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Manual for Batch Mix Spreadsheet batchmix.xls

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Topics include:
Introduction
Operating Instructions
Possible Uses and Examples

INTRODUCTION

Monitoring forage dry matter is critically important to consistently feeding a balanced ration. Moisture content is the most variable aspect of forages. Other components remain relatively stable over time, but moisture can change as much as 5% from one week to the next.

This variability creates a problem because rations are formulated on a dry matter basis, but they are mixed and fed on an as fed or wet basis. Changes in the moisture content of a forage cause changes in the amount of that forage required to provide a specific amount of protein and energy (and all the other nutrients balanced in the ration). Consider this example:

Corn Silage			Amount Over/Under Fed		
As Fed lb	% DM	DM lb fed	DM (lb)	CP (lb)	NE (Mcal)
58.9	28.5	16.8	0	0	0
58.9	25	14.7	-2.07	-0.23	-1.38
58.9	33	19.4	2.65	0.29	1.77

At the time the ration was formulated, the corn silage was 28.5% dry matter and had 11% crude protein and 0.67 Mcal/lb of net energy. To balance the ration, 16.8 pounds of corn silage dry matter were required. This translates to 58.9 pounds of as fed corn silage. If the dry matter changes, but the amount fed is not adjusted, cows will be over or underfed corn silage. As a result, the amount of protein and energy in the ration will not match the cows' needs. Failure to adjust feeding amounts as forage dry matter changes can negatively affect cows' milk production and energy balance. On the other hand, overfeeding forages results in wasted feed, excess nutrients, and increased excretion of nutrients in manure.

We recommend testing forage dry matter two times per week (instructions for using a microwave to do this are provided in the spreadsheet). The Batch Mix spreadsheet can be used to quickly adjust your ration as forage dry matter changes.

USING THE BATCH MIX SPREADSHEET

The spreadsheet batchmix.xls was designed to provide a simple method of adjusting the amount fed as the dry matter of forages changes. The spreadsheet is available on our website at http://www.das.psu.edu/dcn/catforg/ . Type only in cells containing blue text; other cells contain formulas that may stop working if they are erased or changed. Also, be sure to type over or erase all examples to ensure accurate results.

This spreadsheet contains the following worksheets:

1. Instructions
2. Microwave
3. Ration Info
4. Forage DM
5. Feed Sheet

The first two contain a shortened version of these instructions for using the spreadsheet and determining forage dry matter using a microwave.

Step 1. Enter Ration Information

The first step in using this spreadsheet is to enter a ration formulation on the Ration Info worksheet. Up to four rations may be entered; a total of 6 forages and a total of 18 other ingredients may be entered. For each ration, enter the following:

1. Ingredient names or descriptions
2. Pounds of dry matter per cow of each ingredient
3. Dry matter content (as a percent) of each non-forage ingredient

The total dry matter in the ration will be calculated at the bottom of the column. Check this number to be sure it matches your ration formulation.

	% DM	*DM lb in ration (from printout)* Ration				*DMI as % Total DMI* Ration			
Forages		**String 1**	**String 2**	**Dry 10**	**Dry 100**	**String 1**	**String 2**	**Dry 10**	**Dry 100**
Bunk 3 corn silage	**enter values on** forage DM **sheet**	20.5	24.4	16.79	16.79	0.40291	0.50918	0.44773	0.44773
Grass hay		5.5	4.5	9.46	9.46	0.10810	0.09391	0.25227	0.25227
1a. Enter forage ingredients here		2a. Enter lb of forage dry matter here for up to 4 rations							
Other Ingredients		**String 1**	**String 2**	**Dry 10**	**Dry 100**	**String 1**	**String 2**	**Dry 10**	**Dry 100**
Canola meal	87.8	4.33	2.51	2.68	2.68	0.08510	0.05238	0.07147	0.07147
High cow grain mix	91.4	20.55	16.51	1.828	1.828	0.40389	0.34453	0.04875	0.04875
Dry cow grain mix	90.6	0	0	6.742	6.742			0.17979	0.17979
1b. Enter other ingredients here		2b. Enter lb of non-forage dry matter here for up to 4 rations							
	3. Enter dry matter % of non-forage ingredients here								
		4. Check this total. It should match ration print out.							
		String 1	**String 2**	**Dry 10**	**Dry 100**	***String 1***	***String 2***	***Dry 10***	***Dry 100***
Total Dry Matter		50.88	47.92	37.5	37.5	*1.000*	*1.000*	*1.000*	*1.000*

Figure 1. Ration Info Worksheet.

Step 2. Determine Forage Dry Matter

The next step is entering forage dry matters on the Forage DM worksheet. This is a separate sheet to allow you to enter initial and final weights from dry matter determination. The forage dry matter will then be calculated for you. Until the ration formulation changes, the Forage DM worksheet will be the primary place you will need to enter information.

Forage dry matter may be correct on the formulated ration the first time a new ration is entered. In this case, enter 100 for the initial weight and the dry matter percentage reported on the ration as the final weight.

Forage	Initial Weight (grams)	Final Weight (grams)	Dry Matter %
Bunk 3 corn silage	100	28.5	28.5
Grass hay	100	86	86

Figure 2. Forage DM Worksheet.

As you measure dry matter each week, enter the new initial and final weights into the Forage DM worksheet. Information about using a microwave to determine forage dry matter can be found on the Microwave worksheet of the batchmix.xls spreadsheet.

Step 3. Enter Cow Numbers and Print

The last step is entering the number of cows in each feeding group on the Feed Sheet worksheet. Once cow numbers are entered, the pounds of each ingredient required in the mix are calculated for each ration. The sheet can be printed by choosing “Print” from the File menu.

The batch mix sheet can now be updated quickly and printed each time forage dry matter or group sizes change.

POSSIBLE USES AND EXAMPLES

- Enter up to four different rations – Adjust batch sizes for changes in cow numbers. Every time the group size changes, the batch mix sheet must be printed.
- Enter the same ration in all four columns – Enter four different group sizes to create a reference that shows incremental differences in the batch size.
- To build in a cushion (for example 4% feed refusals), simply increase cow numbers.

Ration	String 1	String 2	Dry 10	Dry 100
# Cows in Group	97	65	10	100
DM/Cow	50.88	47.92	37.50	37.50
FORAGE INGREDIENTS				
Bunk 3 corn silage	6977.2	5564.9	589.1	5891.2
Grass hay	620.3	340.1	110.0	1100.0
OTHER INGREDIENTS				
Canola meal	478.4	185.8	30.5	305.2
High cow grain mix	2180.9	1174.1	20.0	200.0
Dry cow grain mix			74.4	744.2
Total Batch Weight	10,256.8	7,265.0	824.1	8,240.6
As Fed lb/cow	105.7	111.8	82.4	82.4

Figure 3. Feed Sheet Worksheet. Example showing three rations; note the amounts for the dry cow ration are calculated for 10 and 100 cows.

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