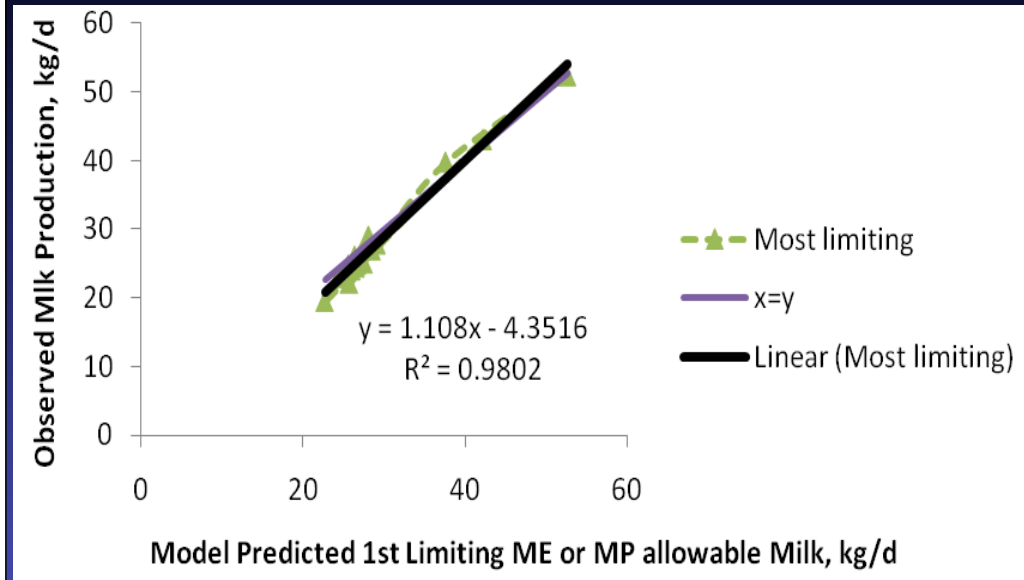


Cornell University has evaluated the current Biological model (CNCPS 6.1).

Every time the model is changed, it is evaluated using a robust dataset.

The following slides were kindly provided by Dr. M. E. Van Amburgh. This represents the evaluations as of Dec 28, 2009

CNCPS v6.1 Most limiting ME or MP Allowable Milk
Yield from 21 to 52 kg/d and CP from 12.7 to 17.4% among 24
data sets – research to herd level data



Herd Level Examples of the Application of
CNCPS v6.1

Example Herd A – 54 lb DMI, 92 lb Milk

<u>% DM basis</u>	<u>CNCPS v6.1</u>
CP	14.4
RDP	8.6
Sol CP	4.9 (34)
Rumen NH ₃ , % req	134
Rumen peptides, % req	143
NDF	31.6
Lys:Met	3.29
ME allowable, lb	99
<u>MP allowable, lb</u>	<u>90</u>

Example Herd Ingredients – 54 lb DMI, 92 lb Milk

Ingredient	DM amount, lb
Corn silage	17
Grass haylage	12
Dry hay	3
Ground corn	13.3
Soybean Meal	4.0
Roasted soybean	1.6
Cane molasses	0.46
Sugar	0.70
Provaal	0.44
Urea	0.097
Meta smart	0.012
Min. & Vitamins	1.59
Total	54.2

Example herd B - 53 lb DMI, 89 lb milk

% DM basis	CNCPS v6.1 output
CP	15.0
RDP	8.1
Sol CP	4.9 (30)
Rumen NH3, % req	104
Rumen peptides, % req	110
NDF	31.5
Lys:Met	2.8
ME allowable, lb	94
MP allowable, lb	98

Example herd B - 53 lb DMI, 89 lb milk

<u>Ingredient</u>	<u>DM amount, lb</u>
Corn silage	19.5
Alfalfa hay	9.8
Wheat straw	1.0
Flaked corn	6.2
Ground corn	6.2
Soybean Meal	1.9
Amino Plus	2.9
Wheat midds	2.0
Citrus pulp	2.0
Sugar	0.50
Provaal	0.23
Energy Booster	0.35
Urea	0.13
Smartamine and Alimet	0.03
Min. & Vitamins	1.3

Herd C – High group

Current stats

DMI	50 lb
CP	15.8%
NDF	30.2%
Actual milk	84 lb
ME allowable	83.5 lb
MP allowable	91 lb
True protein	3.1%
Fat	3.7%
Met	2.3% MP
Lys	6.77% MP

Herd C – High group

Ration Fed				
			DM	AF
Ingredient	\$/hd	%DM	lbs/day	lbs/day
2009 2nd Haylage-CNCPS-04051	0.42	44.4	5.98	13.49
Canola Meal Solvent-CNCPS-02006	0.53	90.2	3.28	3.64
Corn Grain Ground Medium-CNCPS-01040	0.75	88.0	8.83	10.04
2008 Corn Silage-CNCPS-03019	1.32	31.1	21.94	70.66
Citrus Pulp Dry-CNCPS-01031	0.54	88.6	4.07	4.59
Soybean Rolled Roasted-CNCPS-02028	0.24	93.2	1.09	1.17
Old SHF Lact-CNCPS-C071546	0.00	91.8	4.81	5.24

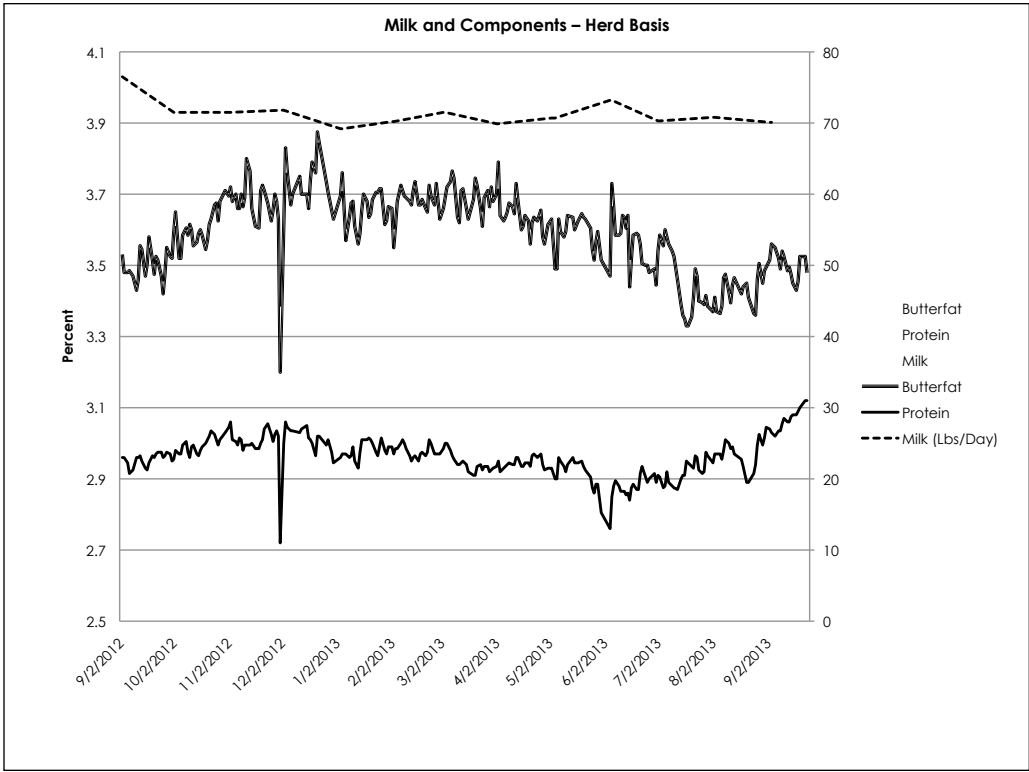
Concentrate mix contains Smartamine and Alimet

Herd C – High group

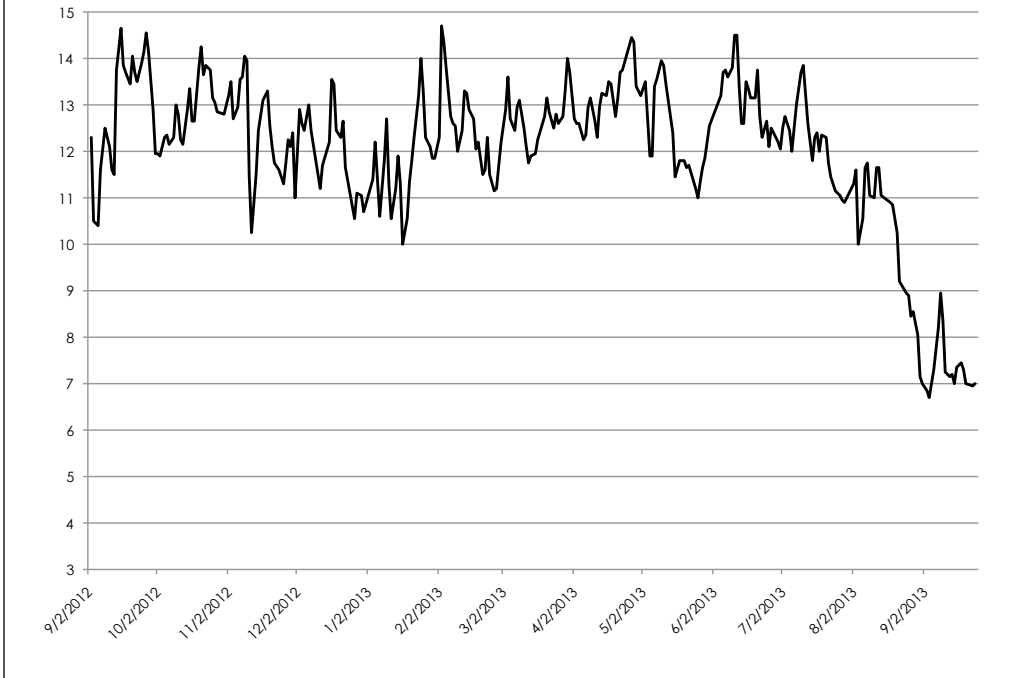
Nutrient Balances		
Nutrient	Balance	%Req
ME	-0.5 Mcal	99
MP	136 g	105
Rum. NH3-N	35 g	122
Rum. Pep-N	9 g	105
peNDF	-0.9 lbs	93
MP Lys	44.1 g	131.8
MP Met	20.3 g	148.5
Ca	46.64 g	169%
P	2.31 g	104%
Lys	6.77 %MP	
Met	2.30 %MP	
Lys:Met	2.94	

Herd C – High group

Fecal N	217 g
Urine N	154 g
Total Manure N	371 g
Productive N/Total N	35%
Productive N/Urinary N	1.30:1
Manure N/Total N	65%



Milk Urea Nitrogen – Bulk Tank



Herd Example - D

1050 cows – High group characterized

1,542 lb BW

~100 DIM

59.5 lb DMI

15.8% CP

60% Forage

120 lb milk/d

Milk:Feed (Feed efficiency): 1.99

Nutrient Balances			Diet Concentrations	
Nutrient	Balance	%Req	NFC	41.5%DM
ME	3.5 Mcal	105	CHO Ferm	41.2%DM
MP	84 g	102		57.7%CHO
NH3-N	33 g	117	NDF Ferm	9.4%DM
Protein-N	+15 g	93		30.5%NDF
pdNDF	0.2 kg	103	Starch Ferm	21.5%DM
Lys	42.4 g	125.6		75.2%Starch
Met	35.9 g	167.1	Sol. Fiber Ferm	6.3%DM
Ca	-8.64 g	89%		84.6%Sol Fiber
P	-2.97 g	89%	Sugar Ferm	3.5%DM
Mg	1.27 g	114%		67.3%Sugar
K	52.74 g	120%	Sugar (Ad)	5.4%DM
Total ME Avail	74.61 Mcal/day		Starch (B1)	28.7%DM
ME Milk Prod	56.0 kg/day		Sol Fiber (S2)	7.4%DM
MP Milk Prod	54.0 kg/day		Ferm Fiber (F3)	21.2%DM
MUN (mg/d)	11.1		Lig*2.4 (L2)	6.7%DM
Urea Conc	0.07 Mcal		NDF	30.90%DM
Rumens pH	6.43		Forage NDF	78.46%NDF
Milk Feed	1.99		Forage NDF	0.94%PBW
IOFC (\$/head)	8.61		EE	5.1%DM
IOFurFC (\$/head)	10.91		LCFA	1.1%DM
Excretion			CP	15.85%DM
Fecal	49 kg		EDF	8.68%DM
Urine	23 kg		Lys	6.74%MP
Total Manure	69 kg		Met	2.71%MP
			Lys:Met	2.49%MP
Fecal N	245 g		TDN	71.6%DM
Urine N	198 g		ME	2.75 Mcal/kg
Total Manure N	441 g		NEI	1.77 Mcal/kg
Productive N/Total N	38%		Forage	60.1%DM
Productive N/Ureinary N	1.33:1		DM	44.7%DM
Manure N/Total N	62%		DCAD1	138 meq/kg
Fecal P	54.2 g		DCAD2	97 meq/kg
Urine P	1.4 g		Monsens	0.60 mg/ml
Total Manure P	55.6 g		Monsens	0.02 ppm
Productive P/Total P	43%			
Manure P/Total P	57%			
CH4 (Mcal)	6.57			
CH4 (L)	728.22			

Herd Example - Herd D

NDF, %DM: 30.9

Starch, % DM: 28.7

Sugar, % DM: 5.4

Ether extract, % DM: 5.1

%Forage: 60.1

Forage NDF, %BW: 0.94

Diet Concentrations	
NFC	41.5 %DM
CHO Ferm.	41.2 %DM
	57.7 %CHO
NDF Ferm.	9.4 %DM
	30.5 %NDF
Starch Ferm.	21.9 %DM
	76.2 %Starch
Sol. Fiber Ferm.	6.3 %DM
	84.8 %Sol Fiber
Sugar Ferm.	3.6 %DM
	67.3 %Sugar
Sugar (A4)	5.4 %DM
Starch (B1)	28.7 %DM
Sol Fiber (B2)	7.4 %DM
Ferm. Fiber (B3)	21.2 %DM
Lig * 2.4 (C)	6.7 %DM
NDF	30.90 %DM
Forage NDF	78.46 %NDF
Forage NDF	0.94 %FBW
EE	5.1 %DM
LCFA	4.1 %DM
CP	15.85 %DM
RDP	8.08 %DM
Lys	6.74 %MP
Met	2.71 %MP
Lys:Met	2.49 %MP
TDN	71.6 %DM
ME	2.75 Mcal/kg
NEI	1.77 Mcal/kg
Forage	60.1 %DM

Herd Example - Herd D

Excretion	
Fecal	49 kg
Urine	20 kg
Total Manure	69 kg
Fecal N	245 g
Urine N	196 g
Total Manure N	441 g
Productive N/Total N	38%
Productive N/Urinary N	1.33:1
Manure N/Total N	62%
Fecal P	54.2 g
Urine P	1.4 g
Total Manure P	55.6 g
Productive P/Total P	43%
Manure P/Total P	57%
CH4 (Mcal)	6.67
CH4 (L)	728.22

Productive N : N Intake – 38%!

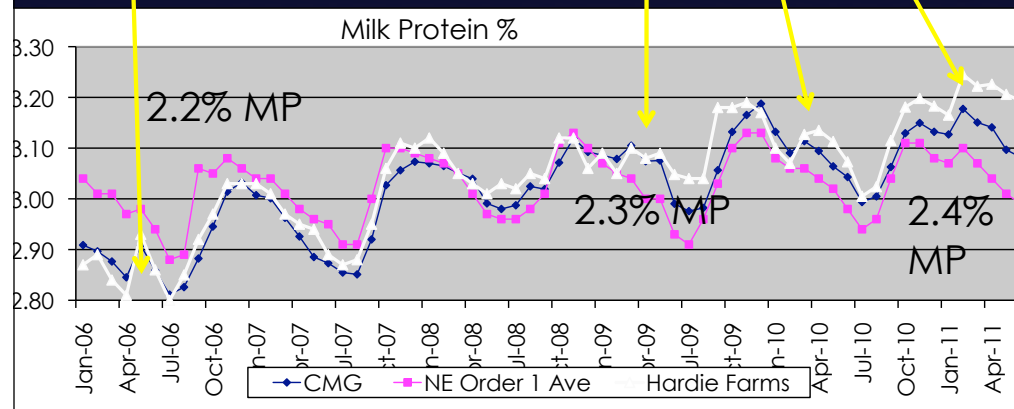
Remember – most farms are 25 to 30%

Productive N: Urinary N – 1.33:1

Most farms are 0.6 to 0.8:1

First introduction
of Smartamine '02

Increased in diet March '05,
March '06
and February '07



Conclusion:

The current biological model is very accurate in predicting most limiting (ME or MP) allowable production.

Rations can be fine tuned reducing N feeding and excretion.

There are NO SAFETY FACTORS in the predictions. It is up to the nutritionist to determine safety factor levels for each client.