Class Exercise 03

Least Cost Breeding (LC-B): Lactating Pregnant Cow

Attendees Group Number:

Attendees Names (Last Name, First Name, Initials)

-
-
-

INPUT

1. From the main menu select the Least Cost Breeding (LC-B).
2. In the Animal Information screen, enter the following information:

Title	Example-03
Beginning Body Weight (kg) (kg)	600
Ending Body Weight (kg) (kg)	800
Daily Gain (kg/day)	0
Overhead Cost ($/day) ($/day)	0.2
Feed Intake Adjustment (-/+) (%)	0
Maintenance Adjustment (-/+) (%)	0
Condition Score	5. Average
Compensatory Growth	No
Breed	Holstein
Frame	Medium
Sex	Cow
Daily Milk Production (kg) (kg)	20
Milk Fat (%) (%)	3.5
Calf Birth Weight (kg) (kg)	20
Days Pregnant (days)	50
Implant	Yes
Additive	None
Temperature	Normal
Mud	None

This a 700-kg Holstine cow of medium frame, with average condition score, producing 20 kg of milk per day with milk fat of 3.5%. The cow is 50-days pregnant, and the expected calf birth weight will be 30 kg. The overhead cost is 0.20 per day. We use implant but no feed additives. The temperature is normal and there is no mud.

Note that the 700-kg cow is entered with beginning weigh of 600 kg and ending weight of 800 kg, which is averaged as 700 kg.

3. Goto Feeds screen and add the following feeds and then go to the Ration screen and enter the following prices:

Library	Feed Number	Feed Name	Feed Price
0	18	ALFALFA middlings bloom	137.79
0	30	ALMOND hulls 15 percent Crude Fiber	82.67
0	154	BUCKWHEAT grain	110.23
0	162	CALCIUM phosphate di	529.1
0	231	CORN grain flaked	132.28
0	267	FAT animal Hydroponic	264.55
0	383	MOLASSES cane	88.18
0	399	OAT hay dough stage	110.23
0	430	OYSTERSHELL ground	110.23
0	563	RICE hulls	0
0	675	UREA 45% nitrogen	264.55
0	692	WHEAT grain Soft red winter (SRW)	137.78

4. Go to the Nutrient Constraints screen, and recalculate nutrient constraints

Nutrient Constraints

InternalName	DisplayName	Pct_Unit_Metric	Pct_UsrMin	Pct_UsrMax	Amt_Unit_Metric	Amt_
DM	Feed Dry Matter	% DM			kg	14.89
NEM	Net Energy for M...	Mcal/kg	1.723	1.723	Mcal	
CP	Crude Protein	% DM	14.142		kg	
CA	Calcium	% DM	0.475	2.000	kg	
P	Phosphor	% DM	0.305	1.000	kg	

5. Do not add any constraints for feeds and feed groups.
6. Go to the Ratio constraints and confirm that it is set as shown below:

Ratio Constraints

Numerator Code	Numerator Name	Denumerator Code	Denumerator Name	Constraint Amount	Constraint Unit
CA	Calcium	P	Phosphor	1.200	3 MIN DM minimum constraint, 10

7. Go to Reports screen and generate the report.

OUTPUT

Using the information in the report fill out the following tables:

Methane Emission:

Item	Value
Methane Emission in MJ per day per head (MJ/d)	
Methane Emission in Mcal per day per head (Mcal/d)	
Methane Emission (kg/day/day)	
CO2 Equivalent Emission (kg/day/head)	
Methane Emission in gram per kg of dry matter intake (g/kg)	
Methane Conversion Rate (%)	

Nutrients Requirements:

Nutrient	Description	Unit	Supplied by Ration Dry Matter	NRC Min	Meets Minimum NRC Requirements?
DM	Intake	Kg			
NEM	Energy	Mcal*			
CP	Protein	Kg*			
CA	Mineral	%DM			
P	Mineral	%DM			

Ration composition:

Feed Number	Feed Name	Kg As Fed	Price/day
18	ALFALFA middlings bloom		
30	ALMOND hulls 15 percent Crude Fiber		
154	BUCKWHEAT grain		
162	CALCIUM phosphate di		
231	CORN grain flaked		
267	FAT animal Hydroponic		
383	MOLASSES cane		
399	OAT hay dough stage		
430	OYSTERSHELL ground		
563	RICE hulls		
675	UREA 45% nitrogen		
692	WHEAT grain Soft red winter (SRW)		
	TOTAL		

References

Citation for Software:

Least Cost and Ration Analysis Program for Beef Cattle for Nigeria Users' Manual. (2023). Global Engagement Office, CA&ES Dean's Office, College of Agricultural and Environmental Sciences, University of California, Davis. https://geosoftware.faculty.ucdavis.edu/users_manuals/

Citation for Methane Equation:

Moraes, L. E., Strathe, A. B., Fadel, J. G., Casper, D. P., & Kebreab, E. (2014). Prediction of enteric methane emissions from cattle. Global Change Biology, 20(7), 2140-2148. https://doi.org/10.1111/gcb.12471

Nutrient Amounts

NEM Amount (Mcal) = NEM Concentration (Mcal/kg) * DMI (kg)

CP Amount (kg) = CP Concentration (%) * DMI (kg) / 100