

MATCHING FORAGE SUPPLIES TO ANIMAL NEEDS



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2010 FORAGE SHORT COURSE

8/25/2010

Outline

- Importance of Good Nutrition
- Timing of Nutrient Supply
 - Growth and forage supply
 - Lactation and forage supply
 - Forage Planning
- Monitoring Forages and Animal Response
- Supplementation



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Importance of Good Nutrition

- Nutrients are required for:
 - Maintenance
 - Growth
 - Production/Reproduction
- Maintenance requirements vary for confinement vs. grazing animals
 - 20% increase in energy requirement for grazing
 - Must meet these requirements first!



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Importance of Good Nutrition

- Growth
 - After maintenance is met extra energy can be used for growth or production
 - Growth may be seasonal or year round
 - Important to target highest forage yields when you desire highest ADG
 - Supplementation necessary for year round
 - Target specific ages for most growth
 - i.e. pre-weaning, pre-puberty, post-1st lactation



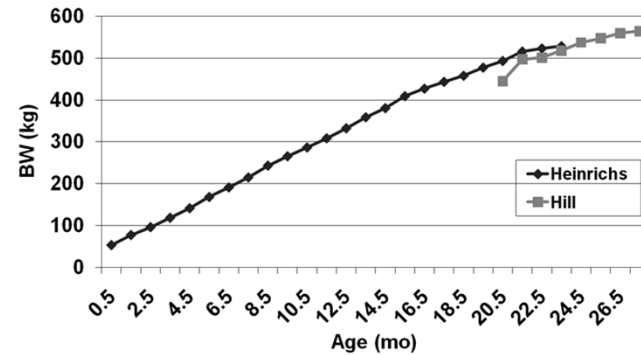
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Importance of Good Nutrition

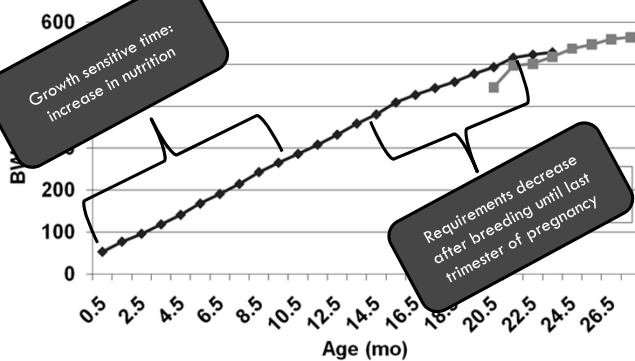
- Reproduction
 - ▣ Breeding is an energetic process
 - ▣ Maintaining pregnancy requires energy
 - Fetal growth is highest during last trimester
- Production
 - ▣ Lactation requires largest amount of energy
 - Above maintenance
 - ▣ High producing cows often in negative energy balance (NEB)



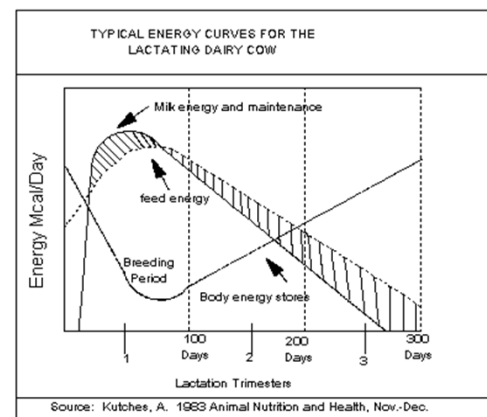
Growth and Forage Supply



Growth and Forage Supply



Lactation and Forage Supply



- Peak milk is ~90-100 DIM
- Prior to that feed energy is not enough
 - ▣ Body stores are utilized
 - ▣ Negative Energy Balance
- Corresponds to breeding period
 - ▣ Embryonic death
 - ▣ Low NRG, hard to maintain pregnancy

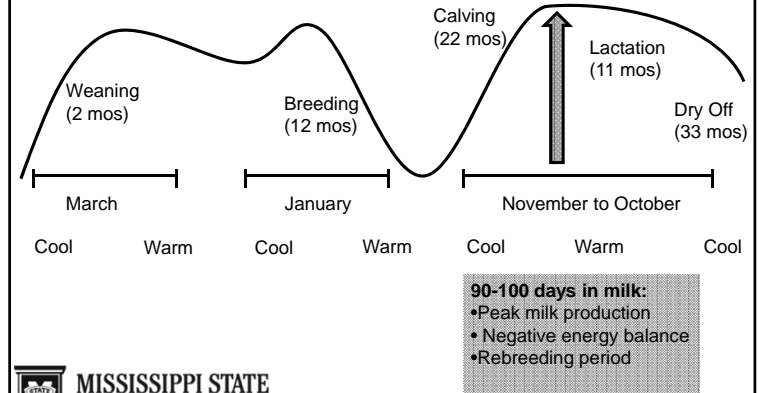
Source: Kutches, A. 1983 Animal Nutrition and Health, Nov.-Dec.

Lactation and Forage Supply

- Very sensitive time for dairy cow
 - ▣ Exponential increase in metabolic disorders
 - Milk fever, displaced abomasum, ketosis, etc.
- Forage availability must be high when cows hit this point
 - ▣ Grain supplement can alleviate some stress but not all!
- Match top forage growth with peak milk
 - ▣ 90-100 DIM is typical but know your herd!



Matching Supply to Demand



Matching Supply to Demand

- Pre-weaning
 - ▣ Calves on liquid diet
 - Milk replacer or nursing
 - ▣ Rumen is developing
 - make little use of grass but will still graze
 - Good to learn behaviors
- Weaning to breeding
 - ▣ Opportunity to manipulate growth
- Breeding to calving
 - ▣ Low nutritional status (until last trimester)




Forage Planning

- **Goal:**
 - ▣ Have most forage available during sensitive growth time and during the transition period
- **Steps:**
 - ▣ Make a forage plan:
 - Winter grasses, Summer grasses
 - Stockpiling forages
 - Supplementing when forage unavailable
 - ▣ Adjust breeding season to match your forage plan



Forage Planning

- **Goal:**
 - Have most forage available during sensitive growth time and during the transition period
- **Steps:**
 - Determine nutrient requirements Ex:
 - 500 lb dairy heifer
 - Target ADG = 2.0 lb/d
 - DMI = $500 \times 2.5\%$ (DMI = 2-3% of BW) = 12.5 lbs DM
 - Energy =
 - Protein =




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Forage Planning

- **Steps:**
 - Determine nutrient requirements Ex:
 - 500 lb dairy heifer, Target ADG = 2.0 lb/d
 - Dry Matter Intake
 - $500 \times 2.5\%$ (DMI = 2-3% of BW) = 12.5 lbs DM
 - Energy
 - TDN = 65%
 - $NE_{\text{maintenance}} = 5.24$ Mcal/d
 - $NE_{\text{gain}} = 2.36$ Mcal/d
 - Total Energy = 7.60 Mcal/d

Values obtained from NRC for Dairy Cattle, 2001.




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Forage Planning

- **Steps:**
 - Determine nutrient requirements Ex:
 - 500 lb dairy heifer, Target ADG = 2.0 lb/d
 - Dry Matter Intake
 - $500 \times 2.5\%$ (DMI = 2-3% of BW) = 12.5 lbs DM
 - Protein
 - CP, % DM = 14%
 - $12.5 \times 0.14 = 1.75$ lbs/d
 - Rumen Degradable Protein = 1.25lb/d
 - Rumen Undegradable Protein = 0.5 lb/d


Values obtained from NRC for Dairy Cattle, 2001.



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Forage Planning

- **Steps:**
 - What do we know?
 - 500 lb heifer, 12.5lb DM, 7.60 Mcal/d, 1.75 lb CP/d
 - Grass Pasture, intensively managed
 - 30% DM
 - 1.24 Mcal/lb (NEg+m)
 - 66% TDN
 - 26.5% CP
 - Can we meet her requirements?



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Math!

Cow Requirement		Forage Supply	Balance
DMI, lbs/d	12.5	20% DM	$12.5/0.30 = 41.7$ lbs 'as-fed'
Energy, Mcal/d	7.60	1.24 Mcal/lb	$12.5 * 1.25 = 15.5$ Mcal/d
CP, lb/d	1.75	26.5% CP	$12.5 * 0.265 = 3.3$ lb/d

- Over on energy and protein
 - ▣ Negative impacts?
- Remember difference in grazing and confinement animals
 - ▣ Increase energy by up to 20%



Meeting Requirements

- Increase in exercise when grazing
- Forage quality changes
 - ▣ Mud, dry, fertilization
- Numbers based on grass pasture
 - ▣ Differs with species
 - ▣ Ex. 26% CP is an average so **important to always have forages tested for nutrient content!!**



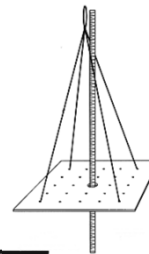
Monitoring Pasture Growth

- Need ~42lb/d of grass pasture-
 - ▣ Do you have that much available?
 - ▣ Will she eat that much?
- A few different ways to monitor growth
 - ▣ All rely on visual appraisal



Monitoring Pasture Growth

- Several ways to measure pasture growth
 - ▣ Hand-made to fully digital



Grazing Wedge

12.5 lbs/hd/d x 100hd x 365 d =
456,250 lbs DM total

456,250 lbs/250 acres = 1825 lbs
DM/acre

Grazing Wedge Charting Sheet
Date: _____
Farm or herd: _____

DMU usage	A										
16	6240										
15	5650										
14	5490										
13	5070										
12	4680										
11	4290										
10	3900										
9.5	3759										
9	3610										
8.5	3315										
8	3120										
7.5	2925										
7	2730										
6.5	2635										
6	2340										
5.5	2145										
5	1950										
4.5	1755										
4	1560										
3.5	1365										
3	1170										

• # of head/acre = 1.5
 x lbs DM from pasture head (e.g. body weight x .03) X 30
 x Rotation Length X 55
 = Target residual lbs DM/ha X 1400
 = lbs DM per acre = 2975

Padstock name or number: _____

- Write in the padstock names or numbers going from the most DM (from Pasture Recording Worksheet) to the least.
- Shade in the columns corresponding the amount of dry matter in each padstock.
- Mark your ideal target grazing cover level in the first column with an A. Mark with a B, your next post grazing residual in the last padstock column. Then with a straight edge connect points A & B.
 - A. Columns above the line indicate a surplus of feed or a potential future surplus of feed. Plan to harvest by grazing or mechanically.
 - B. Columns below the line indicate a deficit of feed or a potential future deficit of feed.
- Note any padstocks that need specific management, such as wet areas, stockpiling areas, species to avoid after frost (eg. Sorghum Sudans), or grass species that require a higher target residual (ovine, canyari or orchard grass) or padstocks to receive fertiliser/manure.

For more copies of this worksheet or the Pasture Cover Recording Sheet go to www.greaseworks.org/grazing_information.htm

Grazing Wedge Charting Sheet was adapted from Devere's Feed Wedge Healthy Pastures www.devere.co.nz

Grazing Wedge

Grazing Wedge Charting Sheet Above the line = overgrowth

Date: _____
Farm or herd: _____

DMU usage	A										
16	6240										
15	5650										
14	5490										
13	5070										
12	4680										
11	4290										
10	3900										
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3.5	1365										
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• # of head/acre = 1.5
 x lbs DM from pasture head (e.g. body weight x .03) X 30
 x Rotation Length X 55
 = Target residual lbs DM/ha X 1400
 = lbs DM per acre = 2975

Padstock name or number: _____

Under the line = do not graze

- Write in the padstock names or numbers going from the most DM (from Pasture Recording Worksheet) to the least.
- Shade in the columns corresponding the amount of dry matter in each padstock.
- Mark your ideal target grazing cover level in the first column with an A. Mark with a B, your next post grazing residual in the last padstock column. Then with a straight edge connect points A & B.
 - A. Columns above the line indicate a surplus of feed or a potential future surplus of feed. Plan to harvest by grazing or mechanically.
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Questions?



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Supplementing Feed

- Several different methods
 - ▣ TMR in parlor during milking
 - ▣ TMR in barn at night
 - ▣ Grain mixes
 - ▣ By-product feeding
- Amount is critical
 - ▣ > 15lbs/d will decrease grazing



Supplement Rations

Ingredient	Spring Ration		Summer Ration		Winter Ration	
	Cool Season Grass		Warm Season Grass		High Quality Alfalfa	
	lbs/ton	%	lbs/ton	%	lbs/ton	%
Corn	1,395	69.8	1,445	72.3	810	40.5
Soy hull pellets	440	22.0	0	0.0	500	25.0
Wet molasses	50	2.5	50	2.5	50	2.5
SB meal (47.5%)	0	0.0	130	6.5	125	6.3
Distillers Grains (Dried)	0	0.0	130	6.5	0	0.0
Corn gluten feed	0	0.0	130	6.5	435	21.8
Tallow	50	2.5	50	2.5	50	2.5
Limestone	35	1.8	35	1.8	0	0.0
Trace mineral salt	20	1.0	20	1.0	20	1.0
Di-cal phosphate	0	0.0	0	0.0	10	0.5
Magnesium oxide	10	0.5	10	0.5	0	0.0



Supplement Rations

- Important to have starch in the diet (~60-70%)
 - ▣ Starch = volatile fatty acids = ENERGY
 - ▣ Grass/Forage = NDF= Milk Fat/Energy
- Protein in some grasses and legumes *can have* reduced digestibility
 - ▣ May consider a higher protein feed
 - ▣ Bypass protein – consider expense



Case Study- Buck Shand

- 1,650 acres- 200 acres for dairy
 - ▣ Dallas, Alabama
- 100 cows, 14,000-15,000 lb/cow/yr
- Transitioned from confinement to grazing in early 90s
 - ▣ Saw a change in feed prices and milk prices coming



Case Study- Buck Shand

- 4 pastures subdivided by permanent and portable electric fencing
- Water is provided for each pasture. Laneways have drainage tile to keep them from becoming muddy
- Pastures are rotated daily. Each pasture is rested for 30 to 45 days after being grazed
- In the spring when grazing cannot keep up with the lush growth, pastures are mechanically harvested and saved for use later when dry matter is low
- The primary forage crops on the dairy are *dallisgrass*, *white clover*, *Persian clover*, and several hardy *fescue* varieties with beneficial endophytes.



Case Study- Buck Shand

- Biggest challenges
 - WEEDS
- Keeping cows out of mud- reduce mastitis and other health problems



12April's Dairy and Happy Cow Creamery

- 97 acres, 25 paddocks (~2-3 acres/paddock)
- 19,600 lb/cow/yr
- Uses irrigation on 16 paddocks
- Geotextile cloth to reduce mud/erosion
- Forage program
 - Grazing maize
 - Trudan
 - Millet
 - Alfalfa
 - Clover



12Aprils' – Tom Trantham

- Cows transitioned themselves
 - Award winning herd, not paying the bills
 - Broke through fencing and grazed
 - Resulted in 2lb/cow increase in milk
- One paddock for each day of the month so each month is like April
- 12April's Cows...



Opportunity for research

- If you're interested in grazing or making the transition
- Producer grants through Southern SARE
 - ▣ \$20-\$50,000 and \$250,000
- Collaborate with Mississippi State
- Funding to explore different parts of the system
 - ▣ Fencing/watering supplies
 - ▣ Animal monitoring
 - ▣ Different forages



Milking Facilities



New Zealand Style

- Swing parlors
- Covered shed
- Supplement in parlor
- No pre-dip



Milking Facilities



United States

- Individual stalls
- Large capital investment
- Center of dairy operation
- Do you have to redo your parlor??



Milking Facilities

- No!
- Grazing is most profitable as a start up operation
- Build low cost facilities
- What if you already have large investments in your milking facility?
- Not likely that switching to grazing will cover that cost

