

## Spartan Dairy 3

- **If you find a bug, please report it to us. You can either send to [mikevh@msu.edu](mailto:mikevh@msu.edu) with Spartan Dairy bug in the subject line or make a comment in the discussion forum on the ANGEL site.**

### Tips for using Spartan 3

- **If something quits working while using the program, save the file as a new name. Then exit the file and try opening it again. If that does not work, exit the program, and then get back into it and open the file.**
- **Evaluating nutritional adequacy.** Whether a diet already being fed or starting from scratch, the nutrient balance graph can help. Turn it on or customize it with Settings in the menu. When formulating a new diet, it is especially helpful to change settings so you can see ForNDF (forage NDF). The graph should have DMI, NDF, EfNDF, ForNDF, NEL, CP, RDP, MP, Ca, P, Na, Se, and Vit A. To formulate the diet, work your way down the graph.
- **Editing Feed Characteristics.** If you have a new feed to put in the Spartan 3 library or a ration, first find a feed that is similar. Then select the feed and use **Feeds > Nutrient Composition** and, at the minimum, edit %DM, %NDF, and %CP.
  - If you have information, edit %ash, %EE, %Ca, and %P.
  - If you have information on lignin you can enter it. If lignin is much different than the original value, you should edit NDF digestibility. See help on this. Higher lignin means lower digestibility, which will decrease energy value.
  - Energy values are calculated in Spartan 3, so they will change as you alter other nutrients.
  - If this was a new feed test, change the TestDate.
  - If you know more mineral information, change that too.
  - RUP and RDP are calculated fields in Spartan 3. To adjust them, you must change the B and C protein fractions. It is best to do this in the protein tab, so you can see the resulting values for RUP and RDP as you change them.
  - NFC is a calculated field in Spartan 3. If you have NFC or NSC, and the value in Spartan is not close, you can adjust it by editing either ash or EE.
  - For commercial feeds, you might want to make an equal mix of the first 3 ingredients, copy it to be a real feed, and then edit as needed. Remember that nutrient content on a feed tag is on an amount AsFed basis, but Spartan has nutrients on a DM basis (except Cost AsSold).
  - Alfalfa haylage is the same as legume silage.
- **Target animal.** For most early lactating cows, set TARGET MILK to match the average milk actually produced. ACTUAL MILK does not impact requirements but is used as a monitor, and is especially useful if you lead feed a group—feed for more milk than the average. .
- **Working in the worksheet.** When you balance a diet, work mostly in the Home tab. The order of columns within the home tab can be rearranged. Just click on a heading and drag it. Unfortunately, sometime when you do this, the columns order in the feeds sections can become out of sync with the columns of the ration summary. If this happens, either save the file and reopen or use the **Settings > Column Order** menu command. To move columns and ensure proper synchronization, move to either about the 12<sup>th</sup> or later place or to the first place (right after Amount DM). A good order is: %diet, NDF, EfNDF, NEL, CP, RUP dig, FA, Ca, P, Se, CostDM, AsFed, and DM%. If you move these to the first column using the reverse order, it will work perfectly. You also should consider sorting feeds according to feed type. Either

click the Feed Type heading once in the Misc tab or use the **Feeds > Sort Feeds By** command.

- **Formulating a diet.** When you balance a diet, adjust feeds on a DM basis or percent of diet basis. Work your way down the nutrient balance graph.
  - a. add forages to meet the ForNDF requirement on fiber tab,
  - b. adjust concentrates until 98% of the predicted DMI is met. Adjust forages and concentrates to meet energy and fiber requirements.
  - c. replace some of the concentrates with protein supplements to meet CP reqt.
  - d. replace some of the CP supplementw with MP supplements if necessary
  - e. recheck to make sure NDF, EfNDF, ForNDF, NEL, CP, and MP are reasonable
  - f. add salt at ~.25-0.5% of DMI and limestone and/or dical to meet Ca and P
  - g. add a trace mineral and vitamin supplement .
- **Printing.** When you Print, only one file can be open. If more than one file is open, the program always prints the first one that was opened.To PRINT, go the Reports – Summary Report and input your name in the prepared by spot. Then hit the print button on right side. Then choose preview. If everything looks okay, press Print.
- **Computer vs cow.** As with any computer program, the cow should be the judge of nutritional adequacy. Evaluate the actual response to a diet change by monitoring DMI, estimate energy intake, and milk production and then fine tune the diet accordingly. Body condition is helpful too but takes longer to evaluate. The DM content of wet feeds should be checked regularly.

## Tutorial

### Creating a Ration for Scratch

In this exercise, we will formulate a diet using defined feeds and determine if it would be cost-effective to use cottonseed in the diet.

The **target animal** will be a Holstein cow in early lactation. She is 2<sup>nd</sup> lactation, has a mature BW of 700 kg and a current total BW of 600 kg with a body condition of 2.5. She is at 60 days after calving and is producing 110 lb of milk at 3.5% fat and 3.2% protein.

The **feeds** to use in this example are in the following table. We will use library values for any feed characteristics that are not known. We will use feed test results for the mixed alfalfa/grass silage.

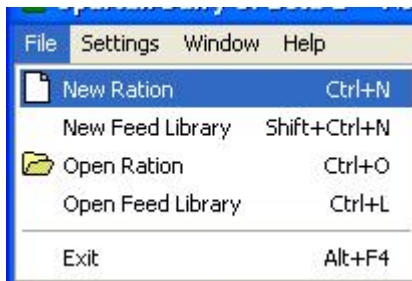
Corn silage 34% DM, 41% NDF, 7.0% CP	\$41 /ton
Alfalfa grass mixed silage Specs are in lab report	\$46 /ton
Cottonseed	\$225 /ton
Corn grain, ground 9.5% CP	\$4.10 /bushel
Canola meal	\$280 /ton
Hydrolyzed tallow fatty acids	\$45 /100 lb
Soybean meal-48	\$340 /ton
Expeller soybean meal	\$388 /ton
Limestone	\$7.50 /100 lb
MSU MinVit premix 98% DM, 8.6% Ca, 8.2% P, 7.5% Mg, 0.6% K, 13% Na, 20% Cl, 2.8% S, 600 ppm Cu, 4000 ppm Fe, 2500 ppm Mn, 2500 ppm Zn, 7 ppm Co, 40 ppm I, 20 ppm Se, 120 kIU vit A/lb, 30 kIU vit D/lb, 1200 IU vit E/lb	\$31 /100 lb

SAMPLE DESCRIPTION: <u>Mixed Silage</u> ID #331585		
WET CHEMISTRY ANALYSIS RESULTS		
COMPONENTS	AS SAMPLED BASIS	DM BASIS
% MOISTURE	67	*****
% DRY MATTER	33	*****
% CRUDE PROTEIN	6.5	19.6
% AVAILABLE PROTEIN	6.0	18.1
% UNAVAILABLE PROTEIN	0.5	1.5
% ACID DETERGENT FIBER	10.8	32.4
% NEUTRAL DETERGENT FIBER	15.0	45.1
% NSC	7.6	22.7
% TDN	16	58
NEL, (MCAL/LB)	0.17	0.60
NEM, (MCAL/LB)	0.16	0.58
NEG, (MCAL/LB)	0.09	0.32
% CALCIUM	0.33	1.01
% PHOSPHORUS	0.10	0.30
% MAGNESIUM	0.07	0.24
% POTASSIUM	0.95	2.85
% SODIUM	0.008	0.024
PPM IRON	75	225
PPM ZINC	10	30
PPM COPPER	4	11
PPM MANGANESE	12	37
PPM MOLYBDENUM	0.8	2.3

Whenever you make a new feed in Spartan 3, always use an existing similar feed as the template. Although Spartan 3 has about 120 feed characteristics, only about 10 need editing from a feed test report. The easiest way to do this is with Edit Nutrient Composition dialog under Feeds in the worksheet menu.

## 1. Setting up the ration.

Choose new ration and select Holstein lactating cow.



**Describe the Target Lactating Cow**

**Current Information**

Cow stage: Early lactation cow

Lactation number: 2

Days in milk: 60 days

Total body weight: 600.0 kg

Mature body weight: 700.0 kg

**Production Information**

	Milk yield kg/day	Fat %	TProtein %	Lactose %
Target:	50.0	3.50	3.20	4.85
Actual:	0.0	3.50	3.20	4.85

Farm's milk price: 0.00 \$/kg or \$/100 kg

Actual DMI per cow: 0.00 kg/day

**Predictions from Target Animal**

Predicted base DMI: 27.91 kg/day

Predicted adjusted DMI: 25.25 kg/day

Predicted daily gain: 0.36 kg/day

Required NEL density: 1.87 Mcal/kg

Required ME density: 3.00 Mcal/kg

**Describe the target cow.** Enter information given on the previous page for this cow. In the **Describe the Target Cow** dialog, choose early lactation and lactation number 2. The program should automatically list 60 days in milk. Then enter a mature BW of 700 kg and a current total BW of 600 kg. If the information is listed in pounds instead of kg, you can enter 1540 lb for mature weight and 1320 lb for current weight. **Currently if you change mature BW, current total BW may be altered. If it is wrong, just edit it again.**

Next enter 50 kg (or 110 lb) of milk at 3.5% fat and 3.2% protein. The dialog should look like this if you are in metric basis.

**Set Daily Body Weight Gain Parameters**

**Current Information**

Total body weight: 600.0 kg

Body condition score: 2.50

Days pregnant: 0

Body weight without fetus: 600.0 kg

Non-pregnant BC3 body wt: 644.1 kg

Mature body weight: 700.0 kg

**Daily Pregnancy Gain: 0.00 kg/day**

**Target Frame Growth**

Non-pregnant BC3 body wt: 700.0 kg

Days to achieve frame growth: 280 days

Target frame growth: 55.88 kg

**Target Daily Frame Growth: 0.20 kg/day**

**Target Body Condition Gain**

Target body condition score: 3.00

Days to achieve body condition: 240 days

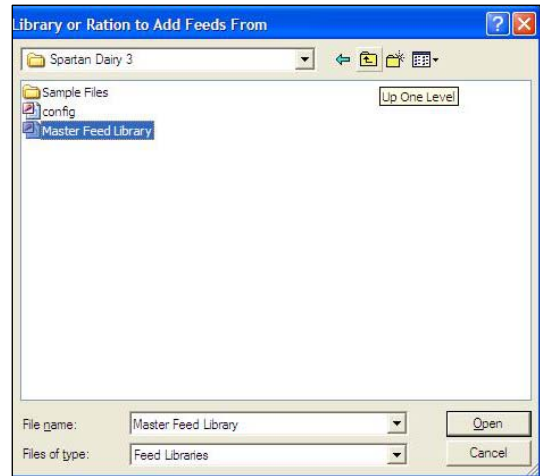
Target body condition gain: 45.76 kg

**Target Daily BC Gain: 0.19 kg/day**

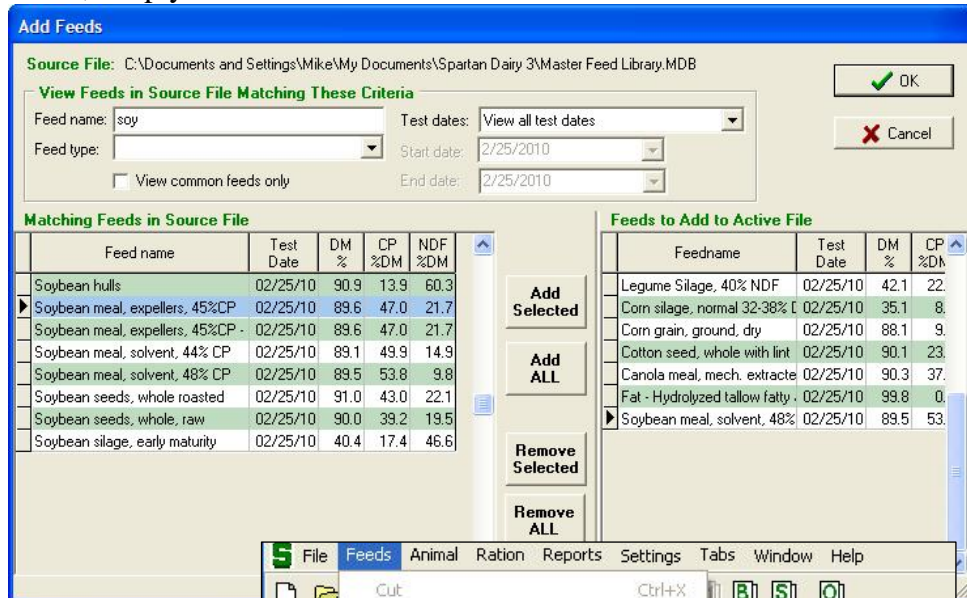
**Target Daily Body Wt. Gain: 0.39 kg/day**

The last step in describing the cow is the **Set Daily Body Weight Gain Parameters** dialog. Note that when you change the current body condition score to 2.5, the current nonpregnant body condition 3 (BC3)-adjusted BW stays the same and the total BW is altered. Go ahead and change it back to 600 kg (1320 lb). The target BC3 BW is the mature wt—just leave it there. Put the target BCS at 3.5 in 240 days. This will result in a target frame gain of 0.20 kg/d and a BC gain of 0.19 kg/d for a total gain of 0.39 kg/day or 0.86 lb/day.

**Choose feeds.** Next the program opens the dialog in which you choose a library for selecting feeds. You can choose any library or ration file for this, but we will choose the Master feed library.



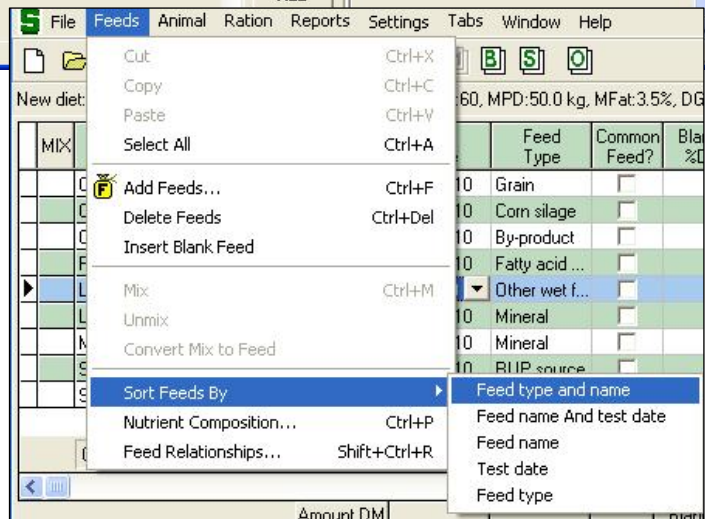
The **Add Feeds** dialog opens and you can select the feeds that were mentioned at the beginning of this exercise. The left bottom panel of this dialog shows the feeds in the source file (Master Feed Library in this case) that match the criteria in the top panel of the dialog. In this example, the only feeds shown are those that have the word “soy” in the feed name field. Note that as you try to find feeds that match your descriptions, you can expand the left side of the dialog so that you can see the test date, %DM, %CP, and %NDF of the library feeds. When you find a feed you want, simply double click it or click it once and press **Add Selected**.



For our exercise, the “legume silage w grass, mid mature” seemed closest to our tested mixed silage and the 1.5% MinVit mix seemed a reasonable template for our minvit premix. After the feeds have all been selected, press

**Sort feeds.** Choose **Feeds>Sort Feeds**

**By>Feed type and name** to arrange the feeds in an organized fashion. This will make balancing the diet more methodical and easier.



### Adjust feed characteristics to match actual feeds on farm

First we will edit feed names, % DM, and costs for our feeds. Just type over existing fields to edit them.

Then highlight MSU MinVit mix row and select **Feeds>Nutrient**

**Composition** or press **Ctrl+P** to pull up the **Edit Nutrient Composition** dialog. Edit the values for minerals and vitamins according to the specifications given at the beginning of this exercise.

Feed name	Amount DM lb	DM %	Cost AsSold \$	Wt AsSold lb	Cost DM \$/lb	Purchased?
Corn silage	0.00	34.0	41.00	2000	0.060	<input type="checkbox"/>
Mixed alfalfa grass silage	0.00	33.0	46.00	2000	0.070	<input type="checkbox"/>
Cotton seed, whole with lint	0.00	90.1	225.00	2000	0.125	<input checked="" type="checkbox"/>
Corn grain, ground, dry	0.00	88.1	4.10	56	0.083	<input checked="" type="checkbox"/>
Hydrolyzed tallow fatty acids	0.00	99.8	45.00	100	0.451	<input checked="" type="checkbox"/>
Soybean meal, solvent, 48...	0.00	89.5	340.00	2000	0.190	<input checked="" type="checkbox"/>
Soybean meal, expellers, 4...	0.00	89.6	388.00	2000	0.217	<input checked="" type="checkbox"/>
Limestone	0.00	99.0	7.50	100	0.076	<input checked="" type="checkbox"/>
MSU MinVit mix	0.00	98.0	31.00	100	0.316	<input checked="" type="checkbox"/>

The screenshot shows the 'Edit Nutrient Composition' dialog for 'MSU MinVit mix'. The 'General' tab is active, showing fields for Feedname, Test Date, DM (98.0%), and Common Feed. Other tabs like Lipid, Mineral, Vitamin, Protein, Carbohydrate, and Energy are also visible with various numerical input fields.

Now do the same for the mixed alfalfa grass silage. Only adjust values for which new information is known. Calculated fields, such as NEL, are not shown in this dialog.

The screenshot shows the 'Edit Nutrient Composition' dialog for 'Mixed alfalfa grass silage'. The 'General' tab is active, showing fields for Feedname, Test Date, DM (33.0%), and Common Feed. Other tabs like Lipid, Mineral, Vitamin, Protein, Carbohydrate, and Energy are also visible with various numerical input fields.

**Check feed characteristics**

**Fiber tab.**

We will use the default values for NDF effectiveness and NDF digestibility. NDF digestibility is a major determinant of the energy value of high fiber feeds. If lignin was in the forage test, we could have used help in Feed Characteristics: Fiber to edit NDF digestibility.

MIX	Feed name	Amount DM lb	NDF %DM	EINDF %NDF	Lignin %DM	ForNDF %DM	NDF dig %NDFn	EINDF %DM	ADF %DM
	Corn silage	0.00	45.0	100.0	2.6	45.0	59.8	45.0	28.1
	Mixed alfalfa grass silage	0.00	45.0	100.0	7.3	45.0	43.9	45.0	32.4
	Cotton seed, whole with lint	0.00	50.3	50.0	12.9	0.0	32.0	25.2	40.1
	Corn grain, ground, dry	0.00	9.5	25.0	0.9	0.0	52.7	2.4	3.4
	Hydrolyzed tallow fatty acids	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Soybean meal, solvent, 48...	0.00	9.8	25.0	0.5	0.0	60.7	2.5	6.2
	Soybean meal, expellers, 4...	0.00	21.7	25.0	1.5	0.0	49.4	5.4	10.4
	MSU MiriVit mix	0.00	3.0	0.0	0.0	0.0	40.0	0.0	0.0
	Limestone	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Concentration supplied		0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Supply</b>		0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Requirements</b>		57.05	15.4	12.3		11.6		12.3	
<b>Difference</b>		-57.05	-15.4	-12.3		-11.6		-12.3	

**Protein tab**

This is just a quick check to make sure the RUP and RPD values of our feeds seem reasonable. These are calculated from the A, B, and C fractions and KdB of a feed. See help on Feed Characteristics: Protein.

Feed name	Amount DM lb	CP %DM	RUP %CP	RDP %CP	MP	RUP dig %RUP	A prot %CP	B prot %CP	C prot %CP	Kd Bprot %/hr
Corn silage	0.00	8.8	36	64		70	51	30	19	4.4
Mixed alfalfa grass silage	0.00	19.6	20	80		65	58	34	8	10.4
Cotton seed, whole with lint	0.00	23.5	23	77		80	45	47	8	15.7
Corn grain, ground, dry	0.00	9.4	49	51		90	23	73	4	4.9
Hydrolyzed tallow fatty acids	0.00	0.0	0	0		0	100	0	0	0.0
Soybean meal, solvent, 48...	0.00	53.8	44	56		93	15	84	1	7.5
Soybean meal, expellers, 4...	0.00	47.0	69	31		93	9	91	0	2.4
MSU MiriVit mix	0.00	0.0	0	0		0	100	0	0	0.0
Limestone	0.00	0.0	0	0		0	100	0	0	0.0

**Carbohydrate tab**

This is just quick check to see if NFC seems reasonable. It is a calculated value and will likely change anytime other nutrients are edited.

Feed name	Amount DM lb	NFC %DM	NFC dig %NFC	Starch %DM	RDStarch %Starch	Sugar %DM	INFA %DM	SoFiber %DM	RDSof %SoF	RDOM %DM	tdNFC %DM
Corn silage	0.00	41.3	90.0	32.0	60.0	1.0	8.0	0.3	90.0	50.0	37.2
Mixed alfalfa grass silage	0.00	26.8	96.0	1.0	90.0	0.0	8.0	17.8	90.0	49.2	25.8
Cotton seed, whole with lint	0.00	6.1	96.0	1.0	50.0	5.0	0.0	0.1	90.0	38.2	5.9
Corn grain, ground, dry	0.00	77.1	96.0	70.0	70.0	2.0	0.0	5.1	90.0	64.9	74.0
Hydrolyzed tallow fatty acids	0.00	0.8	96.0	0.0	0.0	0.0	0.0	0.8	90.0	0.7	0.8
Soybean meal, solvent, 48...	0.00	30.6	96.0	6.0	50.0	0.0	0.0	24.6	90.0	60.9	29.4
Soybean meal, expellers, 4...	0.00	32.4	96.0	6.0	50.0	10.0	0.0	16.4	90.0	51.7	31.1
MSU MiriVit mix	0.00	4.0	0.0	0.0	0.0	0.0	0.0	4.0	0.0	0.9	0.0
Limestone	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

**Energy tab**

Go to the energy tab to see the new calculated values for energy of the silage or other feeds. Switch between “kg” and “lb” basis to get the value you want.

Feed name	Amount DM lb	NEL Mcal/lb	ME Mcal/lb	Disc. Fac. %	NEL 89 Mcal/lb	ME 89 Mcal/lb	NEL 01 Mcal/lb
Corn silage	0.00	0.64	1.03	3.0	0.73	1.21	0.60
Mixed alfalfa grass silage	0.00	0.52	0.86	3.0	0.61	1.00	0.51
Cotton seed, whole with lint	0.00	0.81	1.23	3.0	1.01	1.74	0.79
Corn grain, ground, dry	0.00	0.88	1.37	3.0	0.89	1.51	0.83
Hydrolyzed tallow fatty acids	0.00	2.46	3.08	3.0	2.65	3.31	2.32
Soybean meal, solvent, 48...	0.00	0.91	1.41	3.0	0.91	1.55	0.91
Soybean meal, expellers, 4...	0.00	0.90	1.40	3.0	0.89	1.51	0.90
MSU MiriVit mix	0.00	0.00	0.00	3.0	0.00	0.00	0.00
Limestone	0.00	0.00	0.00	3.0	0.00	0.00	0.00

**Modify the Nutrient Balance Graph**

Choose **Settings>Nutrient Balance Graph** from the menu or right-click on the graph and then edit the selection of nutrients displayed on the graph. In this example, we added Forage NDF, NRC 2001 NEL, and NRC 2001 MP.

**Modify Nutrient Balance Graph**

Display nutrient balance graph OK

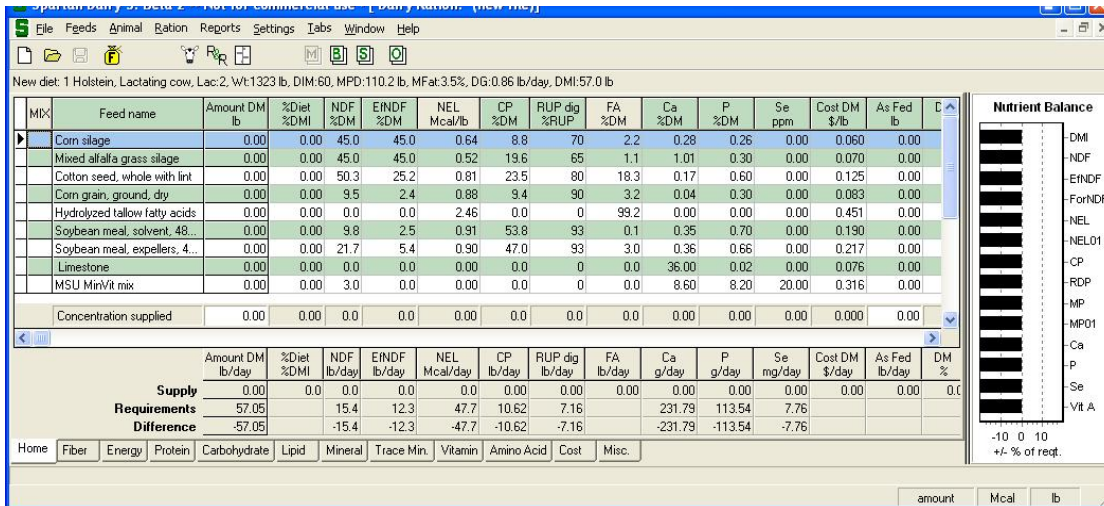
**Set X Axis**  
 Minimum value:  Maximum value:  Cancel

**Select Nutrients to Graph**

<input checked="" type="checkbox"/> Dry matter intake	<input checked="" type="checkbox"/> Rumen degraded protein	<input type="checkbox"/> Copper
<input checked="" type="checkbox"/> Neutral detergent fiber (NDF)	<input checked="" type="checkbox"/> Metabolizable protein (MP)	<input type="checkbox"/> Iron
<input checked="" type="checkbox"/> Effective NDF	<input checked="" type="checkbox"/> NRC 2001 MP	<input type="checkbox"/> Iodine
<input checked="" type="checkbox"/> Forage NDF	<input checked="" type="checkbox"/> Calcium	<input type="checkbox"/> Manganese
<input checked="" type="checkbox"/> Net energy	<input checked="" type="checkbox"/> Phosphorus	<input checked="" type="checkbox"/> Selenium
<input type="checkbox"/> Metabolizable energy (ME)	<input type="checkbox"/> Magnesium	<input type="checkbox"/> Zinc
<input type="checkbox"/> NRC 1989 NEL	<input type="checkbox"/> Potassium	<input checked="" type="checkbox"/> Vitamin A
<input type="checkbox"/> NRC 1989 ME	<input type="checkbox"/> Sodium	<input type="checkbox"/> Vitamin D
<input checked="" type="checkbox"/> NRC 2001 NEL	<input type="checkbox"/> Chlorine	<input type="checkbox"/> Vitamin E
<input type="checkbox"/> NRC 2001 ME	<input type="checkbox"/> Sulfur	<input type="checkbox"/> Lysine
<input checked="" type="checkbox"/> Crude protein	<input type="checkbox"/> Cobalt	<input type="checkbox"/> Methionine

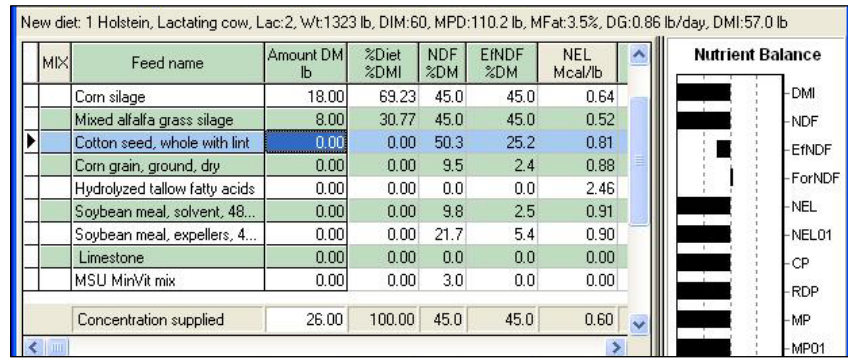
## 2. Balancing the ration

We will now work our way down the list of feeds and down the nutrient balance graph to systematically balance the diet. Here is what the ration worksheet looks like in pounds to start off.



### Balance for fiber and energy.

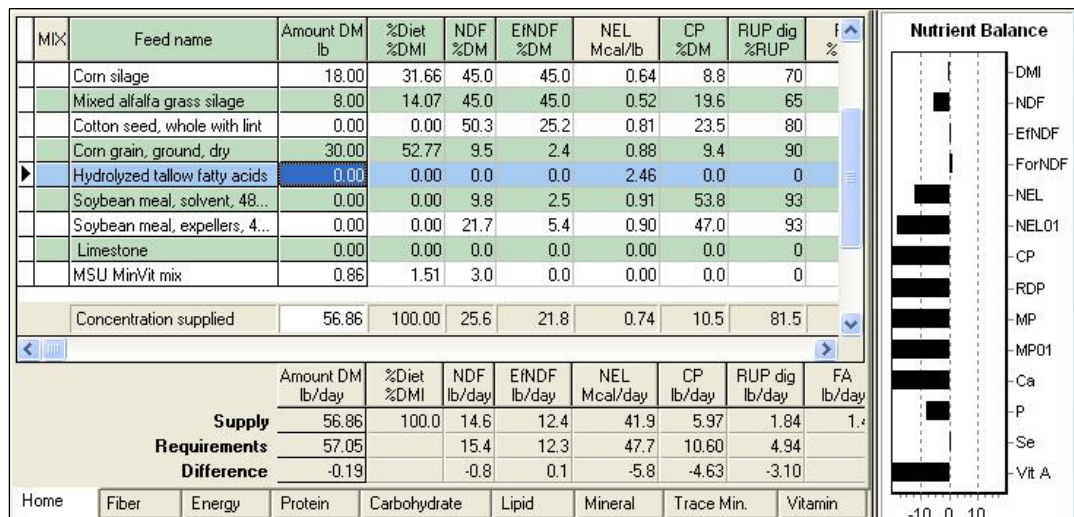
First add forage to make up about half of the diet until we meet the requirement for Forage NDF. We start with 8 lb alfalfa/grass silage and find it takes 18 lb corn silage to meet ForNDF requirement. We are short on total NDF and EfNDF, but the other feeds we add do have some of these.



Add the MSU MinVit mix at 1.5% using the %Diet column (it was designed to be fed at this rate).

Add corn grain to get close to the predicted DM intake of 57 lb. In the end, we will not be feeding this much corn because we will need some protein supplement, but this gives us an idea of how the

balance of fiber and energy will look. We are short on energy but that may happen with a very high producing cow at 60 DIM. We can move on.





**Balance for protein by altering the concentrate portion of the ration.**

First add the regular SBM until the CP and MP supplies are close to meeting requirements.

Note that after adding the soy, the fiber supply looks good.

The diet is a little short on MP, so we will try some expeller SBM (high in RUP). We take

out 5 lb of Soy-48 and add in 5 lb expeller SBM. The protein now looks pretty good. The CP is a little short, but that is fine because MP is more important. The MP system depends on more calculations, however, so we would want the CP to be somewhat close to requirements. In this case, we are only 5-6% short on CP, so it's okay. RDP supply is good.

New diet: 1 Holstein, Lactating cow, Lac:2, Wt:1323 lb, DIM:60, MPD:110.2 lb, MFat:3.5%, DG:0.86 lb/day, DMI:57.0 lb

MIX	Feed name	Amount DM lb	%Diet %DMI	NDF lb/day	EINDF %DM	NEL Mcal/lb	CP %DM	RUP dig %RUP	FA %DM	Ca %DM	P %DM	Se ppm	Cost DM \$/lb	As %
	Corn silage	18.00	31.66	45.0	45.0	0.64	8.8	70	2.2	0.28	0.26	0.00	0.060	
	Mixed alfalfa grass silage	8.00	14.07	45.0	45.0	0.52	19.6	65	1.1	1.01	0.30	0.00	0.070	
	Cotton seed, whole with lint	0.00	0.00	50.3	25.2	0.81	23.5	80	18.3	0.17	0.60	0.00	0.125	
	Corn grain, ground, dry	20.00	35.18	9.5	2.4	0.88	9.4	90	3.2	0.04	0.30	0.00	0.083	
	Hydrolyzed tallow fatty acids	0.00	0.00	0.0	0.0	2.46	0.0	0	99.2	0.00	0.00	0.00	0.451	
	Soybean meal, solvent, 48...	10.00	17.59	9.8	2.5	0.91	53.8	93	0.1	0.35	0.70	0.00	0.190	
	Soybean meal, expellers, 4...	0.00	0.00	21.7	5.4	0.90	47.0	93	3.0	0.36	0.66	0.00	0.217	
	Limestone	0.00	0.00	0.0	0.0	0.00	0.0	0	0.0	36.00	0.02	0.00	0.076	
	MSU MinVit mix	0.86	1.51	3.0	0.0	0.00	0.0	0	0.0	8.60	8.20	20.00	0.316	
Concentration supplied		56.86	100.00	25.7	21.8	0.74	18.3	87.1	2.2	0.44	0.47	0.30	0.099	1
Supply		56.86	100.0	14.6	12.4	42.2	10.41	3.61	1.28	112.62	122.00	7.76	5.61	111.
Requirements		57.05		15.4	12.3	47.7	10.61	3.91		231.79	113.54	7.76		
Difference		-0.19		-0.8	0.1	-5.5	-0.19	-0.30		-119.17	8.46	0.00		

MIX	Feed name	Amount DM lb	%Diet %DMI	NDF lb/day	EINDF %DM	NEL Mcal/day	CP %DM	RUP dig %RUP	FA %DM	Ca %DM	P %DM	Se ppm	Cost DM \$/lb	As %
	Corn silage	18.00	31.66	45.0	45.0	0.64	8.8	70	2.2	0.28	0.26	0.00	0.060	
	Mixed alfalfa grass silage	8.00	14.07	45.0	45.0	0.52	19.6	65	1.1	1.01	0.30	0.00	0.070	
	Cotton seed, whole with lint	0.00	0.00	50.3	25.2	0.81	23.5	80	18.3	0.17	0.60	0.00	0.125	
	Corn grain, ground, dry	20.00	35.18	9.5	2.4	0.88	9.4	90	3.2	0.04	0.30	0.00	0.083	
	Hydrolyzed tallow fatty acids	0.00	0.00	0.0	0.0	2.46	0.0	0	99.2	0.00	0.00	0.00	0.451	
	Soybean meal, solvent, 48...	5.00	8.79	9.8	2.5	0.91	53.8	93	0.1	0.35	0.70	0.00	0.190	
	Soybean meal, expellers, 4...	5.00	8.79	21.7	5.4	0.90	47.0	93	3.0	0.36	0.66	0.00	0.217	
	Limestone	0.00	0.00	0.0	0.0	0.00	0.0	0	0.0	36.00	0.02	0.00	0.076	
	MSU MinVit mix	0.86	1.51	3.0	0.0	0.00	0.0	0	0.0	8.60	8.20	20.00	0.316	
Concentration supplied		56.86	100.00	26.7	22.1	0.74	17.7	87.7	2.2	0.44	0.47	0.30	0.099	1
Supply		56.86	100.0	15.2	12.6	42.2	10.07	4.04	1.28	112.62	122.00	7.76	5.61	111.
Requirements		57.05		15.4	12.3	47.7	10.61	3.92		231.79	113.54	7.76		
Difference		-0.19		-0.2	0.2	-5.5	-0.54	0.11		-119.17	8.46	0.00		

Now go to the Mineral tab and add limestone until you meet Ca requirement. In this case, we are 2% short on total Ca, but we have plenty of absorbed Ca. The other minerals all are okay, although Na is 10% short. We will ignore this, although it might be worth supplementing more Na.

MIX	Feed name	Amount DM lb	Ca %DM	abs Ca %Ca	P %DM	abs P %P	Mg %DM	abs Mg %Mg	K %DM	Na %DM	Cl %DM	S %DM	DCAD meq/100g	As %
	Corn silage	18.00	0.28	30	0.26	70	0.17	12	1.20	0.01	0.29	0.14	14.2	
	Mixed alfalfa grass silage	8.00	1.01	30	0.30	70	0.24	8	2.85	0.02	0.60	0.25	41.2	
	Cotton seed, whole with lint	0.00	0.17	60	0.60	64	0.37	16	1.13	0.02	0.06	0.23	13.7	
	Corn grain, ground, dry	20.00	0.04	60	0.30	64	0.12	24	0.42	0.02	0.08	0.10	3.1	
	Hydrolyzed tallow fatty acids	0.00	0.00	60	0.00	64	0.00	16	0.00	0.00	0.00	0.00	0.0	
	Soybean meal, solvent, 48...	5.00	0.35	60	0.70	64	0.29	8	2.41	0.03	0.13	0.39	34.9	
	Soybean meal, expellers, 4...	5.00	0.36	60	0.66	64	0.30	8	2.12	0.04	0.10	0.34	31.9	
	Limestone	0.70	36.00	75	0.02	75	2.06	30	0.12	0.06	0.03	0.04	2.3	
	MSU MinVit mix	0.86	8.60	75	8.20	75	7.50	70	0.60	13.00	20.00	2.80	-157.8	
Concentration supplied		57.56	0.87	0.5	0.47	0.3	0.32	0.1	1.32	0.21	0.52	0.22	14.7	
Supply		57.56	226.93	140.46	122.07	83.56	82.51	28.39	344.95	55.60	135.65	57.13	3847.81	
Requirements		57.05	231.79	88.08	113.54	76.07	59.51	9.52	304.76	62.51	80.21	57.21		
Difference		0.51	-4.86	52.38	8.52	7.48	23.00	18.86	40.19	-6.91	55.44	-0.08		

We are now ready to check over the diet and reassess our fiber, energy, and protein work in light of the total DM supply relative to requirements. We actually have a little more EfNDF and ForNDF than needed, and we are about a half pound over on feed DM. So we will drop the legume silage to 7.5 lb. It is not necessary to be so close on feed DM (being within 1% of the requirement is perfectly fine), but in our case, we wanted to minimize the fiber in the diet (while still supply enough to keep the rumen healthy) so that we could maximize the amount of feed and energy the cows would consume. We are ready for our final checks.

New diet: 1 Holstein, Lactating cow, Lac:2, Wt:1323 lb, DIM:60, MPD:110.2 lb, Mfat:3.5%, DG:0.86 lb/day, DMI:57.0 lb

MIX	Feed name	Amount DM lb	NDF %DM	EfNDF %NDF	Lignin %DM	ForNDF %DM	NDF dig %NDFn	EfNDF %DM	ADF %DM	RDNDF %NDF	tdNDF %DM
	Corn silage	18.00	45.0	100.0	2.6	45.0	59.8	45.0	28.1	54.0	26.1
	Mixed alfalfa grass silage	7.50	45.0	100.0	7.3	45.0	43.9	45.0	32.4	39.0	18.6
	Cotton seed, whole with lint	0.00	50.3	50.0	12.9	0.0	32.0	25.2	40.1	29.0	15.3
	Corn grain, ground, dry	20.00	9.5	25.0	0.9	0.0	52.7	2.4	3.4	47.0	4.6
	Hydrolyzed tallow fatty acids	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Soybean meal, solvent, 48...	5.00	9.8	25.0	0.5	0.0	60.7	2.5	6.2	55.0	5.5
	Soybean meal, expellers, 4...	5.00	21.7	25.0	1.5	0.0	49.4	5.4	10.4	44.0	6.0
	Limestone	0.70	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	MSU MinVit mix	0.86	3.0	0.0	0.0	0.0	40.0	0.0	0.0	30.0	1.2
Concentration supplied		57.06	26.2	82.4	2.3	20.1	56.1	21.6	15.8	49.0	13.3

	Amount DM lb/day	NDF lb/day	EfNDF lb/day	Lignin lb/day	ForNDF lb/day	NDF dig lb/day	EfNDF lb/day	ADF lb/day	RDNDF lb/day	tdNDF lb/day
<b>Supply</b>	57.06	15.0	12.3	1.3	11.5	7.8	12.3	9.0	7.3	7.6
<b>Requirements</b>	57.05	15.4	12.3		11.6		12.3			
<b>Difference</b>	0.01	-0.4	0.0		-0.1		0.0			

Check the Trace mineral tab. In this case, some such as Cu and Zn are a little short, but note that we did not give most of our feeds any credit for trace minerals. Given that our MinVit mix is supplying well above 50% of the requirement, this calculated shortage is not a concern.

MIX	Feed name	Amount DM lb	Co ppm	Cu ppm	abs Cu %Cu	Fe ppm	abs Fe %Fe	I ppm	abs I %I	Mo ppm	Mn ppm	abs Mn %Mn	Se ppm	abs Se %Se	Zn ppm	abs Zn %Zn
	Corn silage	18.00	0.00	0.0	4	0	10	0.00	85	0.0	0.0	0.75	0.00	40	0	15
	Mixed alfalfa grass silage	7.50	0.00	11.0	4	225	10	0.00	85	0.0	37.0	0.75	0.00	40	30	15
	Cotton seed, whole with lint	0.00	0.00	0.0	4	0	10	0.00	85	0.0	0.0	0.75	0.00	40	0	15
	Corn grain, ground, dry	20.00	0.00	0.0	4	0	10	0.00	85	0.0	0.0	0.75	0.00	40	0	15
	Hydrolyzed tallow fatty acids	0.00	0.00	0.0	4	0	10	0.00	85	0.0	0.0	0.75	0.00	40	0	15
	Soybean meal, solvent, 48...	5.00	0.00	0.0	4	0	10	0.00	85	0.0	0.0	0.75	0.00	40	0	15
	Soybean meal, expellers, 4...	5.00	0.00	0.0	4	0	10	0.00	85	0.0	0.0	0.75	0.00	40	0	15
	Limestone	0.70	0.00	0.0	5	3500	40	0.00	90	0.0	0.0	1.00	0.00	45	0	15
	MSU MinVit mix	0.86	7.00	600.0	5	4000	40	40.00	90	0.0	2500.0	1.00	20.00	45	2500	15
Concentration supplied		57.06	0.10	10.4	0.5	132.5	44.1	0.60	0.5	0.0	42.4	0.41	0.30	0.1	41.4	6.2


	Amount DM lb/day	Co mg/day	Cu mg/day	abs Cu mg/day	Fe mg/day	abs Fe mg/day	I mg/day	abs I mg/day	Mo mg/day	Mn mg/day	abs Mn mg/day	Se mg/day	abs Se mg/day	Zn mg/day	abs Zn mg/day
<b>Supply</b>	57.06	2.72	270.3	13.4	3429	1142	15.53	13.97	0.0	1096	10.65	7.76	3.49	1072	160.9
<b>Requirements</b>	57.05	3.15	307.6	12.3	815	82	15.69	13.34		390	2.93	7.76	3.43	1559	233.8
<b>Difference</b>	0.01	-0.43	-37.3	1.0	2614	1061	-0.17	0.63		706	7.72	0.00	0.06	-486	-72.9

Check the Vitamin tab. In this case, all three vitamins are short, but again we did not give most of our feeds any credit for vitamins. Given that our MinVit mix is supplying about 40% of the requirement, this calculated shortage is not a concern.

Feed name	Amount DM lb	Vit A kIU/lb	Vit D kIU/lb	Vit E IU/lb	
Corn silage	18.00	0	0	0	
Mixed alfalfa grass silage	7.50	0	0	0	
Cotton seed, whole with lint	0.00	0	0	0	
Corn grain, ground, dry	20.00	0	0	0	
Hydrolyzed tallow fatty acids	0.00	0	0	0	
Soybean meal, solvent, 48...	5.00	0	0	0	
Soybean meal, expellers, 4...	5.00	0	0	0	
Limestone	0.70	0	0	0	
MSU MinVit mix	0.86	120	30	1200	
Concentration supplied		57.06	0.8	0.2	8.2

	Amount DM lb/day	Vit A kIU/day	Vit D kIU/day	Vit E IU/day
<b>Supply</b>	57.06	46.58	11.64	465.8
<b>Requirements</b>	57.05	112.45	29.53	888.3
<b>Difference</b>	0.01	-65.87	-17.89	-422.5

Check the Ratios and Relationships dialog. Select **Ration>Ratios and Relationships**, press Ctrl+R, or press the  button.

Note energy-allowable milk is less than the target of 110 lb but protein-allowable milk is close. Unless the cow eats more than predicted, or the energy value of our feeds is greater than predicted, this cow will likely lose some body condition and/or

produce less than expected. Note that income over feed costs is negative –this is because we did not enter a milk price in the cow description. Press okay.

Check the home tab again and note the cost of the ration---\$5.63 per day.

**Ration Ratios and Relationships**

<b>Intake</b>		<b>Diet Composition</b>	
Actual DMI:	57.06 lb/day	Forage in diet:	44.69 %DM
DMI / BW:	4.02 %BW	Forage NDF:	76.6 %NDF
NRC01 Predicted DMI:	57.72 lb/day	CP / ME3%:	597.15 g/Mcal
DEp / DE1%:	91.53 %	MP / ME:	51.31 g/Mcal
Energy-corrected milk (ECM):	112.20 lb/day	Lys : Met:	3.11
ECM / DMI:	1.97	NRC01 Lys : Met:	3.50
		NRC01 Lys:	2.74 %MP
		NRC01 Met:	0.78 %MP
<b>Production / Daily Gain</b>		<b>Nutrient Management (N, P, K)</b>	
Energy-allowable milk:	93.82 lb/day	Predicted Fecal DM:	18.25 lb/day
Protein-allowable milk:	108.84 lb/day	N captured:	40.7 %
Target body energy balance:	1.95 Mcal/day	Total N excreted:	0.947 lb/day
Target body protein balance:	0.16 lb/day	Fecal N:	0.368 lb/day
		Urinary N:	0.578 lb/day
		P captured:	39.3 %
		P excreted:	0.162 lb/day
		P excreted as P205:	0.372 lb/day
		K excreted as K20:	0.698 lb/day
<b>Costs</b>			
Feed cost / ME3%:	17.74 \$/100 Mcal		
Purchased feed costs:	4.02 \$/day		
Feed cost / 100 wt milk:	5.10 \$/100 lb		
Income over feed costs:	-5.63 \$/day		

New diet: 1 Holstein, Lactating cow, Lac:2, Wt:1323 lb, DIM:60, MPD:110.2 lb, Mfat:3.5%, DG:0.86 lb/day, DMI:57.0 lb

MIX	Feed name	Amount DM lb	%Diet %DMI	NDF %DM	E/NDF %DM	NEL Mcal/lb	CP %DM	RUP dig %RUP	FA %DM	Ca %DM	P %DM	Se ppm	Cost DM \$/lb	A
	Corn silage	18.00	31.55	45.0	45.0	0.64	8.8	70	2.2	0.28	0.26	0.00	0.060	
	Mixed alfalfa grass silage	7.50	13.15	45.0	45.0	0.52	19.6	65	1.1	1.01	0.30	0.00	0.070	
	Cotton seed, whole with lint	0.00	0.00	50.3	25.2	0.81	23.5	80	18.3	0.17	0.60	0.00	0.125	
	Corn grain, ground, dry	20.00	35.05	9.5	2.4	0.88	9.4	90	3.2	0.04	0.30	0.00	0.083	
	Hydrolyzed tallow fatty acids	0.00	0.00	0.0	0.0	2.46	0.0	0	99.2	0.00	0.00	0.00	0.451	
	Soybean meal, solvent, 48...	5.00	8.76	9.8	2.5	0.91	53.8	93	0.1	0.35	0.70	0.00	0.190	
	Soybean meal, expellers, 4...	5.00	8.76	21.7	5.4	0.90	47.0	93	3.0	0.36	0.66	0.00	0.217	
	Limestone	0.70	1.23	0.0	0.0	0.00	0.0	0	0.0	36.00	0.02	0.00	0.076	
	MSU MinVit mix	0.86	1.50	3.0	0.0	0.00	0.0	0	0.0	8.60	8.20	20.00	0.316	
	Concentration supplied	57.06	100.00	26.2	21.6	0.73	17.5	87.7	2.2	0.87	0.47	0.30	0.099	

	Amount DM lb/day	%Diet %DMI	NDF lb/day	E/NDF lb/day	NEL Mcal/day	CP lb/day	RUP dig lb/day	FA lb/day	Ca g/day	P g/day	Se mg/day	Cost DM \$/day	As Fe lb/day
<b>Supply</b>	57.06	100.0	15.0	12.3	41.9	9.97	4.02	1.27	224.64	121.39	7.76	5.63	111
<b>Requirements</b>	57.05		15.4	12.3	47.7	10.62	3.95		231.79	113.54	7.76		
<b>Difference</b>	0.01		-0.4	0.0	-5.8	-0.65	0.07		-7.15	7.84	0.00		

Home	Fiber	Energy	Protein	Carbohydrate	Lipid	Mineral	Trace Min.	Vitamin	Amino Acid	Cost	Misc.
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**Nutrient Balance**

### 3. Save the file.

After creating the ration, you should save it. In this example, the ration is for a group of cows at the MSU Dairy, so I save the file in a folder called MSU Dairy. Choose **File>Save as...** and save as with any other windows program.

**Save As**

Save in: Spartan Dairy 3

- Sample Files
- config
- Master Feed Library
- MSU Dairy

File name:

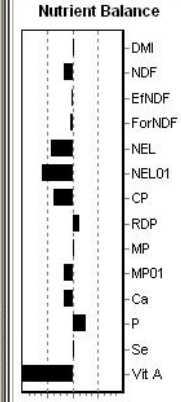
Save as type: Access files (\*.mdb)

Buttons: Open, Cancel

### 4. Consider feed options

Currently Spartan 3 does not have an optimizer cost evaluator. (its completely designed but not coded). But we can easily check the impact on nutrients and ration cost of other available feeds. Let's first check the impact of adding 2% Hydrolyzed Tallow Fatty Acids in place of corn. Type 2 into the %Diet column for HTFA, and subtract 1.14 lb from corn grain.

MIX	Feed name	Amount DM lb	%Diet %DMI	NDF %DM	EINDF %DM	NEL Mcal/lb	CP %DM	RUP dig %RUP	FA %DM	Ca %DM	P %DM	Se ppm	Cost DM \$/lb	A
	Corn silage	18.00	31.55	45.0	45.0	0.64	8.8	70	2.2	0.28	0.26	0.00	0.060	
	Mixed alfalfa grass silage	7.50	13.14	45.0	45.0	0.52	19.6	65	1.1	1.01	0.30	0.00	0.070	
	Cotton seed, whole with lint	0.00	0.00	50.3	25.2	0.81	23.5	80	18.3	0.17	0.60	0.00	0.125	
	Corn grain, ground, dry	18.86	33.05	9.5	2.4	0.88	9.4	90	3.2	0.04	0.30	0.00	0.083	
	Hydrolyzed tallow fatty acids	1.14	2.00	0.0	0.0	2.46	0.0	0	99.2	0.00	0.00	0.00	0.451	
	Soybean meal, solvent, 48...	5.00	8.76	9.8	2.5	0.91	53.8	93	0.1	0.35	0.70	0.00	0.190	
	Soybean meal, expellers, 4...	5.00	8.76	21.7	5.4	0.90	47.0	93	3.0	0.36	0.66	0.00	0.217	
	Limestone	0.70	1.23	0.0	0.0	0.00	0.0	0	0.0	36.00	0.02	0.00	0.076	
	MSU MinVit mix	0.86	1.50	3.0	0.0	0.00	0.0	0	0.0	8.60	8.20	20.00	0.316	
Concentration supplied		57.06	100.00	26.1	21.6	0.77	17.3	87.7	4.2	0.87	0.46	0.30	0.106	
<b>Supply</b>		57.06	100.0	14.9	12.3	43.7	9.87	3.98	2.37	224.43	119.84	7.76	6.05	110
<b>Requirements</b>		57.05		15.4	12.3	47.7	10.62	3.96		231.79	113.54	7.76		
<b>Difference</b>		0.01		-0.5	0.0	-4.0	-0.76	0.02		-7.36	6.29	0.00		



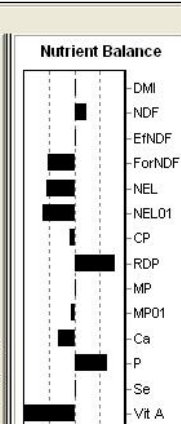
Note this increased NEL intake by almost 2 Mcal and energy-allowable milk by ~6 lb (press  $R_{R}$  button). This costs 40 cents more per day; however, we are assuming the cow will eat the same amount! If she drops her intake 1-2%, we will not have gained anything.

Ration Ratios and Relationships	
<b>Intake</b>	
Actual DMI:	57.06 lb/day
DMI / BW:	4.02 %BW
NRC01 Predicted DMI:	57.72 lb/day
DEp / DE1%:	91.53 %
Energy-corrected milk (ECM):	112.20 lb/day
ECM / DMI:	1.97
<b>Production / Daily Gain</b>	
Energy-allowable milk:	99.81 lb/day
Protein-allowable milk:	107.80 lb/day
Target body energy balance:	1.95 Mcal/day
Target body protein balance:	0.16 lb/day

Now let's see what would happen to nutrient specs and to ration cost if we added 5 lb of cottonseeds. We must also subtract 5 lb of something. Because cottonseeds is high in NDF but we consider it to be only 50% effective, we will drop forage 2.5 lb. The other 2.5 lb will be subtracted from corn. So now we have 5 lb mixed silage, 5 lb cottonseeds, and 17.5 lb corn grain. Note this increased NEL intake by only 0.6 Mcal (2 lb of milk) and increased ration cost by 24 cents /day. However, we are assuming the cow will eat the same amount! If the intake drops, this was an expensive mistake. If the intake increases, it might be

New diet: 1 Holstein, Lactating cow, Lac:2, Wt:1323 lb, DIM:60, MPD:110.2 lb, MFat:3.5%, DG:0.86 lb/day, DMI:57.0 lb

MIX	Feed name	Amount DM lb	%Diet %DMI	NDF %DM	EINDF %DM	NEL Mcal/lb	CP %DM	RUP dig %RUP	FA %DM	Ca %DM	P %DM	Se ppm	Cost DM \$/lb	A
	Corn silage	18.00	31.55	45.0	45.0	0.64	8.8	70	2.2	0.28	0.26	0.00	0.060	
	Mixed alfalfa grass silage	5.00	8.76	45.0	45.0	0.52	19.6	65	1.1	1.01	0.30	0.00	0.070	
	Cotton seed, whole with lint	5.00	8.76	50.3	25.2	0.81	23.5	80	18.3	0.17	0.60	0.00	0.125	
	Corn grain, ground, dry	17.50	30.67	9.5	2.4	0.88	9.4	90	3.2	0.04	0.30	0.00	0.083	
	Hydrolyzed tallow fatty acids	0.00	0.00	0.0	0.0	2.46	0.0	0	99.2	0.00	0.00	0.00	0.451	
	Soybean meal, solvent, 48...	5.00	8.76	9.8	2.5	0.91	53.8	93	0.1	0.35	0.70	0.00	0.190	
	Soybean meal, expellers, 4...	5.00	8.76	21.7	5.4	0.90	47.0	93	3.0	0.36	0.66	0.00	0.217	
	Limestone	0.70	1.23	0.0	0.0	0.00	0.0	0	0.0	36.00	0.02	0.00	0.076	
	MSU MinVit mix	0.86	1.50	3.0	0.0	0.00	0.0	0	0.0	8.60	8.20	20.00	0.316	
Concentration supplied		57.06	100.00	28.3	21.8	0.75	18.3	87.7	3.6	0.84	0.50	0.30	0.103	
<b>Supply</b>		57.06	100.0	16.1	12.4	42.5	10.42	4.06	2.08	216.59	128.19	7.76	5.87	106
<b>Requirements</b>		57.05		15.4	12.3	47.7	10.63	4.02		231.79	113.54	7.76		
<b>Difference</b>		0.01		0.7	0.1	-5.2	-0.21	0.04		-15.20	14.65	0.00		

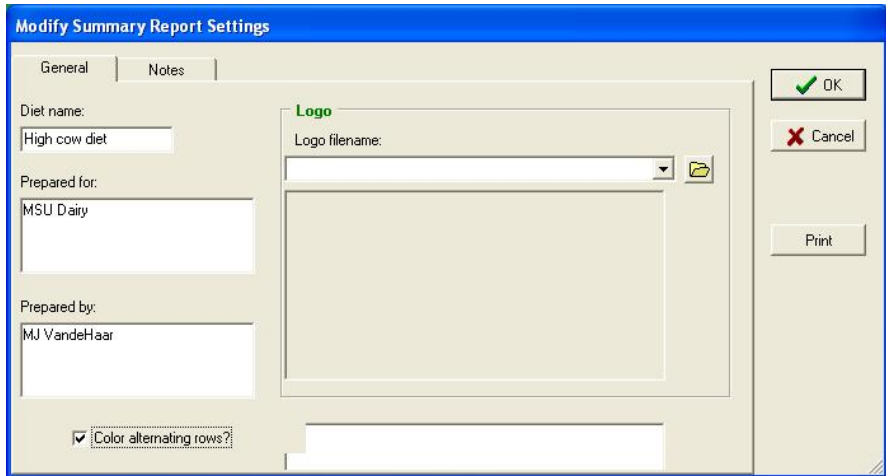


worth it.

### 5. Print reports.

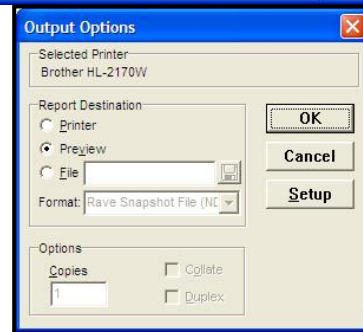
First print the summary report. Choose **Reports>Summary Report** from the menu. In the settings dialog, you can enter your name, give the diet a name, and enter the farm name. Check the box for alternating row colors.

Press the  button.



In the first output options dialog, select preview.

The summary report is usually 2 or 3 pages.



Report Preview

Summary Report High cow diet File date: Mar 12, 2010 Page 1

Prepared for: MSU Dairy

Holstein, Lactating cow

Lactation #	2	Body wt w/o fetus:	644.1 kg
Days in milk:	60	Current BCS:	2.50
Target	Actual	Target daily gain:	0.39 kg/day
Milk yield:	50.0 0.0 kg/day	Mature body weight:	700.0 kg
Fat:	3.50 3.50 %	Days pregnant:	0
Protein:	3.20 3.30 %	Thermonutral zone	No work
Lactose:	4.85 4.85 %	Feed additive:	None

LOGO AREA

Prepared by: MJ VandeHaar


Feed name	Test Date	DM kg	As Fed kg	DM %	%Diet %DM	NDF %DM	NEL Mcal/kg	CP %DM	RUP %CP	AsSold \$	WtAsSold kg
Corn silage	2/25/10	8.00	23.53	34.0	30.94	45.0	1.41	8.8	36	41.00	907
Mixed alfalfa grass silage	2/25/10	3.50	10.61	33.0	13.54	45.0	1.14	19.6	20	46.00	907
Corn grain, ground, dry	2/25/10	9.15	10.39	88.1	35.39	9.5	1.93	9.4	49	4.10	25
Soybean meal, solvent, 48%	2/25/10	2.30	2.57	89.5	8.89	9.8	2.00	53.8	44	340.00	907
Soybean meal, expellers, 45	2/25/10	2.20	2.46	89.6	8.51	21.7	1.98	47.0	69	398.00	907
Limestone	2/25/10	0.32	0.32	99.0	1.24	0.0	0.00	0.0	0	7.50	45
MSU Min/Vit mix	2/25/10	0.39	0.40	98.0	1.50	3.0	0.00	0.0	0	31.00	45
Supply		25.86	50.27	51.4	100.0	6.8	41.9	4.52	2.07		5.62
Requirements		25.88				7.0	47.7	4.84	2.26		
Difference		-0.02				-0.2	-5.8	-0.32	-0.19		

DIET SUMMARY MP system used: Spartan 3 (w/ defaults)

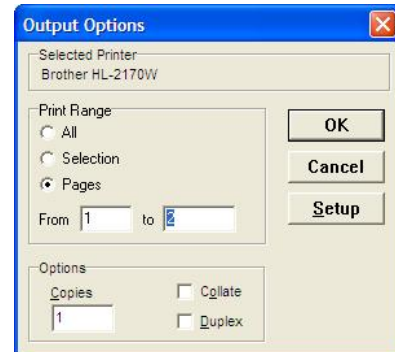
	NDF %DM	eNDF %DM	ForNDF %DM	NEL Mcal/kg	NEg Mcal/kg	CP %DM	RUP %DM	RDP %DM	RUPdg %DM	NPNCPE %CP	MP %DM
Supply	26.1	21.5	20.0	1.6	17.49	7.99	9.50	7.01	1.54	13.11	
Requirements	27.0	21.6	20.3	1.8	18.70	8.73	9.10	6.99		13.09	
Difference	-0.9	-0.1	-0.2	-0.2	-1.21	-0.74	0.40	0.02		0.03	

	Ca %DM	P %DM	Mg %DM	K %DM	Na %DM	Cl %DM	S %DM	Co ppm	Cu ppm	Fe ppm	I ppm
Supply	0.87	0.47	0.32	1.31	0.21	0.52	0.22	0.11	10.5	134	0.60
Requirements	0.90	0.44	0.23	1.18	0.24	0.31	0.22	0.12	11.9	32	0.61
Difference	-0.02	0.03	0.09	0.13	-0.03	0.21	0.00	-0.02	-1.4	102	-0.01

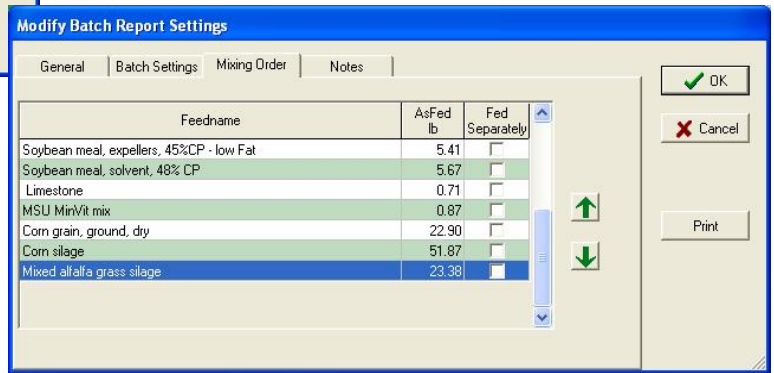
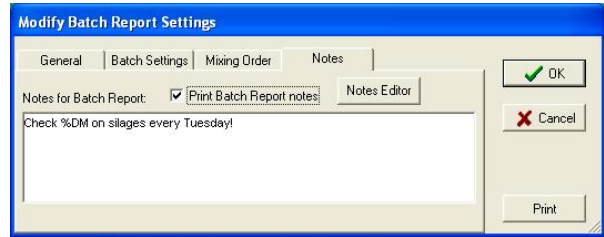
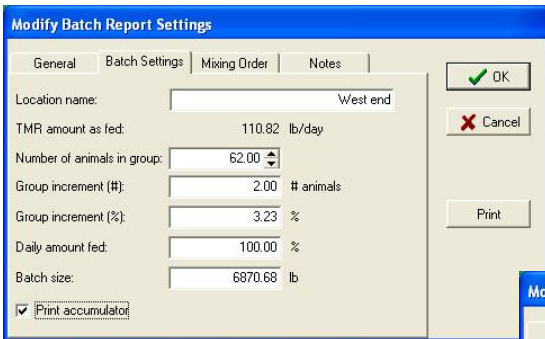
	Mn ppm	Se ppm	Zn ppm	Starch %DM	RDStarch %Starch	FA %DM	NFC %DM	DCAD meq/100g	Vit A kIU/kg	Vit D IU/kg	Vit E IU/kg
Supply	43	0.30	42	35.85	66.73	2.23	49.2	14.55	1.80	0.45	18.0
Requirements	15	0.30	60						4.35	1.14	34.3
Difference	27	0.00	-19						-2.54	-0.69	-16.3


If you are happy with the report, choose **File>Print** or press the  button.

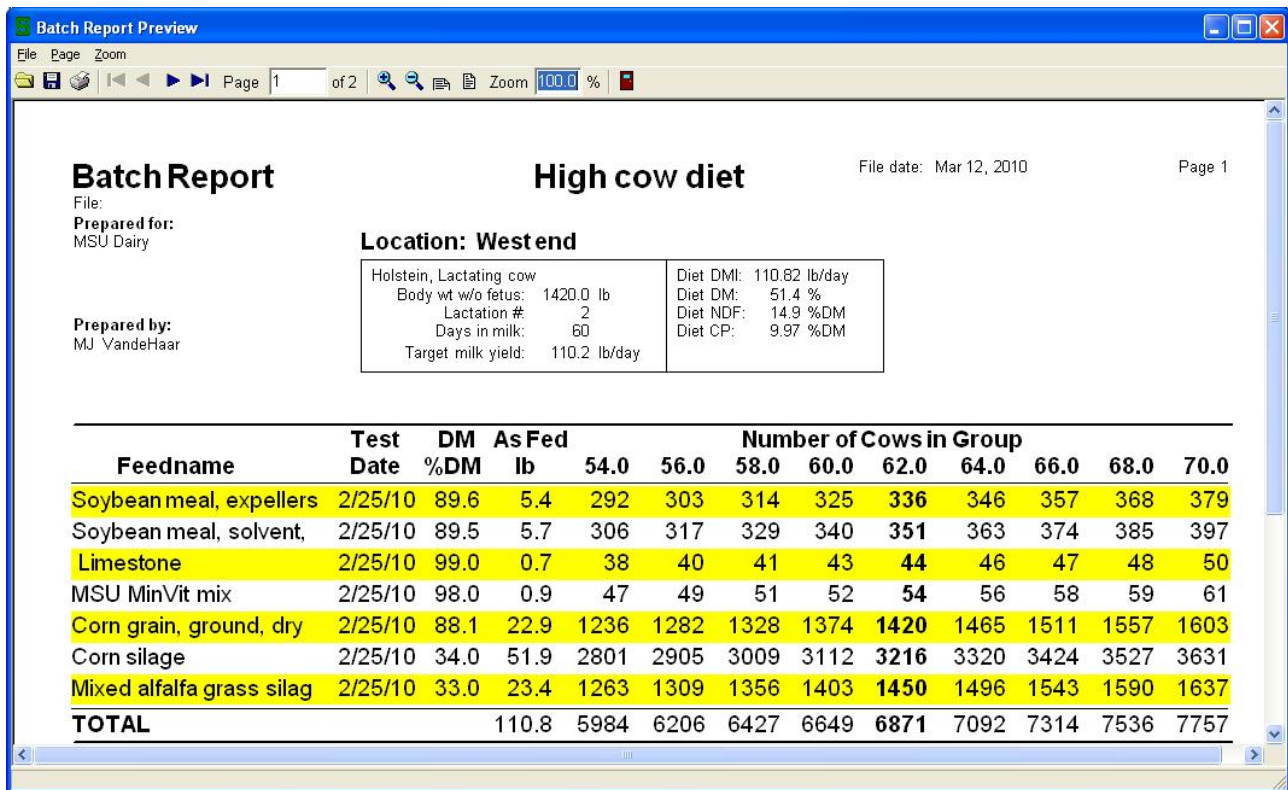
The second **Output Options** dialog will appear. In this dialog, you may choose to print only page 1 or pages 1 and 2. Sometimes page 3 has no useful information and you may want to save the paper.



Next print the batch report to use the recipe for mixing a ration. Choose **Reports>Batch Reports**. In addition to the general settings you set for the summary report, you now can edit setting for batch size and mixing order and type notes.



The first page of the batch report looks like this. Click  to print.



This concludes the tutorial on formulating a new lactation diet. I apologize if you use kg instead of pounds. I hope you could follow it anyway.