



UGA Basic Balancer Instructions

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Introduction

The UGA Basic Balancer is a spreadsheet based decision aid to formulate basic rations for beef cattle operations. The nutrient requirements used in this program are adapted from guidelines presented in the 2000 National Research Council publication “Nutrient Requirement of Beef Cattle: Seventh Revised Edition: Update 2000.” This program consists of a feed library, least cost feedstuff analyzer, a ration analyzer, and sections to balance rations for brood cows, bulls, heifers, and stockers. This document gives step-by-step instructions on how to use this program. The program is available for download on the UGA Beef Team Website (www.ugabeef.com/tools.html) or at <https://extension.uga.edu/publications/detail.html?number=B1371>.

Disclaimer

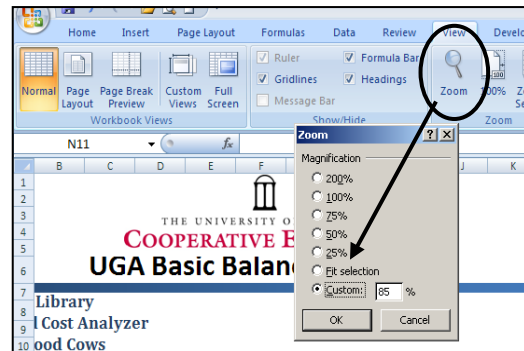
The UGA Basic Balancer is intended to be a simple ration balancer that addresses energy (TDN) and crude protein (CP) requirements of cattle. This program does not take into consideration other requirements or limitations (e.g. micro minerals, fat level, effective fiber, nonstructural carbohydrates, etc.). Before feeding any rations developed in this program, contact your local Extension office to address any potential problem.

System Requirements

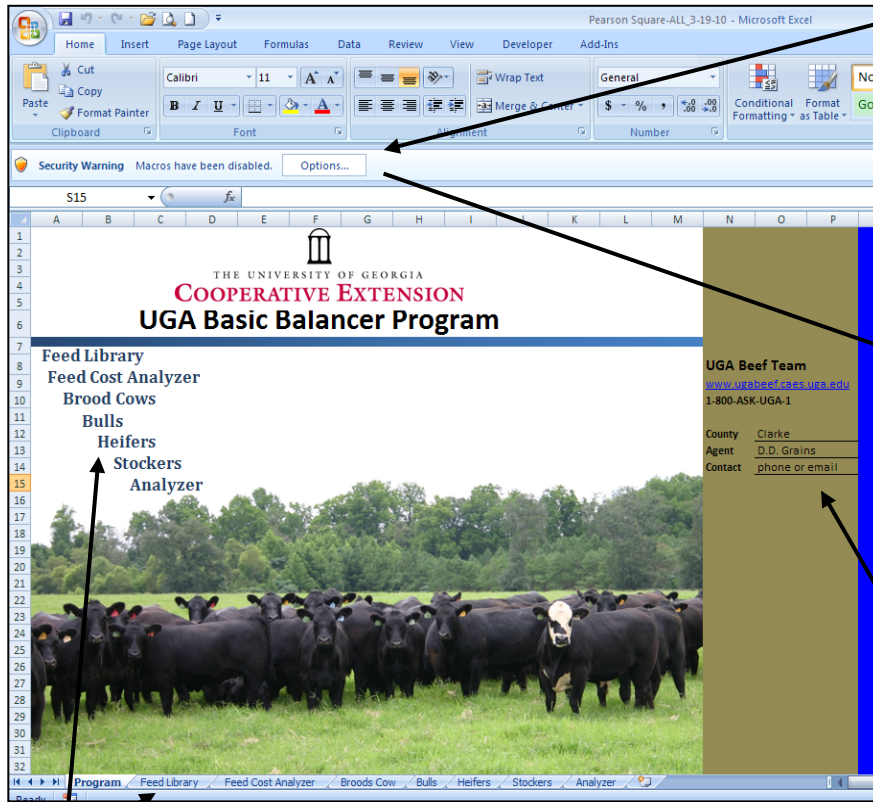
This program was developed to run on Microsoft Excel 2007 or later. Using an earlier version of Excel, or another spreadsheet software, may result in some loss of functionality. Check for free software patches that are available from Microsoft’s website (<https://support.microsoft.com>) for your version of Windows and Excel. If you are already using Excel 2007, be sure to check for and download the latest patches to prevent graphics from becoming distorted when viewing the screens.

Viewing the Program

This program was developed for use on a widescreen monitor. If all components of a given spreadsheet are not visible on your screen, adjust the view by selecting the “View” tab, “Zoom,” and adjusting the screen size.

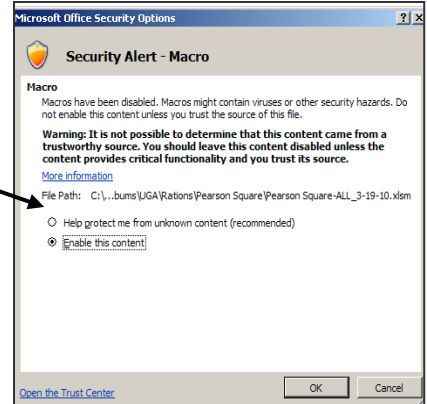


Program Page



Macros

Macros must be enabled to maintain full function of the spreadsheet.



Contact Information

County Extension agents should enter their info so that it is incorporated into the report sheets.

Tabs and Links

Each section of the workbook can be accessed through links on the main program page or the tabs across the bottom of the workbook. Also, the homepage is accessible on subsequent pages by following the "HOME" link located at the top of each section.

Feeds	DM	CP	TDN	Ca	P	\$/ton*
FORAGE/ROUGHAGE						
1 Bermudagrass Hay, Good	85	12	60	0.38	0.22	\$100
2 Bermudagrass Hay, Average	85	10	54	0.36	0.18	\$90
3 Bermudagrass Hay, Poor	85	6	48	0.34	0.18	\$80
4 Tall Fescue Hay, Good	85	16	60	0.43	0.32	\$120
5 Tall Fescue Hay, Average	85	13	55	0.42	0.31	\$100
6 Tall Fescue Hay, Poor	85	10	50	0.41	0.3	\$80
7 Peanut Hay	88	11	54	1.20	0.15	\$80

Feed Library

- The feed library comes pre-populated with several common feedstuffs.
- The ingredients are categorized by feed type (forage/roughage, protein, energy, and mineral).
- The nutritive value of these feeds are listed based on the 2000 NRC. If an individual analysis of feed has been performed, values can be updated for a given feedstuff (**highly recommended**, especially for forages).
- Prices should be updated regularly to ensure proper calculations of feed costs. Prices are obtained by contacting your local feed supplier. A list of commodity feed sources can be found on the UGA Beef Team website: www.ugabeef.com/tools.
- Blanks are provided for additional feeds to be added to the library.

The screenshot shows the 'Feed Library' section of the UGAFeedCostAnalyzer software. The table lists various feedstuffs with their corresponding nutritive values and prices. A 'Proceed to Analyzer' button is visible at the top right of the table area.

Feeds	DM	CP	TDN	Ca	P	\$/ton*
FORAGE/ROUGHAGE						
1 Bermudagrass hay, good	85	12	58	0.38	0.22	\$20
2 Bermudagrass hay, average	85	10	53	0.36	0.18	\$100
3 Bermudagrass hay, poor	85	6	49	0.34	0.18	\$80
4 Tall fescue hay, good	85	16	60	0.43	0.32	\$120
5 Tall fescue hay, average	85	13	55	0.42	0.31	\$100
6 Tall fescue hay, poor	85	10	50	0.41	0.3	\$80
7 Peanut Hay	88	11	48	1.20	0.15	\$80
8 Bermudagrass pasture	25	13	64	0.4	0.27	\$8.75
9 Bermudagrass pasture	25	10	58	0.46	0.22	\$8.25
10 Summer annual pasture	25	12	60	0.5	0.44	\$8.50
11 Small grains pasture - vegetative	22	18	70	0.45	0.35	\$12.50
12 Small grains pasture - mature	25	12	58	0.4	0.3	\$12.50
13 Ann. Ryegrass pasture - vegetative	22	20	72	0.65	0.41	\$10.00
14 Ann. Ryegrass pasture - mature	25	12	58	0.6	0.35	\$10.00
15 Tall fescue pasture	25	14	62	0.44	0.33	\$8.00
16 Corn Silage	32	8	71	0.14	0.18	\$50
17 Cottonseed Hulls	90	4	45	0.15	0.09	\$180
18 Gin Trash	85	12	47	0.90	0.20	\$35
19 Peanut Hulls	90	8	25	1.20	0.10	\$20
20 Soybean Stubble	85	5	40	1.20	0.15	\$20
21 BLANK	100	1	1	0.00	0.00	\$999
22 BLANK	100	1	1	0.00	0.00	\$999
23 BLANK	100	1	1	0.00	0.00	\$999
24 BLANK	100	1	1	0.00	0.00	\$999

Feed Cost Analyzer

The UGA Feed Cost Analyzer is also available as an individual spreadsheet. This spreadsheet allows side-by-side comparison of feeds to identify the least cost options for crude protein (CP) and energy (TDN) feeds.

- Feed ingredients to be compared can be selected from a drop down menu (populated from the Feed Library).
- The least cost feed analyzed as \$/pound of CP will be highlighted green, second will be yellow, and third will be red.
- The same least cost analysis will be performed for \$/pound of TDN.
- The spreadsheet will allow for up to 20 feeds to be compared simultaneously.
- To include a feedstuff that is not in the Feed Library, edit a “BLANK” entry on the Feed Library sheet and then select it from the drop-down menu.
- To remove a feed from the analyzer, select “BLANK” from the drop-down menu in the ingredients column.

Ingredients	\$/ton	% DM	% CP	% TDN	\$/CWT DM	\$/lb CP	\$/lb TDN
Citrus Pulp	120	90.0	7.0	82.0	6.67	\$ 0.952	\$ 0.081
Corn	164	90.0	8.0	90.0	9.08	\$ 1.135	\$ 0.101
Grain Sorghum molasses	130	90.0	12.0	75.0	7.22	\$ 0.602	\$ 0.096
Oats	175	90.0	14.0	90.0	9.72	\$ 0.694	\$ 0.108
Soyhulls	165	90.0	18.0	83.0	9.17	\$ 0.509	\$ 0.110
Wheat	140	90.0	28.0	95.0	7.78	\$ 0.278	\$ 0.082
Wheat Midds							
BLANK	\$ 999	100.0	0.0	0.0	49.95	\$ 500.000	\$ 500.000
BLANK	\$ 999	100.0	0.0	0.0	49.95	\$ 500.000	\$ 500.000
BLANK	\$ 999	100.0	0.0	0.0	49.95	\$ 500.000	\$ 500.000
BLANK	\$ 999	100.0	0.0	0.0	49.95	\$ 500.000	\$ 500.000
BLANK	\$ 999	100.0	0.0	0.0	49.95	\$ 500.000	\$ 500.000
BLANK	\$ 999	100.0	0.0	0.0	49.95	\$ 500.000	\$ 500.000
BLANK	\$ 999	100.0	0.0	0.0	49.95	\$ 500.000	\$ 500.000
BLANK	\$ 999	100.0	0.0	0.0	49.95	\$ 500.000	\$ 500.000
BLANK	\$ 999	100.0	0.0	0.0	49.95	\$ 500.000	\$ 500.000
BLANK	\$ 999	100.0	0.0	0.0	49.95	\$ 500.000	\$ 500.000
BLANK	\$ 999	100.0	0.0	0.0	49.95	\$ 500.000	\$ 500.000
BLANK	\$ 999	100.0	0.0	0.0	49.95	\$ 500.000	\$ 500.000
BLANK	\$ 999	100.0	0.0	0.0	49.95	\$ 500.000	\$ 500.000
BLANK	\$ 999	100.0	0.0	0.0	49.95	\$ 500.000	\$ 500.000
BLANK	\$ 999	100.0	0.0	0.0	49.95	\$ 500.000	\$ 500.000

Feed Comparison

The Feed Comparison tool on the Feed Cost Analyzer page calculates the price a potential feed needs to be equal to or lower than in order to replace a current feed as a CP or TDN supplement.

- In this example, soybean meal is the current source of CP, and corn gluten feed is considered as a replacement.
- Feeds to be compared can be selected from a drop-down menu (populated from the **Feed Library**).
- The price at which the potential feed (corn gluten) must be, or lower, to replace the current feed (SBM) will be listed for both TDN and CP.
- In this example, corn gluten feed must be less than \$153/ton to replace soybean meal as a CP supplement at its current price. *PLEASE NOTE:* these prices only indicate the value of replacing a feedstuff as source of TDN or CP. It DOES NOT take into consideration the value, or lack of, other nutrients.

Current Feedstuff	Potential
Soybean Meal	Corn Gluten Feed
	TDN
	\$ 296
	CP
	\$ 153

Balancer Worksheets

A spreadsheet is available for each class of cattle (brood cows, bulls, heifers, and stockers). Each spreadsheet has the same basic design, but the specifics differ based on the nutrient requirements of that animal class. Throughout the sections, **only change the cells with blue font**. Changing other cells will cause a loss of function and incorrect diet formulation. Notes are available to explain the content of cells with a small red triangle in the upper, right corner. Scrolling over the cell will make the note appear. When trying to formulate a least cost ration, it is advised to start by determining the least cost feed ingredients for forage, CP, and energy from the Feed Cost Analyzer. Please note that this program does not take into consideration safe feeding levels of any feeds (e.g., corn gluten feed, distillers grains, etc.) or the value of other nutrients. Consult with your county Extension agent to determine if feeding certain levels of a given feed is safe.

Example of Displaying an Informational Note

Getting Started

- Start by describing the group of cattle of interest. This includes the farm name, number of head, average weight of the group, and the target gain (stage of production). Note the target gain/stage of production will be from a drop down menu.
- The requirements will be based on the target gain/stage of production and will be listed.
- If any notes need to be recorded for the ration session, they can be made in the notes box and will be incorporated into the printed report.

Diet Formulation

The spreadsheet is designed to handle up to four ingredients.

1. **Constant Ingredient.** Any ingredient that is intended to be held constant in the diet (e.g., a producer has corn on hand and wants to use it up, even though there are additional ingredients available and more economical). Choose from the drop-down menu populated from the Feed Library. Next determine the percentage of inclusion in the diet (dry matter basis). If a constant ingredient is not to be used, select BLANK from the drop-down menu and 0% for the inclusion rate.

- Forage/Roughage.** Choose the forage base in the diet. Select from the drop-down menu populated from the Feed Library.
- Energy Source.** Choose an ingredient to serve as an energy (TDN) supplement.
- Protein Source.** Choose an ingredient to serve as a protein (CP) supplement.

Interpreting the Diet

Based on the “Constant Ingredient” and the first two ingredients, a base diet ration is formulated. Note that the fourth ingredient is used only if ingredients 1, 2, and 3 do not meet the CP requirement.

BASE DIET		-----Total Mixed Ration-----			Grazing or Free Choice Forage				
TDN	Ingredient	DM %	AF %	lb/ton	lb/hd/d	lb/group/d	lb/ton	lb/hd/d	lb/group/d
60.00	1 Corn	10%	10%	191	2.7	667	1286	2.7	667
12.3	2 Tall Fescue Hay, Average	84%	85%	1704	23.8	5961	-	-	-
0.46	3 Citrus Pulp	6%	5%	106	1.5	370	734	1.5	370
0.31	Total	100%	100%	2000	28.0	6998	2000	4.1	1037
\$/ton	\$ 112.07								
\$/hd/d	\$ 1.57								
Ca:P	1.50								

- The diet will be characterized on the left-hand side of the “Base Diet” box. Note that \$/ton and \$/head/day **include forage costs**. If the cost of a supplement without the cost of forage is wanted, enter \$0 for the cost of the particular forage in the Feed Library.
- The ingredient amounts will be given on a pound per ton, pound per head per day, and pound per group per day basis (AF) as a “**Total Mixed Ration**” and “**Grazing or Free Choice Forage.**” Total Mixed Ration is reported for producers that will mix all feeds together (i.e., corn silage based diets, ground hay, etc.). Grazing or free choice is reported for producers that will provide forage as grazing or free choice hay and only need to mix the supplemental components
- If the TDN and CP requirements are met without using the ingredient selected as the “Protein Source,” then this ingredient will not be include in the **BASE DIET**. However, if CP is deficient, the program will automatically incorporate the “Protein Source” ingredient and provide a **FINAL DIET**.

Errors

Two errors may occur during formulation:

1. **Not enough energy.** The ration developed does not contain enough TDN. This occurs when the diet is balanced for CP first or when too many low-energy feeds are used.

FINAL DIET		Total Mixed Ration			Grating or Free Choice Forage			
Ingredient	DM %	AF %	lb/ton	lb/hd/d	lb/group/d	lb/ton	lb/hd/d	lb/group/d
TDN	50.95							
CP	10.5							
Ca	0.46	58%	62%	1196	16.5	4122	0	0.0
P	0.24	20%	19%	341	5.3	1335	993	5.3
StNon	\$ 96.02	22%	21%	417	5.8	1438	1037	5.8
St/hd/d	\$ 1.92						2000	11.1
Ca:P	1.89	100.0%	100%	2000	27.6	6996	2000	11.1

NOT ENOUGH ENERGY AVAILABLE IN DIET

2. **Adjust mineral.**

The ration developed needs additional calcium to maintain a Ca:P ratio above 1.5:1. This is common when using feeds such as corn gluten feed and distiller's grains that are high in P. This can be corrected by using a limestone or a low-P mineral. The program will calculate the amount of limestone needed to mix into a ton of feed to be delivered in a TMR or in a supplement to grazing or free choice forage. Note that this program does not account for other macro/micro minerals or vitamins.

CHEMICAL COMPOSITION		FINAL DIET			Total Mixed Ration			Grating or Free Choice Forage		
Ingredient	DM %	AF %	lb/ton	lb/hd/d	lb/group/d	lb/ton	lb/hd/d	lb/group/d		
TDN	61.37									
CP	10.5									
Ca	0.29	78%	79%	1586	22.1	5531	0	0.0		
P	0.23	16%	15%	300	4.2	1045	1448	4.2		
StNon	\$ 105.62	6%	6%	114	1.6	398	552	1.6		
St/hd/d	\$ 1.47						2000	9.8		
Ca:P	1.27	100.0%	100%	2000	27.9	6974	2000	9.8		

**ADJUST MINERAL TO INCREASE Ca:P RATIO To 1.5
Limestone needed:
2.7 lb/ton TMR
13.0 lb/ton Grazing or FC Forage**

Notes

While working on a specific diet, notes can be recorded specific to the ration, producer, feeding situation, etc. These will be incorporated into the final report.

Printing a Report

Once the diet is formulated, a report can be printed with the final diet. Select the orange "Print Ration" button (macros must be enabled to allow this function to work). *NOTE:* This macro will not work on Mac computers. Mac users should follow the print command under "File" or press the "Command" key and "P" key simultaneously.

A print preview screen will appear for the formulated ration. This ration summary sheet will include:

- The producer and county agent information previously entered.
- The description of the cattle and requirements.
- The diet ration formulated.
- Any notes about the ration.

Ration Analyzer

The ration analyzer allows custom mixes to be analyzed for nutritional value and price. This will aid in evaluating premixed feeds and custom rations of known ingredient amounts. These results can be incorporated into the Feed Library by replacing a BLANK. Only change cells with blue text.

- Ingredients can be selected from the drop-down menu, which is populated from the Feed Library.
- Enter amounts as pounds/ton, pounds/head or percent of ration.
- Percent of ration as fed, pounds of dry matter, and percent of ration (dry matter) will be calculated automatically.
- The diet analysis will be calculated based on nutritional values entered in the Feed Library. (Remember: these are based on NRC listed values unless otherwise entered by the user.)

Ration Analyzer					
Ration 1					
Ingredients	As Fed		Dry Matter		Diet Analysis
	lb/ton, lb/hd, or %	%	lb	% of ration	
Soybean Hulls	50	50%	45	50%	DM 90.0
Corn Gluten Feed	25	25%	22.5	25%	CP 14.3
Corn	25	25%	22.5	25%	TDN 82.3
BLANK	0	0%	0	0%	Ca 0.300
BLANK	0	0%	0	0%	P 0.323
BLANK	0	0%	0	0%	Ca:P 0.93
BLANK	0	0%	0	0%	\$/ton \$ 136.25
BLANK	0	0%	0	0%	
BLANK	0	0%	0	0%	
BLANK	0	0%	0	0%	
BLANK	0	0%	0	0%	
Total	100	100%	90	100%	

A second ration analyzer is available to the right of "Ration 1" (not shown) to allow side-by-side comparison of custom rations.

***For questions or support for the program,
please contact your local extension office (1-800-ASK-UGA-1).***