87 0.0022 Sacilar, Dry 57 0.87 0.0022 Shelled - 30% Moisture 770 1.08 9.915 0.0012 Shelled - 30% Moisture w/Urea 770 1.22 0.99 0.0002 Cob - 30% Moisture w/Urea 770 0.86 0.99 0.0002 Cob - 30% Moisture w/Urea 770 0.96 0.99 0.0002 Cob - 30% Moisture w/Urea 770 0.96 0.99 0.0002 Inten Meal 1	Beans, Sov	06	107	H. C.	3000	2000.
rs Grain, Dry Shelled - 30% Moisture Shelled - 30% Moisture Shelled - 30% Moisture Shelled - 30% Moisture To Shelled - 30% Shelled To Shelled - 30% Shell		16	7.00	0.00	0000	6000
Shelled Shelled - 30% Moisture	Brewers Grain, Dry	. 63	257	0000	2000.	\$ 700°
Shelled - 30% Moisture . 70 . 108 . 915 . 0012 Shelled - 30% Moisture w/Urea . 70 . 122 . 915 . 0002 Cob - 30% Moisture w/Urea . 70 . 086 . 0.99 . 0002 Luten Feed . 70 . 196 . 0.99 . 0002 Luten Meal . 914 . 472 . 0.88 . 0013 I Seed Meal . 924 . 477 . 0.75 . 0026 I Seed Meal . Solvent . 91 . 387 . 0.95 I Old Meal . Solvent . 91 . 402 . 0.95 I Old . 68 . 0040 I Old . 68 . 0040 I Old . 68 . 0010 I Old . 68 . 0000 I Old . 00000 I Old .		. 85	108	915	2100	0400
Shelled - 30% Moisture w/Urea .70 .122 .915 .0002 Cob - 30% Moisture = .70 .086 0.99 .0002 Cob - 30% Moisture = .70 .086 0.99 .0002 Cob - 30% Moisture = .70 .196 0.99 .0002 Sluten Read	-	.70	108	915	2100	0000
Cob - 30% Moisture	Shelled -	. 70	.122	.915	0000	9200
Cob - 30% Moisture 70 .086 0.99 .0002 .000 .000 .000 .000 .000 .00		. 86	.086	06 0	2000	0000
Cob - 30% Moisture w/Urea . 70 . 196 0.99 .0002 lluten Feed . 85 . 220 0.75 .0030 lluten Meal . 914 . 472 0.88 .0013 1 Seed Meal . 93 . 447 0.75 .0020 2 Seed Meal . 115 . 0026 2 Seed Oil Meal, Hydraulic . 91 . 402 0.95 . 0040 3 Soraps . 94 . 529 0.77 . 1057 3 Sees, Cane . 94 . 529 0.77 . 1057 3 Sees, Cane . 78 . 100 0.86 . 0011 3 Strond . 90 . 133 0.87 . 0020 3 Indi Meal - 44% . 90 . 508 1.01 . 0020 3 Indi Meal - 50% . 90 . 588 . 0000 1 Sees . 6000 . 6000 . 6000 1 Sees . 6000 . 6000 . 6000 1 Sees . 6000 . 6000 . 6000 . 6000 1 Sees . 6000 . 6	Cob -	. 70	980.	0.99	0000	.0022
1 Gluten Feed .85 .220 0.75 .0030 1 Gluten Meal .914 .472 0.88 .0013 1 Gluten Meal .938 .447 0.75 .0020 2.56 1.15 0.026 1.18 0.94 .0006 2.56 1.15 .0026 2.56 1.15 .0026 2.56 1.15 .0026 2.57 .387 0.94 .0040 2.589 0.77 .0040 2.81 0.86 .0011 2.50 0.87 .0040 2.81 0.86 .0011 2.50 0.87 .0029 2.50 0.79 .0029 2.50 0.79 .0029 2.50 0.79 .0029 2.50 0.89 0.0029 2.50 0.89 0.0029 2.50 0.89 0.0029 2.50 0.89 0.0029 2.50 0.89 0.009	Cob - 30% Moisture w/Ur	.70	.196	0.99	.0002	.0022
to Gluten Meal 1 Gluten Meal 2 3 447 2 47 2 6 6 6 75 2 6 6 1.15 2 75 1 18 2 75 1 18 2 75 1 18 2 75 2 75 2 75 2 75 2 75 2 75 2 75 2 75 2 75 2 75 2 75 2 75 2 75 3 70 3 70 3 70 3 70 3 70 3 70 3 70 3 70 3 70 3 70 3 70 3 70 3 70 3 70 3 70 3 70 4 70 5 84 5 70 5 70 5 84 5 70 5 86 5 70 5	Gluten	.85	.220	0.75	.0030	00.00
ton Seed Meal .938 .256 1.15 .0020 .938 .256 1.15 .0026 .938 .256 1.15 .0026 .902 .0026 .91 .387 0.94 .0042 .91 .402 0.86 .0042 .92 .529 0.77 .0848 .94 .529 0.77 .0848 .94 .529 0.77 .0848 .94 .529 0.77 .0066 .95 .0010 .85 .0009 .96 .0011 .8 Bone Scraps .73 .041 0.81 .0066 .90 .133 0.87 .0009 .895 .141 0.79 .0010 .029 .029 .120 0.85 .0009 .120 0.85 .0009 .120 0.85 .0009		.914	.472	0.88	.0013	.0038
ty Feed lay	Cotton Seed Meal	.93	7447	0.75	.0020	0000
Iny Feed Seed Oil Meal, Hydraulic 91 387 0.95 0.0042 0.0042 0.95 0.0042 0.86 0.0042 0.86 0.0040 0.86 0.0040 0.86 0.0040 0.77 0.0848 0.77 0.0848 0.77 0.0848 0.77 0.0848 0.77 0.0848 0.77 0.084 0.77 0.0848 0.77 0.0848 0.77 0.0848 0.77 0.0848 0.77 0.0848 0.77 0.0041 0.86 0.005 0.81 0.005 0.81 0.005 0.81 0.005 0.85 0.0010 0.85 0.0029 0.85 0.000 0.85 0.000 0.85 0.000 0.	Flax	.938	.256	1.15	.0026	.0055
seed Oil Meal, Hydraulic .91 .387 0.95 .0042 seed Oil Meal, Solvent .91 .402 0.860040 t Scraps t & Bone Scraps t & Bone Scraps sess, Cane ssess, Cane ssess, Cane sy	Hominy Feed	768.	.118	76.0	9000	.00700
seed Oil Meal, Solvent .91 .402 0.860040 .77 .94 .584 0.77 .0848 .94 .584 0.77 .0848 .0848 .94 .529 0.77 .0848 .1057 .1057 .0066 .1057 .100 0.86 .0011 .101 .0009 .895 .141 0.79 .0010 .0029 .120 0.85 .100 .0029 .120 0.85 .100 .0029 .120 0.85 .100 .120 0.85 .1000 .120 0.85 .1000 .120 0.85 .1000 .120 0.85 .120 0.000 0.000 0	Meal,	.91	.387	0.95	.0042	.0084
t Scraps 1. Scraps 2. & Bone Scraps 2. & Bone Scraps 3. Straps 4. Straps 5. Straps 6. Straps	Meal,	.91	.402	0.86	0700	.0081
## Sone Scraps 1. & Bone Scraps 1. Straps	Scraps	76.	.584	0.77	.0848	.0419
usses, Cane .73 .041 0.81 .0066 .78 .100 0.86 .0011 s, Ground .90 .133 0.87 .0009 .895 .141 0.79 .0010 .90 .508 1.01 .0029 .ean Oil Meal - 44% .92 .548 1.00 .0029 .tz .120 0.85 .0009 .120 0.00 .0000	& Bone	76.	. 529	0.73	.1057	.0529
sses, Beet	Molasses, Cane	.73	.041	0.81	9900	6000
s, Ground s, Ground .895 .141 0.79 .0010 .895 .141 0.79 .0010 .0029 .ean Oil Meal - 44% .92 .92 .548 1.00 .0029 .120 .120 0.85 .0009 .120 .120 .120 .120 .120 .120 .120 .120	Molasses, Beet	. 78	.100	0.86	.0011	.0001
.895 .141 0.79 .0010 .90 .508 1.01 .0029 .92 .548 1.00 .0029 .1tz .90 .120 0.85 .0009 .100 2.810 0.00 .0000	Oats, Ground	%	.133	0.87	6000	.0033
Dean Oil Meal - 44% .90 .508 1.01 .0029 Dean Oil Meal - 50% .92 .548 1.00 .0029 Ltz .90 .120 0.85 .0009	Rye	. 895	.141	0.79	0010	0033
0il Meal - 50% .92 .548 1.00 .0029 .90 .120 0.85 .0009 1.00 2.810 0.00 .0000	bean Oil Meal -	.90	. 508	1.01	.0029	0064
.90 .120 0.85 .0009 1.00 2.810 0.00 .0000	Oil Meal -	.92	.548	1,00	.0029	7900.
. 0000. 0.00 0.00	Speltz	96.	.120	0.85	6000.	.0033
	рало	T.00	2.810	0.00	00000	0000

Feed Description	(1) Dry Matter	(2) Protein	(3) Net Energy MCal	(4) Ca.	(5) Phos.
CONCENTRATES CON'T:			,		
III. C. C. C. C.	8	115	1 07	0000	7900
Wheat Hand	106	175	1.05	.0029	0064
Wheat Bran Hard	06	.193	0.82	.0013	.0029
Bran.	06.	.162	0.82	*000	.0029
Shorts	.887	.191	0.76	.0014	.0092
	968.	.202	0.78	6000.	.0093
	06.	.194	0.77	6000.	0600.
Wheat Screenings	706.	.169	0.83	6000.	00400
Whey	.93	.133	09.0	.0100	00800
Barley, Lightweight	.891	.134	0.68	2000.	.0036
Barley Screenings	998.	.134	0.80	2000.	.0037
Corn Cobs	[*] 706.	.028	0.35	.0012	.0004
Citrus Pulp	.901	690.	0.77	.0227	.0017
Fat, Beef Tallow	500.	000.	0.17	0000	0000
Feather Meal	.932	776.	0.67	0000	0000
Flat Screenings	.916	.178	0.71	.0040	7,00.
Malt	906.	.158	0.85	0000	.0052
Millet	906.	.132	0.80	9000	.0033
Milo - 8% C.P.	68.	.088	0.86	7000.	.0033
	68.	.100	0.86	,000	.0035
Milo - 10% C.P.	68.	.111	0.86	7000.	.0037
Rice Mill	06.	790.	0.30	6000.	9900.
Sorghum Grain	968.	.124	0.94	.0004	.0034
Sunflower Meal	.943	. 500	0.67	.0028	7.900.
MINERALS:					
0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1	00 [000	00 0	2650	2000
DI-CALCIUM FILOSPIIA CE	90.		00.0	3000	.1400
Mono-Sodium Phosphate	1.00	000	0.00	00000	.2200
Timestone	1.00	0000	00.00	.3830	0000
Salt	1.00	0000	00.00	.3830	00000
Magnesium Oxide	1.00	000.	00.00	0000.	0000

Feed Description	(1) Dry Matter	(2) Protein	(3) Net Energy MCal	(4) Ca.	(5) Phos.
MINERALS CON'T:					
Rock Phosphate Sodium Tri-Polyphosphate Commercial Wineral Supplement	1.00	0000.	00.00	. 2400	.1800
ROUGHAGES:					
Alfalfa Hay - PreBloom Alfalfa Haylage - PreBloom	.90	.211	0.49	.0150	.0030
	07.	.212	0.49	.0150	0030
Alfalfa Silage - PreBloom Alfalfa Haw - Bud	000	.212	67.0	.0150	.0030
	200	184	0.47	.0124	.0023
	.40	184	27.0	0127	.0023
	.30	.184	0.47	.0124	.0023
Alfalfa Haviage 1/2 Bloom	06.	.169	0.44	.0133	.0022
Haylage -	070	.169	0.44	.0133	.0022
	. 3	169	77.0	.0123	.0022
Alfalfa Hay - Full Bloom	06.	.156	0.42	.0126	.0020
Alialia Haylage - Full Bloom	.50	.156	0.42	.0126	.0020
Alfalfa Silage - Full Bloom Alfalfa Silage - Full Bloom	.40	.156	0.42	.0126	.0020
Alfalfa Hay - Severe Rain Damage	38	123	0.44	9710.	.0020
Mix Hay - Alfalfa & Brome	68.	.126	0.44	.0081	1200
Mixed Haylage - Alfalfa & Brome	.50	.126	0.44	.0081	0026
	07.	.126	0.44	.0081	0026
Mixed Silage - Alfalfa & Brome	.30	.126	0.44	.0081	.0026
Mixed hay - Alialfa & Timothy	68.	.118	0.43	.0081	.0024
Mixed Haylage - Alfalfa & Ilmothy	.50	87.	0.43	.0081	.0024
Mixed Silage - Alfalfa & Timothy	. 04.	• LL8	0.43	.0081	.0024
Mixed Hay - Clover & Timothy	2 80	101	0.43	.0081	.0024
Mixed Haylage - Clover & Timothy	.50	101	0.43	.0070	.0020
Mixed haylage - Clover & Timothy	.40	.101	0.43	0,000	.0020

Mixed Silage - Clover & Timothy 30 .101 0.43 .0070 .0020 Brone Grass Hay - Flower Stage 9.0 .064 .063 .054 .0021 .0021 .0021 .0022 .0034 .0031 .0021 .0022 .0034 .0031 .0021 .0022 .0031 .0023 .0031 .0022 .0032 .0033 .0023 .	Feed Description	(1) Dry Matter	(2) Protein	(3) Net Energy MCal	(4) Ca.	(5) Phos.
.30 .101 0.43 .0070 .90 .084 0.54 .0043 .88 .147 0.50 .0031 .88 .149 0.47 0.0161 .88 .149 0.47 0.0161 .88 .127 0.43 .0045 .88 .085 0.41 0.026 .89 .008 0.42 0.026 .20 .120 0.44 0.0089 .219 .120 0.44 0.0089 .22 .148 0.50 0.44 0.0089 .22 .148 0.50 0.44 0.0089 .23 .120 0.47 0.0150 .24 0.033 .25 .120 0.47 0.026 .26 .008 0.47 0.030 .27 0.08 0.46 0.033 .32 .124 0.71 0.028 .32 .124 0.71 0.028 .33 .146 0.71 0.028 .34 0.75 0.61 0.028 .35 0.08 0.71 0.028 .36 0.08 0.75 0.066 .37 0.028 .38 0.48 0.78 0.09 .09 0.70 0.61 0.028 .39 0.09 0.65 0.003 .30 0.09 0.65 0.003 .30 0.09 0.65 0.003 .30 0.09 0.09 0.00	ROUGHAGE,S CON'T:					
90 084 0.54 0.043 0.083 0.38 0.093 0.88 0.47 0.65 0.38 0.093 0.093 0.47 0.65 0.47 0.0161 0.045 0.88 0.47 0.045 0.47 0.0161 0.045 0.43 0.045 0.45 0.045	Mixed Silage - Clover & Timothy	.30	.101	0.43	00.00	.0020
94 .063 0.38 .0031 88 .147 0.50 88 .149 0.47 .0127 88 .129 0.47 .0127 88 .085 0.43 0.045 87 .085 0.44 .0064 87 .085 0.44 .0084 87 .078 0.45 .0126 87 .078 0.45 .0126 88 .085 0.45 .0089 88 .092 0.45 .0089 88 .092 0.46 .0089 88 .092 0.47 .0089 88 .092 0.46 .0033 88 .092 0.46 .0033 88 .092 0.46 .0038 89 .092 0.46 .0038 89 .092 0.46 .0038 89 .092 0.46 .0038 89 .092 0.46 .0038 89 .092 0.46 .0038 89 .092 0.46 .0038 89 .092 0.46 .0038 89 .092 0.46 .0038 89 .093 0.71 .0028 89 .094 0.71 .0028 89 .095 0.71 .0028 89 .097 0.076 0.71 .0028 89 .098 0.74 .0039 89 .098 0.75 .0038 89 .098 0.75 .0038 89 .098 0.75 .0038 89 .098 0.75 .0038 89 .098 0.76 .0039 89 .098 0.78 .0039	Brome Grass Hay - Flower Stage	06.	.084	0.54	.0043	.0028
88 .147 0.50 .0131 88 .149 0.47 .0161 88 .127 0.43 88 .188 .127 0.44 88 .127 0.44 88 .085 0.44 .004 87 .085 0.44 .004 87 .085 0.44 .004 87 .085 0.44 .0034 88 .120 0.44 .0089 88 .085 0.44 .0089 88 .085 0.45 .0126 88 .085 0.42 .0089 88 .098 0.42 .0023 88 .098 0.42 .0023 88 .098 0.42 .0028 88 .098 0.45 .0028 88 .098 0.46 .0038 88 .098 0.46 .0038 88 .098 0.47 .0028 88 .098 0.46 .0038 88 .098 0.71 .0028 88 .080 0.71 .0028 89 .080 0.71 .0028 89 .080 0.72 .0036 89 .080 0.75 .0036 89 .080 0.75 .0036 89 .080 0.75 .0036 89 .080 0.70 .0038 89 .088 0.48 .0030 89 .088 0.48 .0030	Brome Grass Hay - Mature Stage	76.	.063	0.38	.0031	.0014
883 .1479 0.47 .0101 883 .127 0.43 .0127 88 .085 0.44 .0066 88 .087 0.45 .0067 205 .120 0.46 .0034 2078 0.46 .0034 208 0.45 .0034 219 .120 0.44 .0089 22 .148 0.50 .0126 22 .148 0.50 .0042 23 .120 0.47 .0089 24 .0089 25 .0085 0.47 .0089 26 .0085 0.47 .0089 27 .0086 0.47 .0038 28 .0087 0.46 .0038 29 .0088 0.47 .0038 20 .102 0.46 .0038 21 .15 0.47 .0038 22 .146 0.71 .0028 23 .124 0.71 .0028 24 .0030 25 .0030 26 .0030 27 .0028 28 .0030 29 .0041 0.56 20 .0030 20 .0042 0.56 20 .0030 20 .0048 0.48 .0030 20 .0050 20 .0060 0.30 20 .0060 0.30 20 .0060 0.30 20 .0060 0.30 20 .0060 0.30	Clover Hay - Alsike	to to	.147	0.50	.0131	.0025
S83 . 118 . 0.41 . 0.045	Clover Hay - Red	× × ×	· 149	0.47	1910.	.0022
887	Clover Hay - Stemmy	× 88 × 8	127	0.4I	1770	5200·
S8	Orchara Grass nay	200	136	0.00	7400	0035
.87 .078 0.40 .0034 .206 0.45 .0156 .126 0.42 .0126 .217 .120 0.44 .0087 .219 .110 0.44 .0089 .22 .148 0.50 .0131 .181 .150 0.47 .0089 .24 .085 0.50 .0042 .25 .148 0.50 .0042 .26 .085 0.47 .0028 .27 .102 0.47 .0028 .281 .098 0.42 .0036 .907 .006 0.37 .0028 .32 .115 0.46 .0038 .32 .124 0.71 .0028 .32 .146 0.71 .0028 .32 .146 0.71 .0028 .32 .146 0.71 .0028 .32 .080 0.73 .0036 .33 .115 0.71 .0028 .34 .041 0.25 .0030 .25 .088 0.48 .0030 .26 .088 0.48 .0030	Timothy Hay - Mid-Bloom	80	085	0.44	.0041	.0018
loom .18 .206 0.45 .0150 205 .120 0.42 .0126 .22 .120 0.44 .0089 .22 .148 0.50 .0131 .23 .150 0.47 .0042 .181 .098 0.47 .0042 .181 .098 0.47 .0042 .90 .078 0.36 .0038 .32 .008 0.46 .0038 .32 .124 0.71 .0028 .32 .124 0.71 .0028 .32 .146 0.71 .0028 .32 .146 0.71 .0028 .32 .146 0.71 .0028 .32 .146 0.71 .0028 .32 .146 0.71 .0028 .32 .146 0.71 .0028 .32 .146 0.71 .0028 .32 .146 0.71 .0028 .32 .146 0.71 .0028 .33 .146 0.71 .0028 .34 .089 0.75 .0030 .655 .0030 .655 .008 0.48 .0030	Timothy Hay - Late Bloom	.87	.078	0.40	.0034	.0021
Loom .253 .156 0.42 .0126	Alfalfa Pasture (Gr.Ch.) Pre-1/2 Bloom	.18	.206	0.45	.0150	.0030
205 .120 0.44 .0097 .219 .110 0.44 .0089 .22 .148 0.50 .0131 .24 .085 0.57 .0042 .16 .140 0.57 .0064 .907 .078 0.37 .0023 .90 .078 0.42 .0036 .90 .102 0.46 .0036 .90 .102 0.46 .0036 .90 .102 0.46 .0036 .32 .124 0.71 .0028 .32 .124 0.71 .0028 .32 .146 0.71 .0028 .32 .146 0.71 .0028 .32 .146 0.71 .0028 .90 .041 0.75 .0036 .90 .041 0.25 .0036 .90 .041 0.50 .0030 .065 .065 .0030 .0030 .080 .075 .0030 .081 .062 .0030	Alfalfa Pasture (Gr.Ch.) 1/2-Full Bloom	.253	.156	0.42	.0126	.0028
.219 .110 0.44 .0089 .22 .148 0.50 .0131 .26 .085 0.50 .0042 .26 .140 0.57 .0042 .26 .140 0.57 .0042 .27 .089 0.42 .0023 .90 .078 0.37 .003 .90 .102 0.46 .003 .90 .102 0.46 .003 .90 .102 0.46 .003 .32 .115 0.71 .0028 .32 .146 0.71 .0028 .32 .146 0.71 .0028 .32 .146 0.73 .0028 .32 .146 0.73 .0028 .90 .041 0.25 .0030 .724 .115 0.75 .0030 .906 .065 .0030 .0030 .906 .065 .0030 .0030 .093 .065 .0030 .0030 .093 .065	Alfalfa & Brome Pasture (Gr. Chop)	.205	.120	0.44	2600.	.0026
. 181 . 148 0.50	Alfalfa & Timothy Pasture (Gr. Chop)	.219	.110	0.44	.0089	.0023
181 .150 .26 .085 .050 .0042 .0042 .0042 .0042 .0043 .0043 .0043 .0043 .0041 .0028 .0030 .0028 .0028 .0028 .0028 .0028 .0028 .0028 .0028 .0028 .0029 .0029 .0029 .0030	Clover Pasture (Gr. Chop) - Alsike	. 22	.148	0.50	.0131	.0025
wm & Sudan Silage (Late) .26 .085 0.50 .0042 wm & Sudan Silage (Early) .i6 .140 0.57 .0064 ay .881 .098 0.42 .0063 ie Hay .907 .066 0.37 .0023 ie Grass Hay (Common) .90 .078 0.37 .0034 Silage Grass Hay (Common) .90 .078 0.46 .0030 Silage w/Urea @ 8 lb/ton .32 .115 0.71 .0028 Silage w/Urea @ 10 lb/ton .32 .124 0.71 .0028 Silage w/Urea @ 12 lb/ton .32 .124 0.71 .0028 Silage w/Urea @ 15 lb/ton .32 .146 0.71 .0028 Silage (Low Moisture) .50 .075 .075 .0028 Silage (High Magnesium) .32 .146 0.73 .0028 y Straw .0041 0.55 .0030 y Silage (Flower) .655 .093 0.50 .0030 y Silage (Dough .065 .065 .030 .0030 y Silage (Dough <td>Clover Pasture (Gr. Chop) - Red</td> <td>.181</td> <td>.150</td> <td>0.47</td> <td>.0150</td> <td>.0028</td>	Clover Pasture (Gr. Chop) - Red	.181	.150	0.47	.0150	.0028
ww & Sudan Silage (Early) .16 .140 0.57 .0064 ay	Sorghum & Sudan Silage (Late)	.26	.085	0.50	.0042	.0015
ay da Grass Hay (Common)		.16	.140	0.57	. 0064	.0023
ie Hay da Grass Hay (Common) 30, .006 0.37, .0036 da Grass Hay (Coastal) 32 .092 0.46 .0030 0.33 Silage w/Urea @ 1b/ton 32 .115 0.71 0.028 Silage w/Urea @ 12 lb/ton 32 .124 0.71 0.028 Silage w/Urea @ 15 lb/ton 32 .146 0.71 0.028 Silage w/Prosil @ 50 lb/ton 32 .146 0.77 0.028 Silage (Low Moisture) 0.75 0.61 0.020 0.71 0.028 0.71 0.028 0.71 0.028 0.72 0.030 0.73 0.030 0.74 0.75 0.030 0.75 0.030 0.75 0.030 0.75 0.030 0.75 0.030 0.75 0.030 0.75 0.030 0.30 0.30 0.30 0.30 0.30	Oat Hay	1881	860.	0.42	.0023	.0021
da Grass Hay (Common) da Grass Hay (Coastal) Silage Silage W/Urea @ 8 lb/ton Silage w/Urea @ 10 lb/ton Silage w/Urea @ 15 lb/ton Silage w/Vrea @ 15 lb/	Prairie Hay	.907	990.	0.37	.0036	£100.
da Grass Hay (Coastal) Silage Silage Silage w/Urea @ 8 lb/ton 32 .092 0.62 .0033 Silage w/Urea @ 10 lb/ton 32 .124 0.71 .0028 Silage w/Urea @ 15 lb/ton 32 .135 0.71 .0028 Silage w/Urea @ 15 lb/ton 32 .146 0.71 .0028 Silage w/Prosil @ 50 lb/ton 32 .146 0.73 .0050 Silage (Low Moisture) Silage (High Magnesium) 32 .041 0.58 .0036 y Straw y Straw y Silage (Boot) y Silage (Flower) y Silage (Flower) y Silage (Dough	Bermuda Grass Hay (Common)	06.	.078	0.39	.0041	.0021
Silage w/Urea @ 8 lb/ton	Bermuda Grass Hay (Coastal)	96.	701.	0.40	.0030	.0020
Silage W/Urea @ 8 LD/ton	Corn Silage	77.00	360.	20.0	2000.	1200.
Silage w/Urea @ 10 lb/ton		.32	CTT.	77.0	.0028	.0022
Silage w/Urea @ 12 lb/ton	Corn Silage w/Urea @ 10 lb/ton	.32	124	0.11	0000	.0022
Silage w/Urea @ 15 lb/ton .32 .146 0.71 .0028 Silage w/Prosil @ 50 lb/ton .32 .146 0.73 .0050 Silage (Low Moisture) .50 .075 0.61 .0020 Silage (Low Moisture) .32 .080 0.75 .0028 y Straw .90 .041 0.25 .0036 y Silage (Boot) .724 .115 0.58 .0030 y Silage (Flower) .655 .093 0.48 .0030 Stalks .0065 0.30 .0060		.32	.135	0.71	.0028	.0022
Silage w/Prosil @ 50 lb/ton .32 .146 0.73 .0050 Silage (Low Moisture) .50 .075 0.61 .0020 Silage (High Magnesium) .32 .080 0.75 .0028 y Straw .90 .041 0.25 .0036 y Silage (Boot) .724 .115 0.58 .0030 y Silage (Flower) .655 .093 0.50 .0030 y Silage (Dough .065 .065 0.30 .0030	Corn Silage w/Urea @ 15 lb/ton	.32	.146	0.71	.0028	.0022
Silage (Low Moisture) .50 .075 0.61 .0020 Silage (High Magnesium) .32 .080 0.75 .0028 y Straw .90 .041 0.25 .0036 y Silage (Boot) .724 .115 0.58 .0030 y Silage (Flower) .655 .093 0.50 .0030 y Silage (Dough .906 .065 0.30 .0060	Corn Silage w/Prosil @ 50 lb/ton	.32	.146	0.73	.0050	.0050
(High Magnesium) .32 .080 0.75 .0028 .90 .041 0.25 .0036 .90 .041 0.58 .0036 e (Boot) .655 .093 0.50 .0030 e (Dough .906 .065 0.30 .0060	Corn Silage (Low Moisture)	.50	.075	0.61	.0020	.0022
e (Boot) .724 .115 0.25 .0036 e (Boot) .724 .115 0.58 .0030 e (Flower) .655 .088 0.48 .0030 e (Dough .906 .065 0.30 .0060		.32	080.	0.75	.0028	.0022
ge (Boot) .724 .115 0.58 .0030 .0030 ge (Flower) .655 .093 0.50 .0030 .0030 ge (Dough .906 .065 0.30 .0060		06.	.041	0.25	.0036	.0011
ge (Flower) .655 .093 0.50 .003068 .088 0.48003068088 0.480030065 0.30060	Silage (. 724	.115	0.58	.0030	.0030
ge (Dough .68 .0030 .0030 .0030 .0050 .0050 .006	Silage (.655	.093	0.50	.0030	.0030
. 0900. 05.0 590. 906.	ge (.68	.088	0.48	.0030	.0030
	Corn Stalks	906.	990.	0.30	0900.	00100

(3) (4) Net Energy Ca. MCal 0.50 0.26 0.26 0.70 0.60 0.47 0.60 0.47 0.033 0.47 0.060 0.44 0.55 0.040 0.44 0.51 0.040 0.44 0.014 0.028 0.15 0.011						
hop hop hop size hop sylvit: 227 .079 0.50 .0039 hop ylvit: 140 .089 0.70 .0064 hop	Feed Description	(1) Dry Matter	(2) Protein	(3) Net Energy MCal	(4) Ca.	(5) Phos.
hop 1227 1079 1035 1036 1064 1089 10.26 10064 1089 10.70 1089 10.70 1089 10.70 1081 1083 1080 120 120 120 120 120 120 120 120 120 12	ROUGHAGES CON'T:					
Flower) Flower) Flower) Flower) So .089 0.70 .0016 .008 .007 .0033 .120 0.47 .0033 .672 .131 0.55 .0060 .072 0.44 .0060 .072 0.41 .0060 .072 0.41 .0060 .072 0.41 .0060 .072 0.41 .0060 .072 0.041 .0060 .072 0.041 .0060 .072 0.041 .0060 .072 0.041 .0060 .072 0.041 .0060 .	Wilo Green Chop	.227	640.	0.50	.0039	000
Flower) 50 50 50 140 0.60 0.033 0.47 0.633 0.47 0.033 0.57 0.47 0.033 0.55 0.045 0.045 0.046 0.046 0.047 0.060 0.046 0.047 0.060 0.047 0.060 0.047 0.060 0.047 0.060 0.047 0.060 0.047 0.060 0.047 0.060 0.047 0.060 0.047 0.060 0.047 0.060 0.047 0.060 0.047 0.060 0.047 0.060 0.047 0.060 0.040 0.060 0.041 0.060 0.041 0.060 0.041 0.014 0.014 0.014 0.014 0.015 0.014 0.015	Wilo Stalks	.91	.035	0.26	7900	000
Flower) 50 50 50 50 50 50 50 50 50 5	Wilo Heads	07.	680.	0.70	.0016	00
Dough) .30 .120 0.47 .0033 Boot) .672 .131 0.55 .0060 Flower) .608 .072 0.44 .0060 Dough) .568 .149 0.55 .0040 (Flower) .542 .114 0.51 .0040 (Pough) .675 .086 0.44 .0014 ulls .923 .019 0.04 .0028 Ammoniated) .92 .016 0.15 .0011	Oat Silage (Flower)	99	.140	09.0	.0033	00
Boot) Boot) 672 131 0.55 0.066 0.88 0.44 0.060 0.060 0.72 0.41 0.060 0.060 0.060 0.060 0.060 0.060 0.060 0.040 0.040 0.040 0.040 0.014 0.014 0.028 0.014 0.028 0.015 0.015 0.011		.30	.120	0.47	.0033	00
Flower) Flower) Lough) Lough) Lough) Sea .072 0.41 .0060 Chough) Sea .149 0.55 .0040 Sea .114 0.51 .0040 Chough) Lough) Sea .014 .0014 Sea .015 .0014 Sea .015 .0014 Sea .016 0.15 .0011 Sea .016 0.15 .0011	$\overline{}$.672	.131	0.55	0900	900
Dough) 568 .072 0.41 .0060 (Boot) .568 .149 0.55 .0040 (Flower) .542 .114 0.51 .0040 (Dough) .675 .086 0.44 .0014 ulls .907 .043 0.32 .0014 .923 .019 0.04 .0028 Ammoniated) .92 .016 0.15 .0011	$\overline{}$	09.	.088	0.44	0900	00.
(Boot) .568 .149 0.55 .0040 .0040 (Flower) .542 .114 0.51 .0040 .0040 (Dough) .675 .086 0.44 .0014 .0014 .0014 .0028 .019 0.04 .0028 .019 0.04 .0028 .016 0.15 .0011 .92 .111 0.15 .0011	Rye Silage (Dough)	\$09.	.072	0.41	0900	00.
(Flower) .542 .114 0.51 .0040 (Dough) .675 .086 0.44 .0014 .0014 .0014 .0014 .0014 .0014 .0019 0.04 .0028 .016 0.15 .001100110011		. 568	.149	0.55	0700	00.
(Dough) .675 .086 0.44 .0014 ulls .907 .043 0.32 .0014 .0014 .923 .019 0.04 .0028 .016 0.15 .0011	-	.542	.114	0.51	0700	00
ulls .907 .043 0.32 .0014 .028 .923 .019 0.04 .0028 .0028 .016 0.15 .0011 .92 .011 0.15 .0011	Wheat Silage (Dough)	.675	980.	0.44	.0014	000
.923 .019 0.04 .0028 .019 0.04 .0028 .016 0.15 .0011 .92 .011 0.15 .0011011	Cottonseed Hulls	.907	.043	0.32	.0014	000
. 92 . 016 0.15 . 0011	Peanut Hulls	.923	.019	0.04	.0028	000
.92 .111 0.15 .0011	Rice Hulls	.92	.016	0.15	.0011	000.
	Rice Hulls (Ammoniated)	.92	.111	0.15	.0011	000

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