

Sorting Out Transition Issues

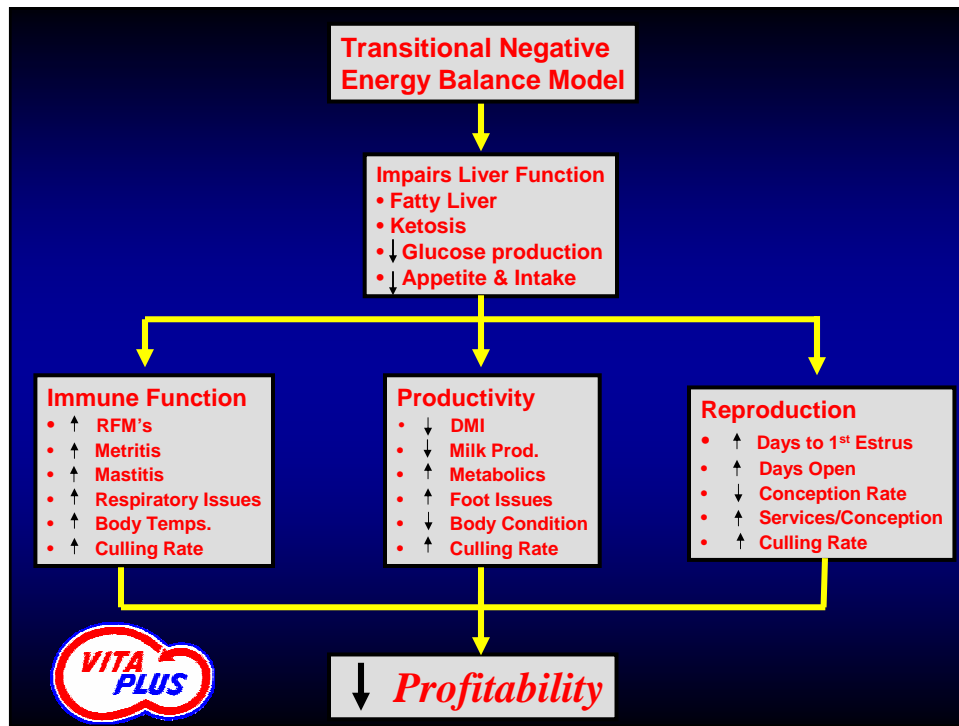


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Fall DTN Series- 2004

Discussion Topics

- Energy Balance of Transition Cows
- Low Energy, High Fiber Dry Cow Diets
- Summary & Discussion





What About Low Energy, High Fiber Prefresh Diets?

- New Diet Strategy May Help Alleviate Metabolic Challenges
- New Data From The University of Illinois Looks Good
- Data Discussion and Practical Implications



Rationale For Increasing Energy With Non-Fiber Carbohydrates

- Compensate for decreased DMI
- Intermediate between far off and fresh cow
 - Adapt rumen microbes to starch and sugars
 - Stimulate rumen papillae growth
- Increase propionate production in rumen
 - Stimulate insulin, decrease NEFA
- May increase DMI

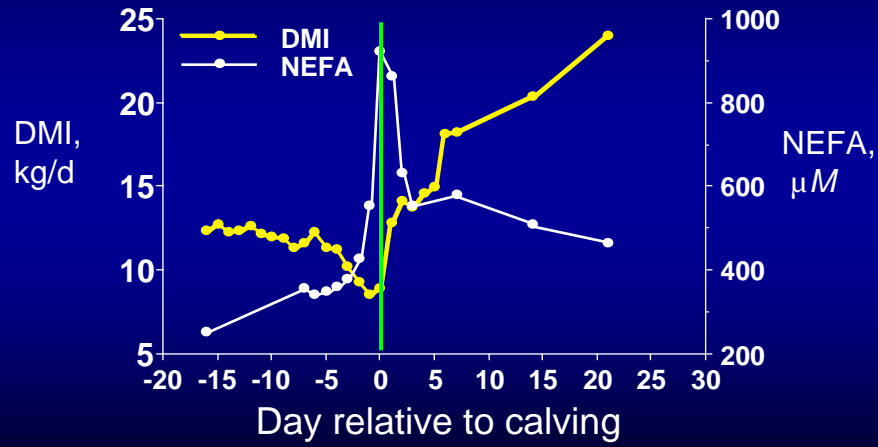


Low Energy, High Fiber Prefresh Diets?

- ARE YOU KIDDING ME!!!!
 - We will have higher NEFA's & more ketosis!!
 - We will have lower prefresh intakes!!
 - The rumen microbes will not be adapted!!
 - The rumen papillae will not be adapted!!
 - We will not have an insulin response!!

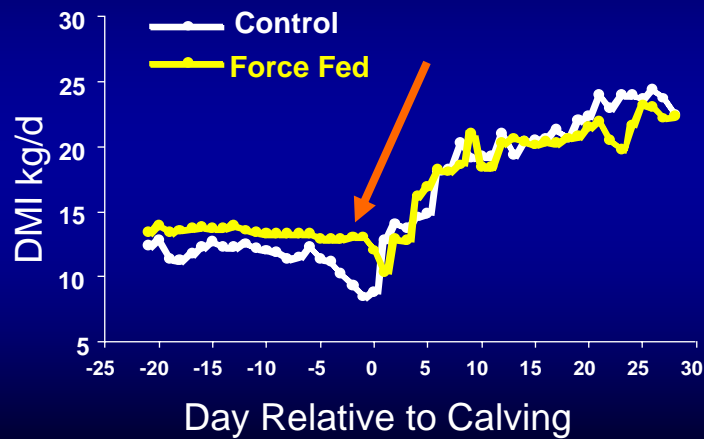


Dry Matter Intake And Plasma NEFA



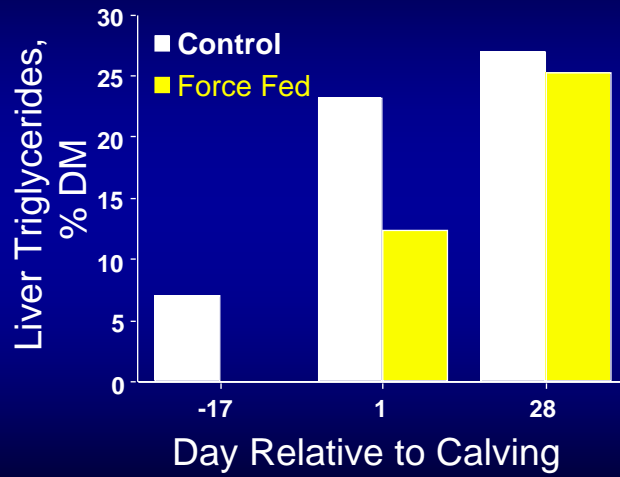
Grummer, 1993

Force-Feeding Prepartum Cows Via Rumen Cannula



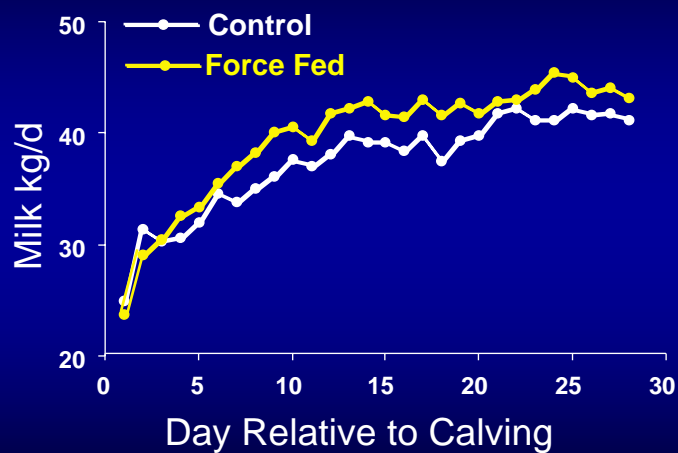
Bertics et al., 1992

Fat Content In Liver Of Force-Fed Cows



Bertics et al., 1992

Milk Production Of Force-Fed Cows



Diet was 50% alfalfa silage, 50% corn silage, plus minerals/vitamins in wheat midds carrier

Bertics et al., 1992

Bottom Line Thinking:

- Higher Intakes Prefresh:
 - Higher intakes postfresh
 - Less metabolic disorders
 - Higher milk production
 - Prefresh feeding strategies that promoted high intakes were implemented:
 - » Higher corn silage, by-products & grassy hay/straw
 - » This resulted in a **LOW POTASSIUM, HIGH DMI DIET**



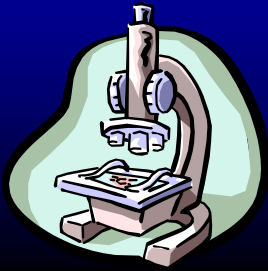
Data Showing No Benefit To Increased Dietary Energy Before Calving

- VandeHaar et al., 1999
- Kunz et al., 1985
- Tesfa et al., 1999
- Dewhurst et al., 2000
- Andersen et al., 2001
- Holcomb et al., 2001
- Agenas et al., 2003
- Rabelo et al., 2003





University of Illinois Research Took A Different Direction

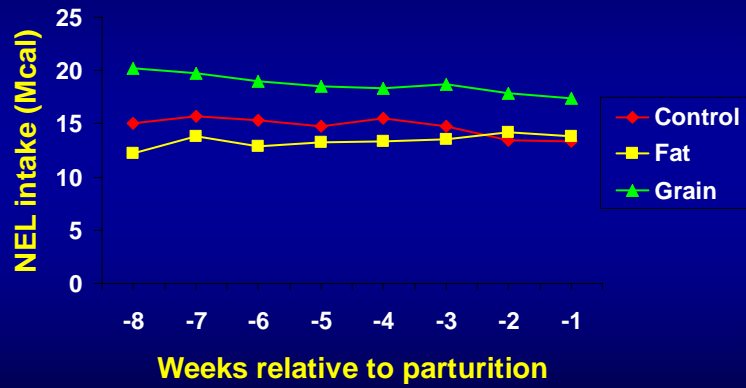


Diets Fed During The Dry Period (% DM)

Ingredient	Control	Fat	Grain
Chopped oat hay	69.8	79.4	51.0
Ground corn	26.0	9.0	42.6
Soybean meal	3.0	4.0	4.6
Liquid fat	---	6.5	---
Minerals/vitamins	1.2	1.1	.5

Grum et al., 1996

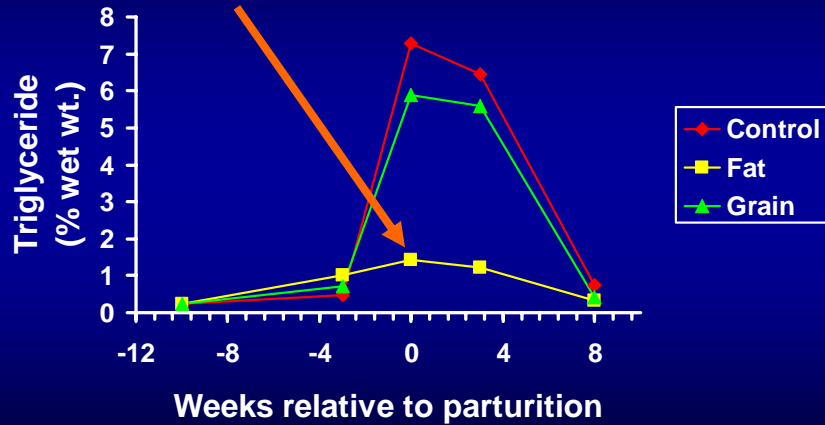
Intake Of NE_L During The Dry Period



Fat vs. Grain, $P < 0.001$

Grum et al., 1996

Liver Triglyceride Levels



Control vs. Fat + Grain, $P < 0.06$;
Fat vs. Grain, $P < 0.04$; diet x week, $P < 0.01$

Grum et al., 1996

Conclusions

- There was less fat in the liver of cows that consumed lower amounts of energy in the prefresh period!
- There was less fat in the liver of cows that consumed lower amount of energy coming from starch!
- WHY????



IL Hypothesis

- Excessive energy intake during the dry period, even in cows not over-conditioned, results in *insulin resistance* (may increase susceptibility to health problems)
 - Decreased DMI
 - Increased mobilization of NEFA, fat accumulation in liver
 - Makes susceptible to “Type II ketosis”
 - Subclinical ketosis a risk factor for other problems



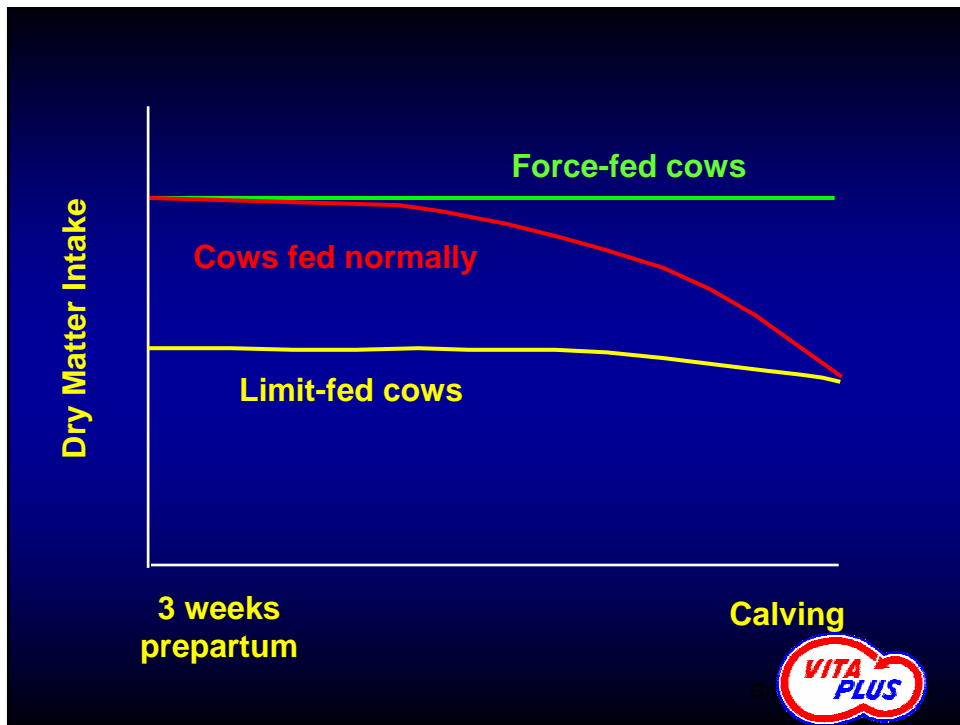
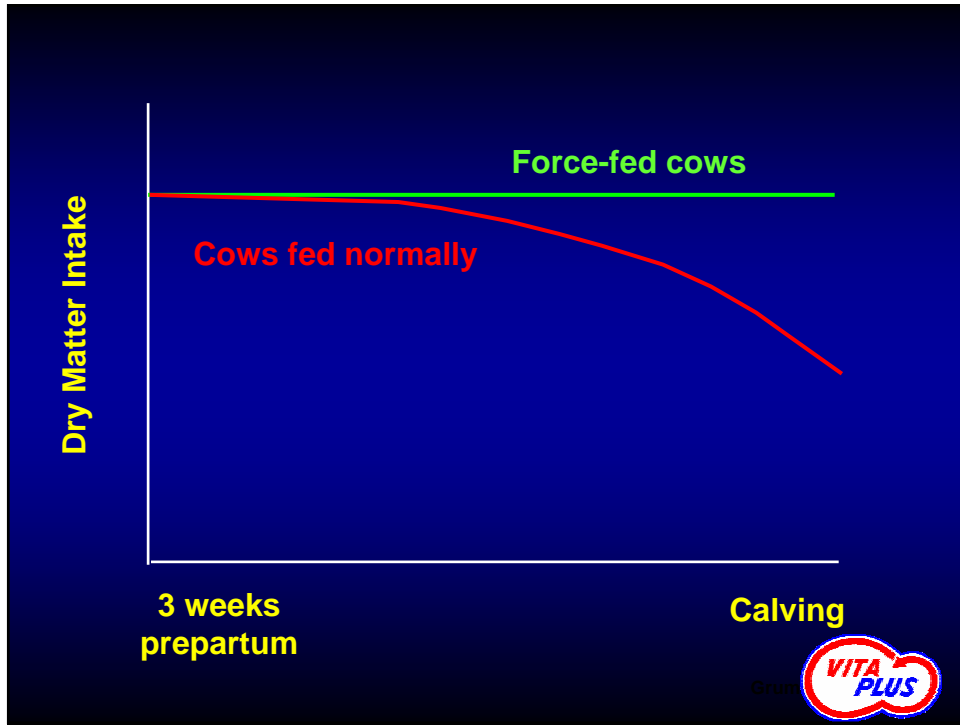
**Additional U of IL Studies
With Prefresh Energy
Restriction And Limit
Feeding Have Supported
Their Hypotheses.**



General Conclusions: Pre-Calving Energy

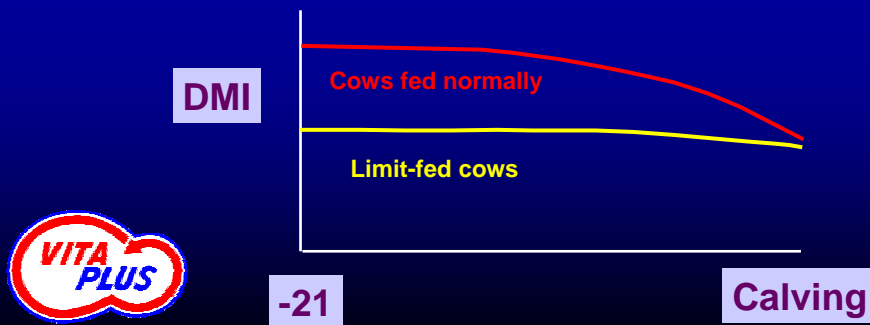
- Decreasing feed intake by voluntary restriction or by feeding high forage diets has:
 - No detrimental effect on postpartum health and performance.
 - Prevents a **DECREASE** in DMI during the final week before calving.





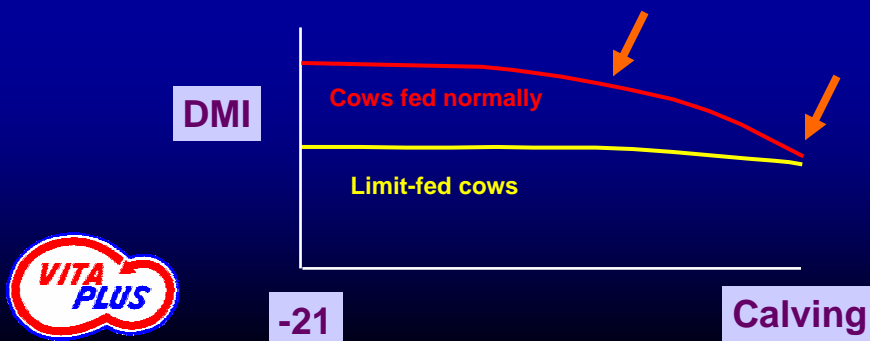
Implications

- No relationship between average intake during the 3 weeks before calving and the amount of fat in the liver after calving



Implications

- Highly significant relationship between the severity on prefresh intake drop and the amount of fat in the liver after calving



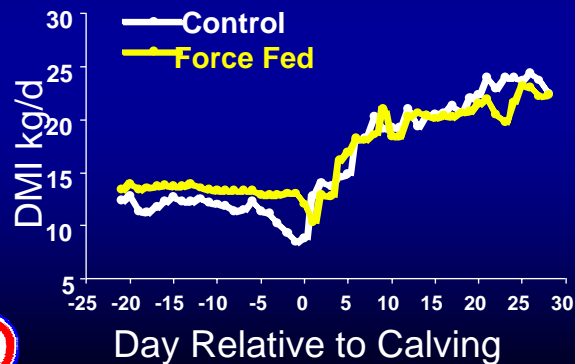
Implications

- Changes in prepartum DMI are more important in determining postpartum DMI and liver lipid accumulation than absolute DMI.
- Focus efforts towards preventing the decline in DMI before calving:
 - Cow Movements
 - Overcrowding
 - Nutritional Stress
 - Water Access
 - Ketogenic Forages
 - Bunk Mgmt Issues
 - Body Condition
 - Environmental Stress
 - Social Stress
 - Cow Comfort
 - Low Days in Prefresh



Implications

- Grummer's force-feeding study allowed them to prevent the decline in DMI before calving.



Implications

- High prefresh DMI is not discouraged. High prepartum DMI may indicate good cow comfort, good management, and low stress.
- However, a cow consuming large amounts of DMI prefresh may be more at risk for metabolic problems if she is unable to sustain her intake through calving.



Implications

- Excellent managers with excellent facilities may never have a problem feeding higher energy prefresh diets. Others may do better with lower energy diets for consistency of intake and avoiding overfeeding effects.



Implementation

- Is feed restriction practical?
 - **NO!**
- What about energy restriction by feeding higher fiber prefresh diets?
 - **YES!**



Implementation Of High Fiber-Low Starch Prefresh Diets

- Must have minimal sorting!
- Must be highly palatable. By low energy, I don't mean low quality.
- What ingredients should you choose?
 - Straw, grass hay, high fiber by-products, haylage, etc.



Common Byproducts Used In Prefresh Diets

- Beet pulp, soy hulls, wheat midds, citrus pulp???:
 - High in energy due to high digestibility (0.7 to 0.8 NEI)
 - They typically increase dry matter intake



By-Products That Might Work To Reduce Energy Intake

- Almond hulls (0.55 NEI)
- Cottonseed hulls (0.45 NEI)
- Flax hulls (0.37 NEI)
- Oat hulls (0.34 NEI)
- Rice hulls (0.08 NEI) but 20% ash ??
- Soybean hay or haylage may work also (0.54 NEI and ~1% K)



Example Diet Currently Being Fed

Ingredient	lb DM	CP, %	14.0
Corn silage (low starch)	7.35	NEI, Mcal/#	0.60
Oat hulls	7.28	ADF, %	30.2
Prefresh pellet	4.28	NDF, %	50.0
Grass hay	3.2	NFC, %	26.1
Haylage	2.54	S + S, %	14.1
SBM	2.35	DCAD _{meq/kg}	-89

Prefresh pellet includes beet pulp, soyhulls, SoyChlor, additives, MIN/VTM

Example Diet Currently Being Fed

Ingredient	lb DM	CP, %	14.3
Haylage	8.2	NEI, Mcal/#	0.60
Oat hulls	6.37	ADF, %	30.2
Corn silage	5.04	NDF, %	48.0
CGF	5.0	NFC, %	27.2
Supplement	2.66	S + S, %	14.5
Alf Hay	2.6	DCAD _{meq/kg}	-130

Supplement includes SoyChlor, NutroCal, additives, MIN/VTM

When Should You Try A Low Energy (High Fiber/Low Starch) Prefresh Program?

- If it's not broke, don't fix it!
- Try it when:
 - Management is sub par
 - Facilities are sub par
 - Higher energy transition diets are not working
 - When you need to get more consistent intake through calving



Low Energy-High Fiber Dry Cow Diets

- May Give You More Room For Error
 - When faced with challenges that negatively affect feed intake
 - By maintaining a better rumen mat during the transition period



Practical Scenario:

Projected calving date: May 1



Prefresh move date: April 14



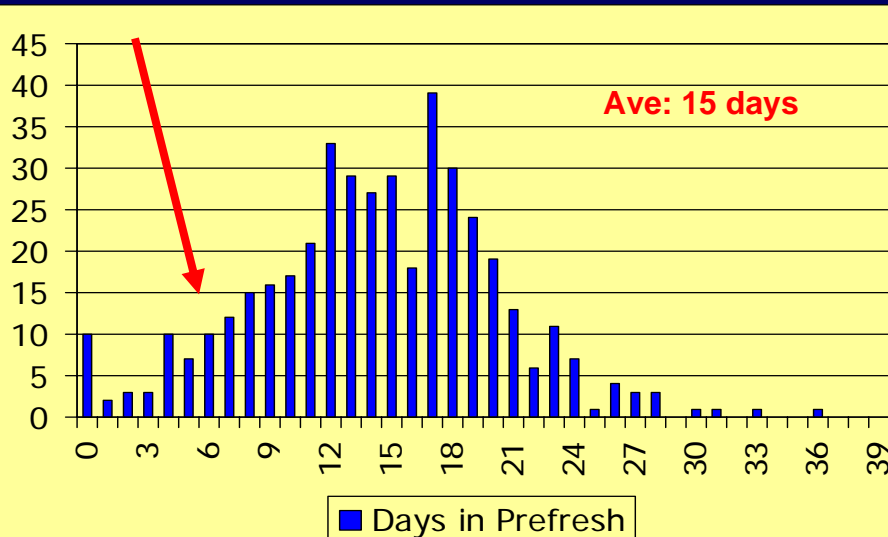
Actual calving date: April 20



6 actual days in prefresh group



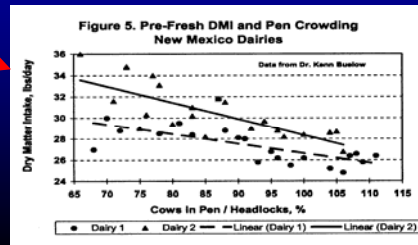
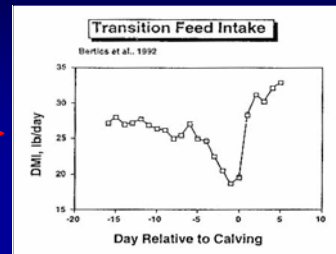
Average Days in Prefresh Period Mature Cows- 426 Calvings



6 Days In Prefresh Group

- Additional Challenges:

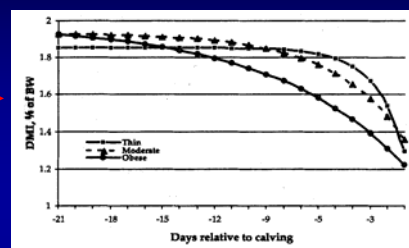
- Intake is dropping
- Ration change:
 - Can the rumen adapt??
 - Introduction of anionic salts??
- Social stress: Boss cows??
- Overcrowded:



6 Days In Prefresh Group

- Challenges:

- Fat heifers
- Heat stress
- Water access
- Bunk Mgmt:
 - Feed sorting
 - Particle size
 - Feeding every other day
 - Wet/clostridia forages
 - Bunk space/Headlocks



- Everyone of these factors will negatively affect intake!!!

Multiple Movements

Far-off dry cow group

Prefresh move date: April 14

Maternity pen move: April 20

Fresh cow pen move: April 22

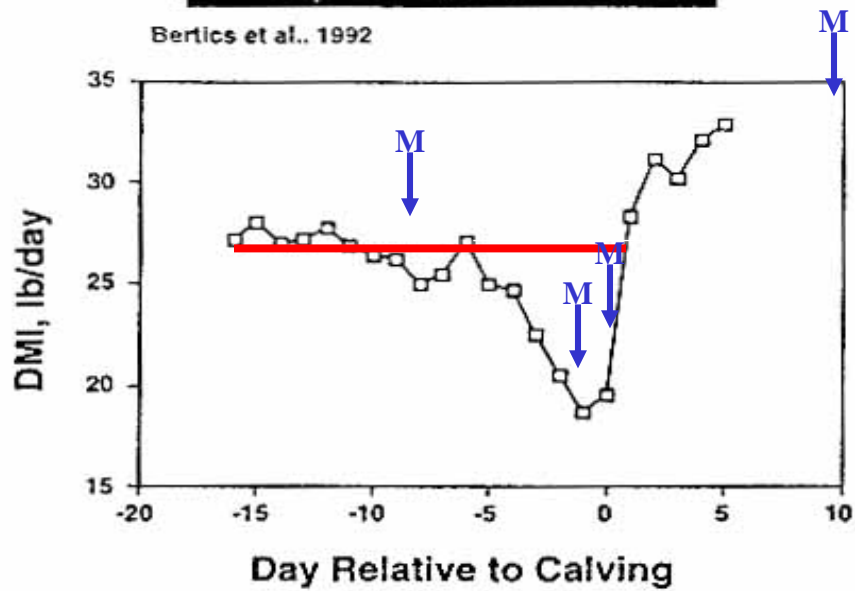
Early lact. group move: May 5

4 moves in
21 days or 1
move every 5
days



Transition Feed Intake

Bertics et al., 1992



Final Thoughts

- Can you implement a 1-group dry cow program using the high fiber, low energy feeding strategy?
 - **YES!!**
 - Better ration consistency
 - Less pen moves
 - Better rumen mat when faced with on-farm challenges
 - Will counteract insulin resistance



Final Thoughts

- Can you feed Reashure in a 1-group dry cow program?
 - **YES!!**
 - Need to consider return on investment
 - Need to evaluate the on-farm management to make sure as many bottlenecks as possible are removed first
 - Prioritize:
 1. Both prefresh & postfresh
 2. Just prefresh
 3. Just postfresh



Final Thoughts

- Can you feed an anion program in a 1 group dry cow program that is using the low energy, high fiber feeding strategy?

- **YES!!**

- But the first priority is to minimize the total potassium level in the diet
- Try to use the minimal amount of anions needed to reach your DCAD goal



Final Thoughts

- When is blood testing for NEFA's & BHB's helpful?
 - When you are having a higher than normal amount of subclinical and clinical ketosis
 - Will help you determine **WHEN** the problem is beginning
 - Be sure to sample enough animals (≥ 12)



Final Thoughts

- When is blood testing for NEFA's & BHB's helpful?

NEFA TEST:

- Use on Prefresh Cows
- Keep Cows Calm-
Excitement increases NEFA
- NEFA Cut-Off Points:
 - 4-14 days prefresh: 400 ueq/l
 - 2 days prefresh: Difficult to interpret
 - Day of calving: 1000 ueq/l
 - 3 days postcalving: 700 ueq/l
- No more than 50% of the cows should have elevated NEFA's above the cut off points



Final Thoughts

- When is blood testing for NEFA's & BHB's helpful?

BHB TEST:

- Use on Postfresh Cows
- Sample 4-5 hrs after feeding
- BHB Cut-Off Point:
 - 14.4 mg/dl
 - No more than 10% above this point
- Gold standard for testing for subclinical ketosis



Final Thoughts

- Maintaining proper energy balance is critical during the transition period...Will have huge effects on:
 - Milk Production
 - Reproduction
 - Immune Function
 - Productive Life
- New Reashure research offers a feed additive tool that may help alleviate fatty liver and improve energy balance

