

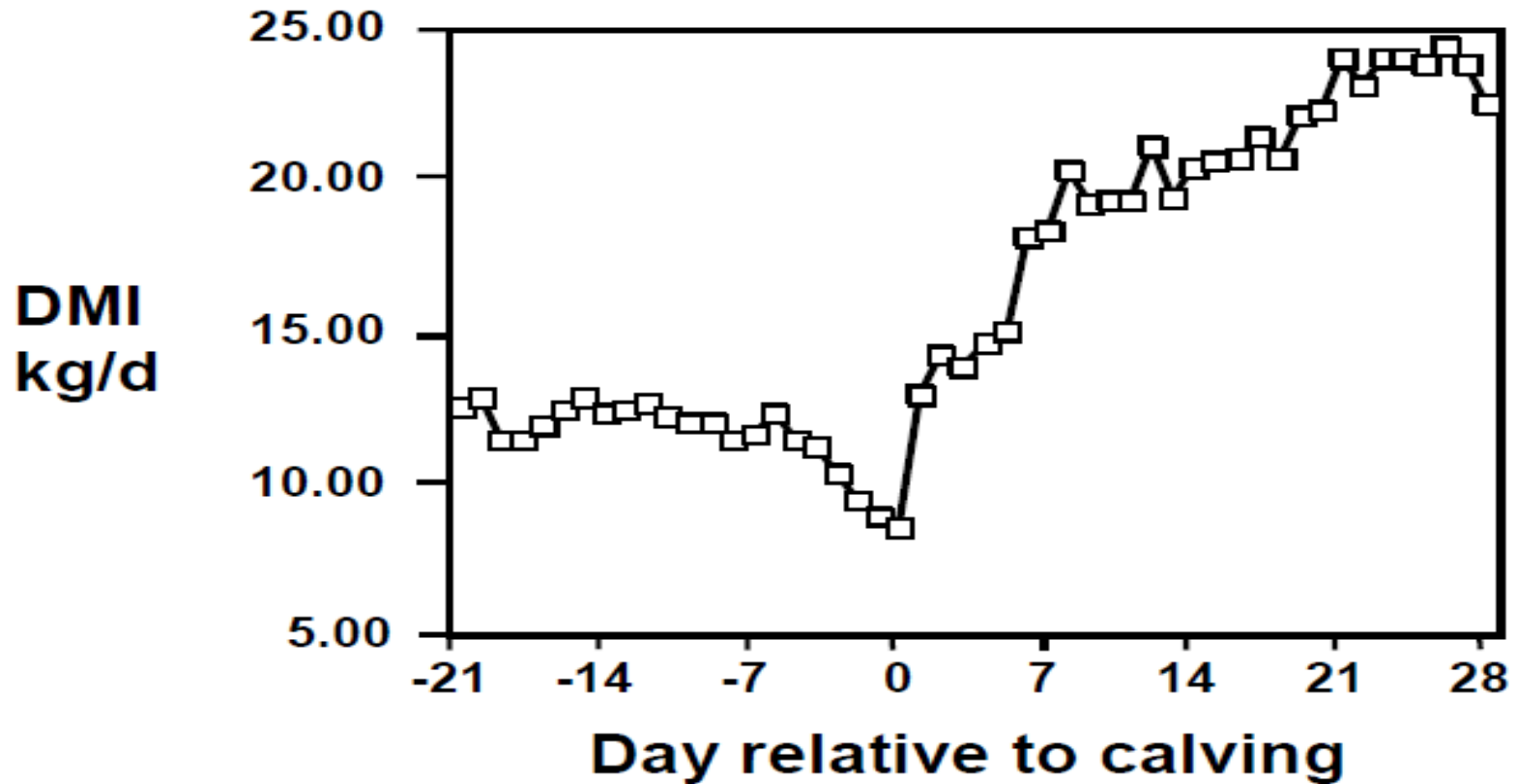


Maximizing DMI in Close-Ups

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AABP Ration Design Preconference Seminar
September 18, 2013
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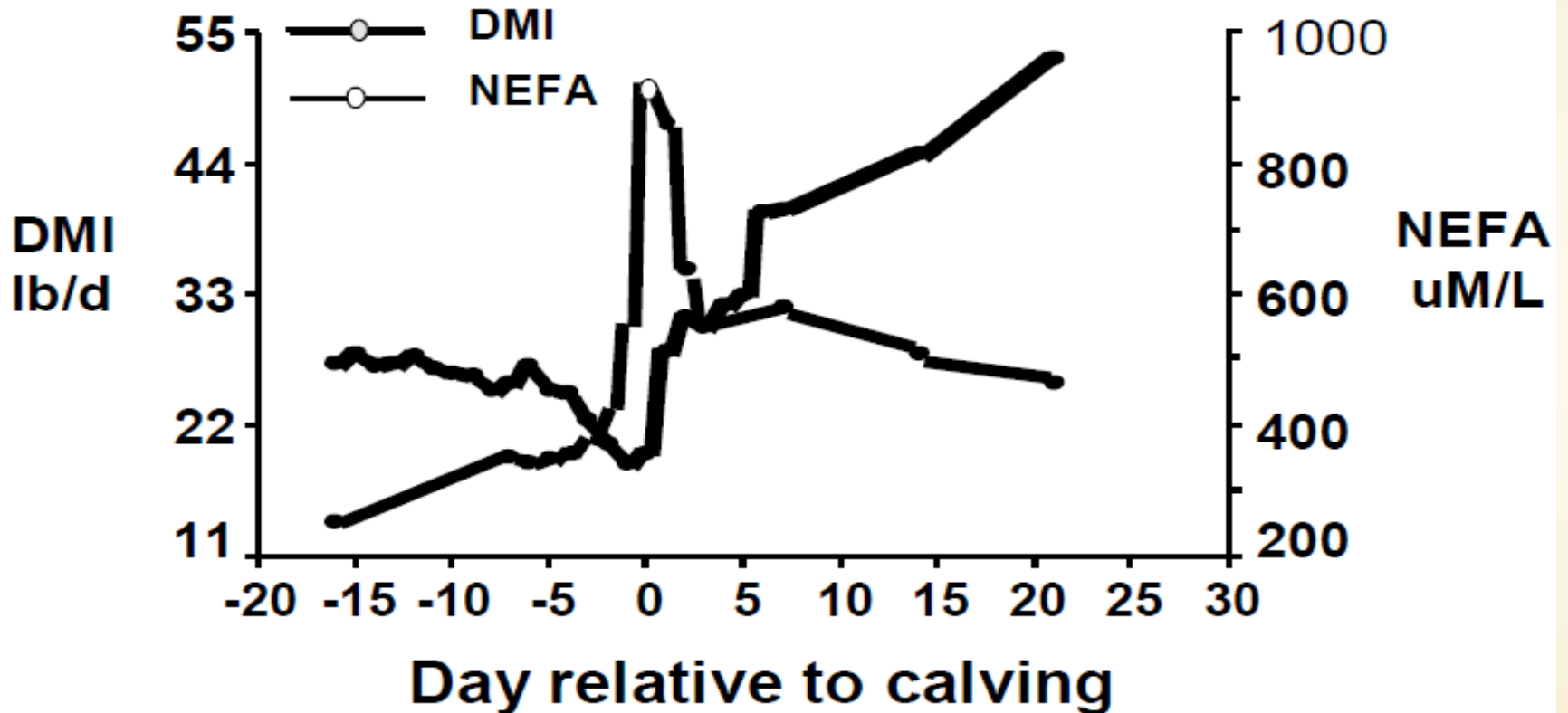


Prepartum Feed Intake



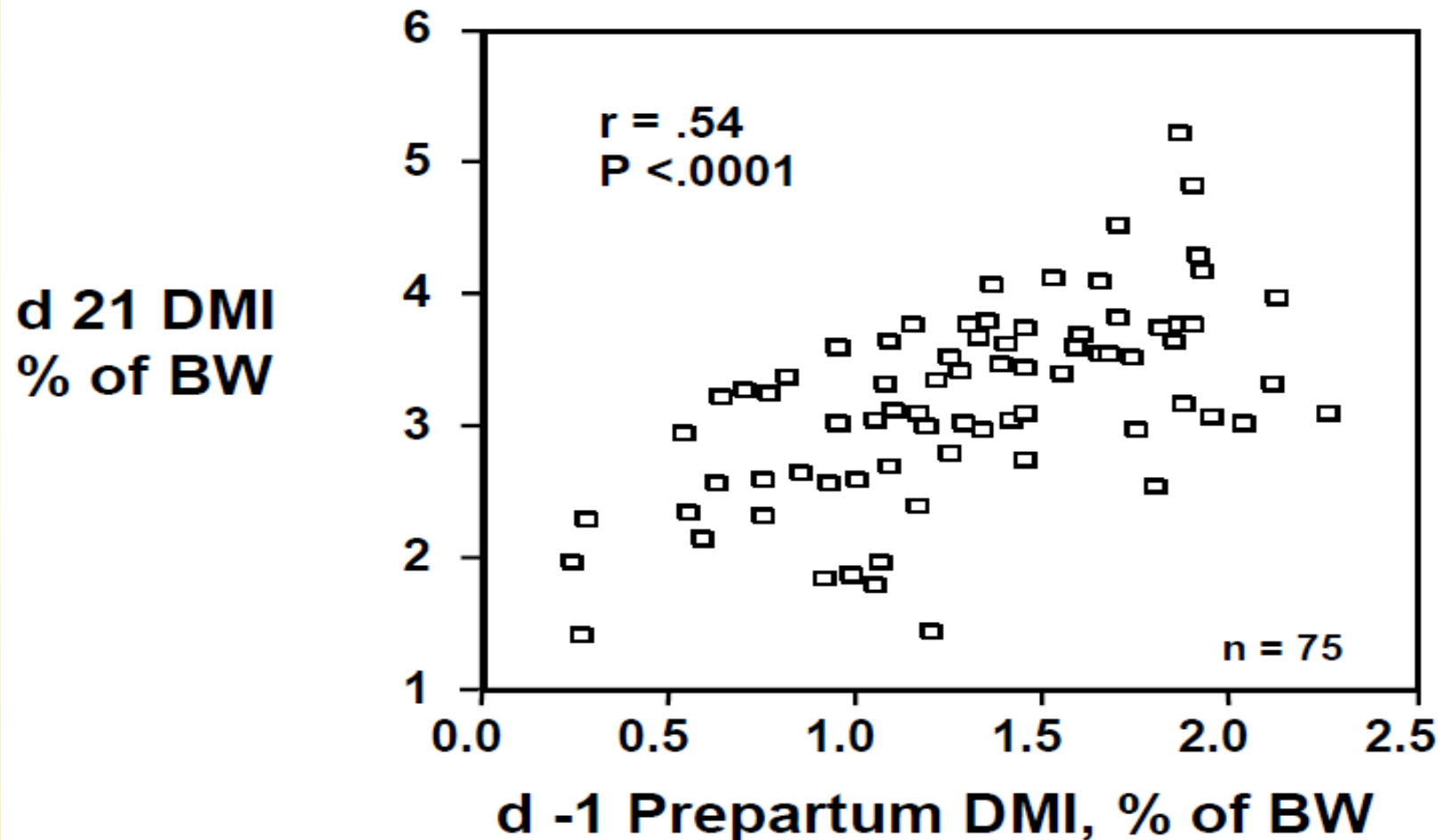
Grummer, 1993

DMI and Plasma NEFA



Grummer, 1993

Prepartum vs. Postpartum DMI



Results of Not Implementing Management Practices to Achieve Optimal DMI

- Body Condition Loss
- Metabolic Disorders
- Digestive Disorders
- Lower Peak Milk Yields
- Decreased Reproductive Performance
- Higher Veterinary Costs
- Higher Involuntary Culls

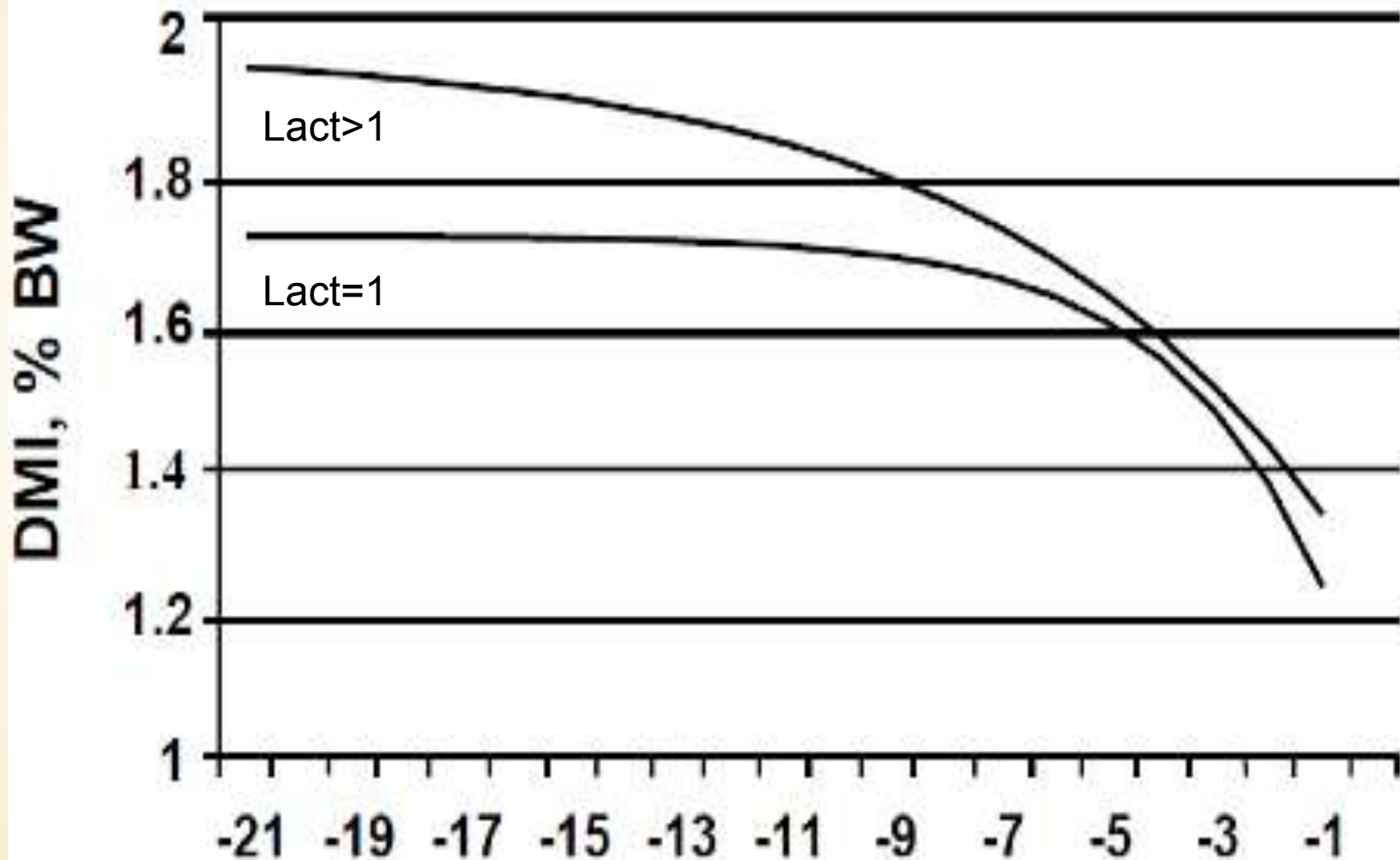
Factors That Affect Prepartum Dry Matter Intake

- Animal Factors
 - The physiologic state of the animal
- Diet Factors
 - The nutrient and physical composition of the diet
- Management (People) Factors
 - The management of the animal, its diet and its environment



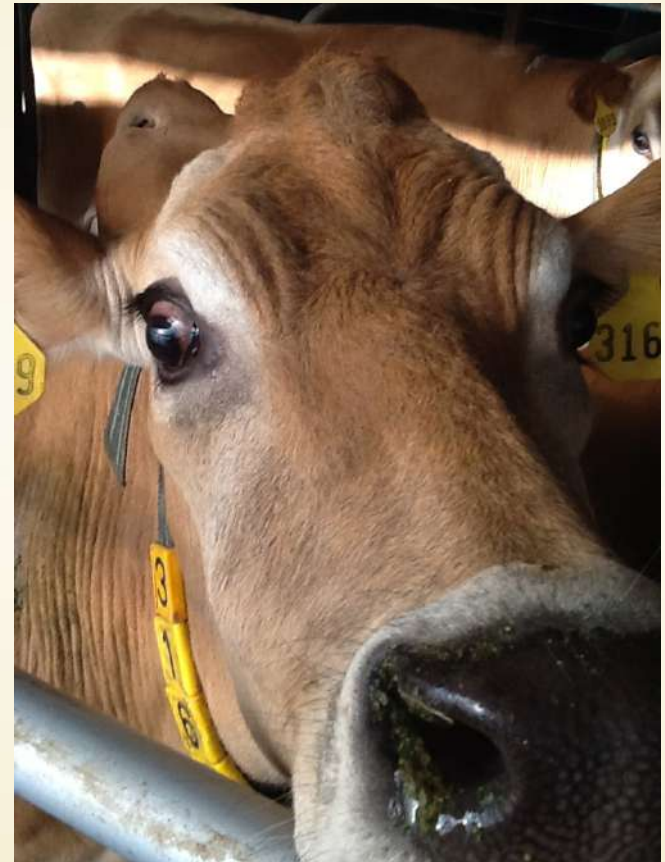
Animal Factors

Parity



Breed

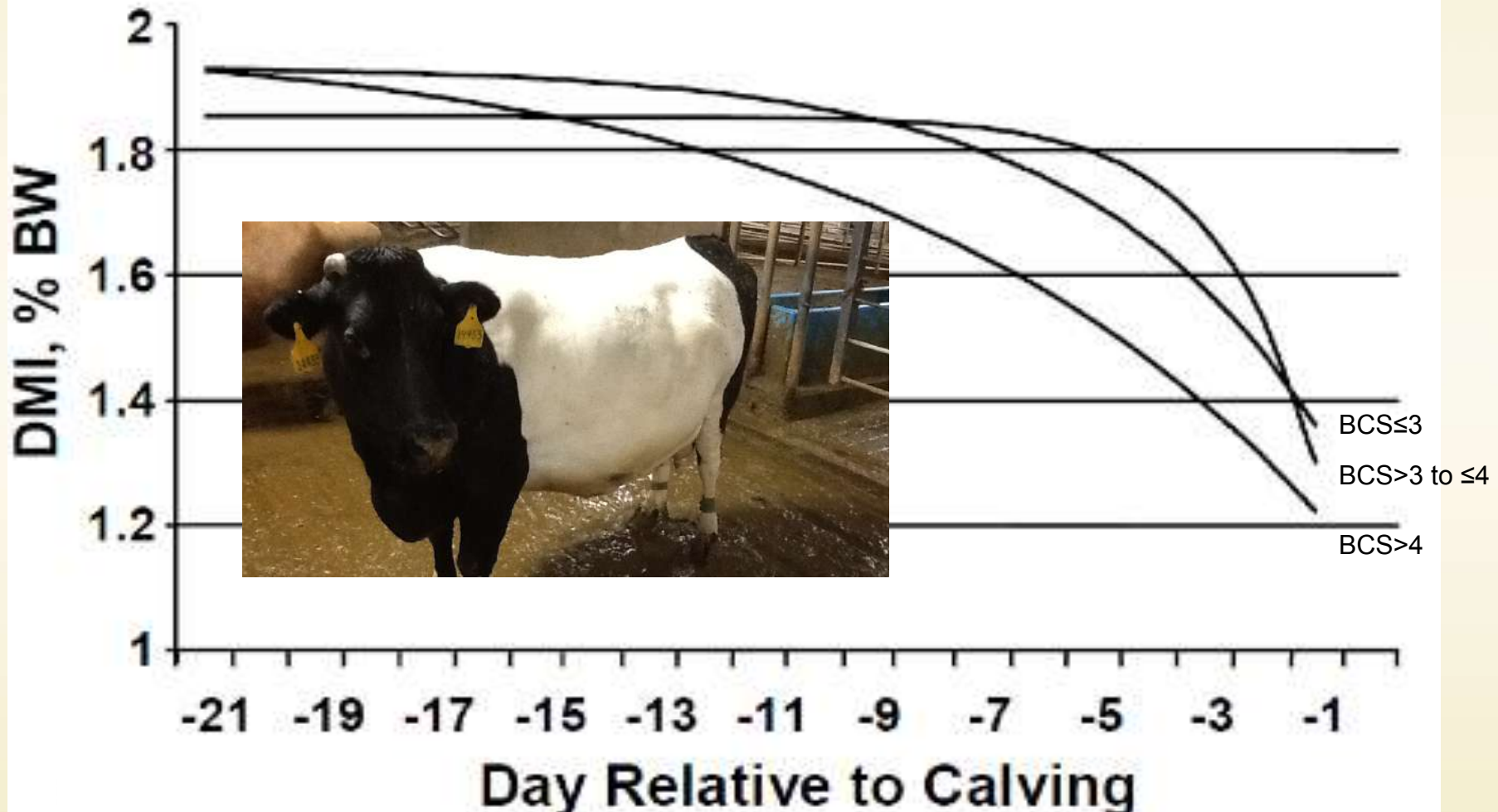
- Dry matter intake at 21 day prepartum was approx. 2.35% of body weight for Jerseys compared with 1.98% for Holsteins.
- The predicted mean DMI for final three weeks was 1.77% BW for Holstein Cows and 2.2% BW for Jersey cows.



Hayirli A, et al J Dairy Sci 2003;86:1771-9.
French A. et al J Dairy Sci 2002;(Suppl 1):44.

Body Condition

Thin vs Moderate vs Obese



French A. et al J Dairy Sci 2002;(Suppl 1):44.



Diet Factors

“It’s the ability of a cow to eat a fresh, non-sorted, high-quality, consistent and palatable ration... all she wants, when she wants it, without competition.”

Jim Barmore



“We examined the importance of parity, body condition, [breed], and various diet components that may influence DMI during the final 3 weeks before parturition ... they only explained 18% of the variation in intake among cows.” Hayirli A, et al J Dairy Sci 2003;86:1771-9.



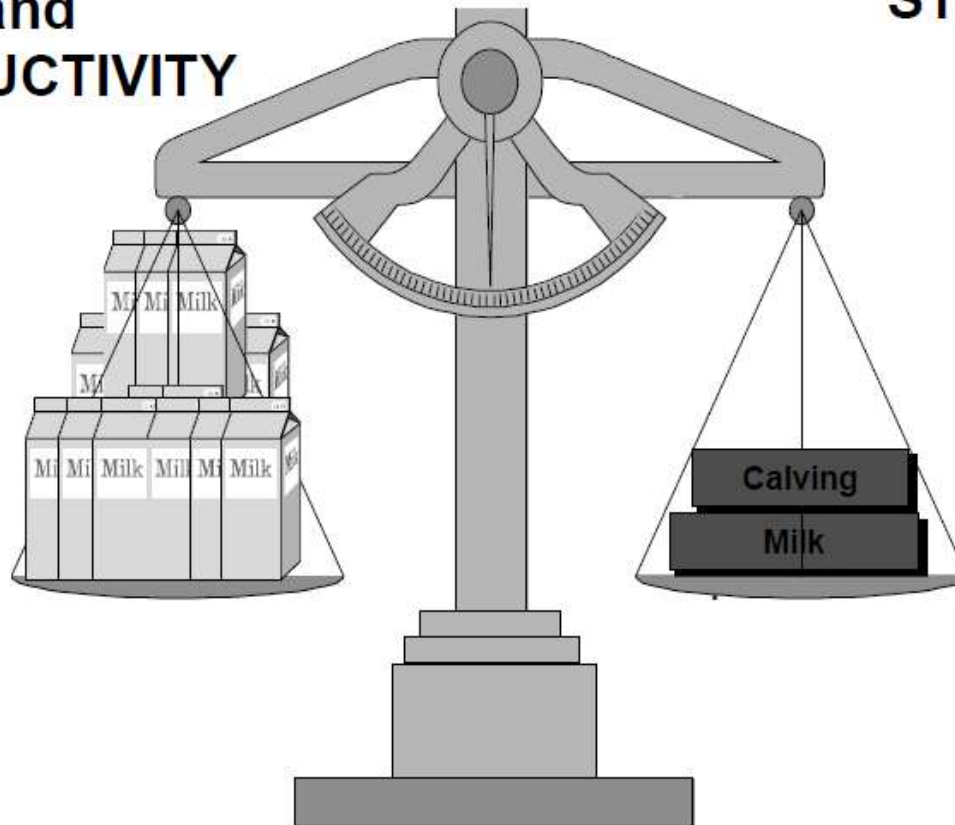


Management (People) Factors

Successful transitions and good health are largely a result of minimizing a cows' exposure to stress.

**COW HEALTH
and
PRODUCTIVITY**

STRESS



Non-Nutritional Factors That Affect Prepartum Dry Matter Intake

- Stocking Density
- Grouping Management
- Environmental Control

“Transition cows must be able to rest, eat, drink, and move about freely without competition in an area with ample air exchange and no heat stress.”

Barmore



Stocking Density

Prepartum Stocking Density

- Cattle are described as allelomimetic – they like to perform the same activity at the same time.
- Overstocking frustrates this allelomimetic behavior.
- Behavioral consequences of overstocking include:
 - Reductions in feeding time
 - Increased inactive standing
 - Increased competition for the resource being overstocked
 - Increased feeding rate
 - Changes in daily feeding pattern

Prepartum Stocking Density

- Field data collected by Buelow demonstrated a significant reduction in group DMI when cow numbers exceeded 92% of **headlocks**. 2001 WVMA Proceedings
- Data collected by Oetzel demonstrated that stocking densities greater than 80% of **stalls** adversely affected subsequent milk production. 2001 WVMA Proceedings
- Studies by Huzzey and Overton showed that higher concentrations of metabolites associated with stress during the period before calving may increase a cow's risk for postpartum health complications and reduced milk production. 2010 Cornell Nutrition Conference

Prepartum Stocking Density

Table 4. Average daily LSMEANS (\pm SE) for behavioral and metabolic measures collected from 4 groups housed at either a control stocking density or a crowded stocking density¹.

Variable	Treatment		SEM	P
	Control	Treatment		
Feeding Time (min/d)	240.9	242.1	3.1	0.77
Time to feed bunk post fresh feed delivery (min)	35.2	68.0	7.4	0.005
Dry Matter Intake (kg DM/cow/d)	14.9	15.9	0.1	<0.001
Daily NEFA (uEq/L)	90.6	106.0	32.	0.002
Daily Glucose (mg/dL)	64.2	65.3	0.4	0.05
Daily Fecal Cortisol Metabolites (ng/g DM)	16.4	18.7	0.9	0.103

¹Control Stocking Density = 1 lying stall/ cow and 0.64 m linear feed bunk space/cow;
Crowded Stocking Density = 0.5 lying stalls/cow and 0.35 m linear bunk space/cow

Huzzey and Overton 2010



Grouping Management

Grouping Management

- From the far-off dry-cow group through the high lactating group a typical cow completes 5 moves in a period of less than 5 weeks.
- Grant and Albright report that social impacts of moves last around 3-7 days. J Dairy Sci 2001;84(E Suppl.)
- This undoubtedly has an effect on normal behaviors performed during the day – feeding and resting time in particular.
- Studies by Robinson et al indicate that exposure to the social turmoil that occurs within a short stay – high throughput group may have a greater effect on primiparous cows. J Dairy Sci 2001;84(10)



Environmental Control

Environmental Control

Implement a simple system focused on:

- Cow Comfort
- Day-to-day consistency
- Bunk management

Cow Comfort

- Airflow
 - Ensure that fresh air is moving at the cow's face level to dissipate heat and moisture.
 - Keep tall grass and weeds around pens and buildings trimmed.
 - Maintain adequate air exchange in cold weather too
- Heat Abatement
 - As THI moves above 72 there will tend to be more slug feeding
 - Use fans and other cooling mechanisms
 - Consider shade on outside bunks.



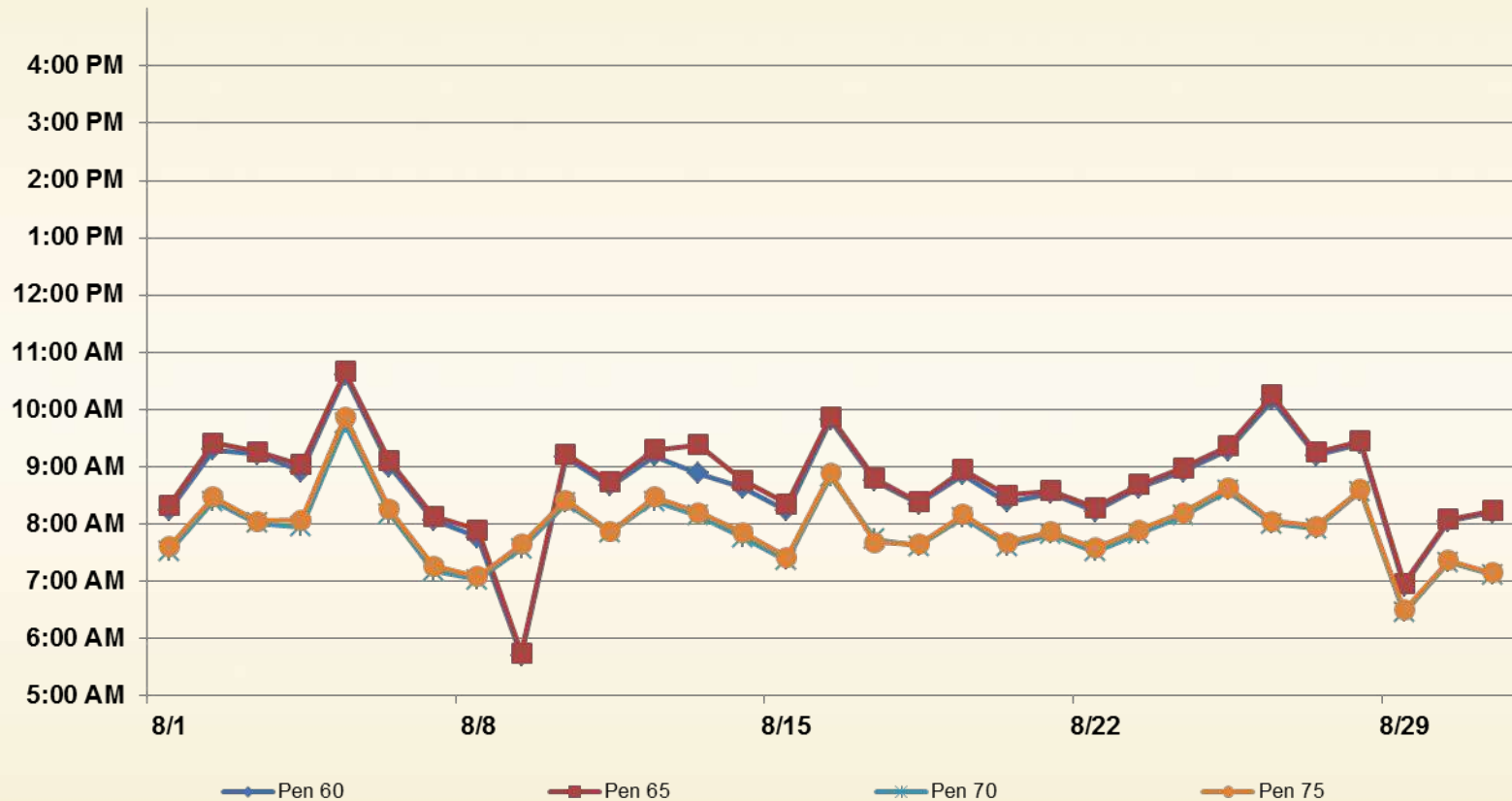
Cow Comfort

- Don't overlook water
 - The ability to deliver adequate water to transition cows is a bottleneck seen on many dairies.
- What about headlocks?
 - Current field experiences suggest either headlocks or post and rail bunk systems are comparable if properly designed
 - Have springing heifers adapted to headlocks before entering the prefresh pen.
 - Cow space, stocking density, availability of fresh feed at all times, distribution of waterers and consistency of the ration and feeding will influence feed intake more than the choice of headlocks versus a post and rail design.

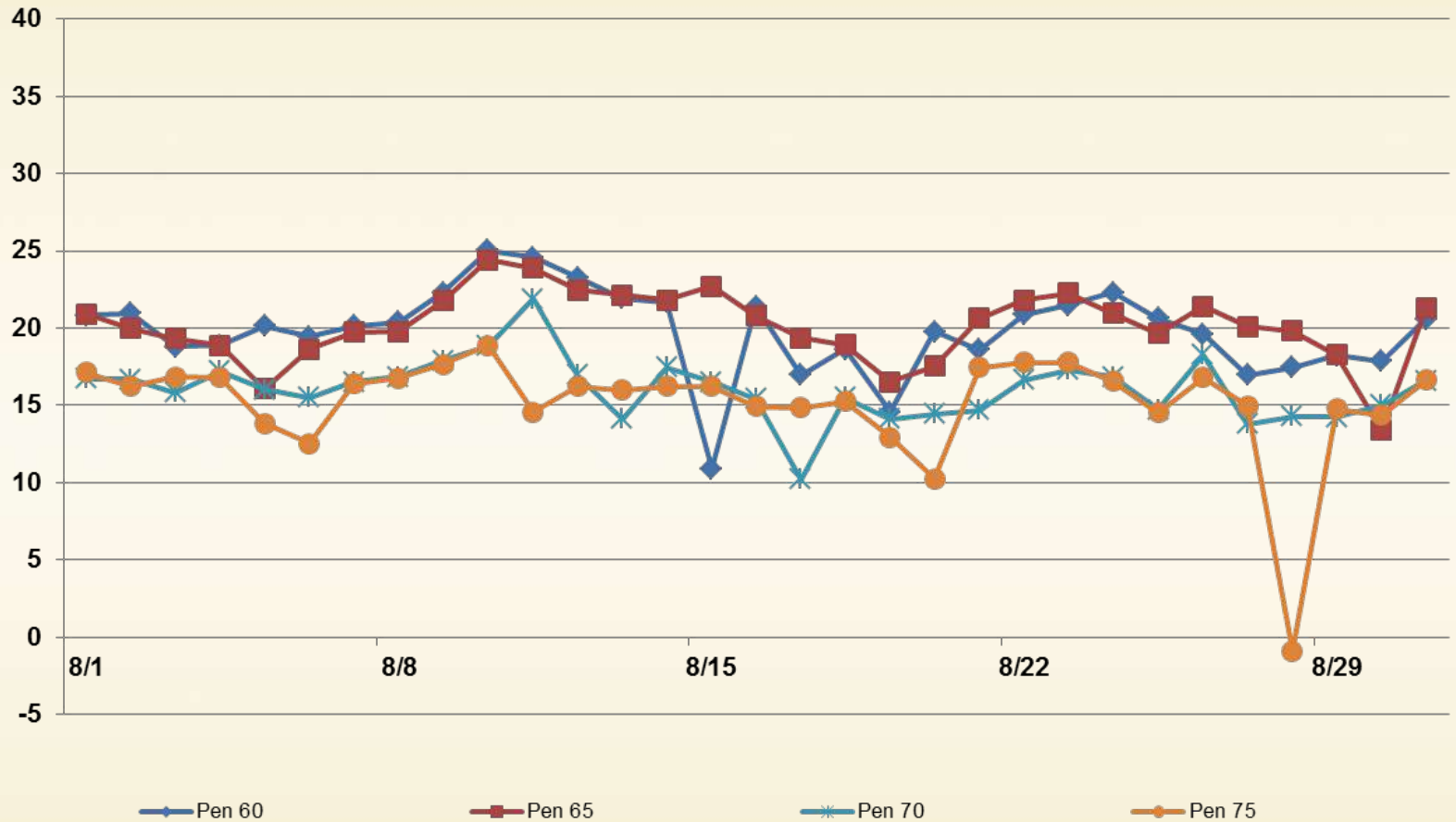
Bunk Management

- Our focus on having enough bunk space, in a sense, has distracted us from the core purpose of bunk management.
 - Closely monitor forage moisture changes
 - Zero mold tolerance – throw off all moldy feed.
 - Feed which is heating or warm must be avoided
 - Monitor the ration for sorting
 - Always avoid over mixing
 - If snow or rain hurt feed intake. Remove the ration and replace it with fresh feed – wasting a little feed is better than DAs caused by cows that refuse to eat for 12 hours because of wet, frozen or moldy feed.

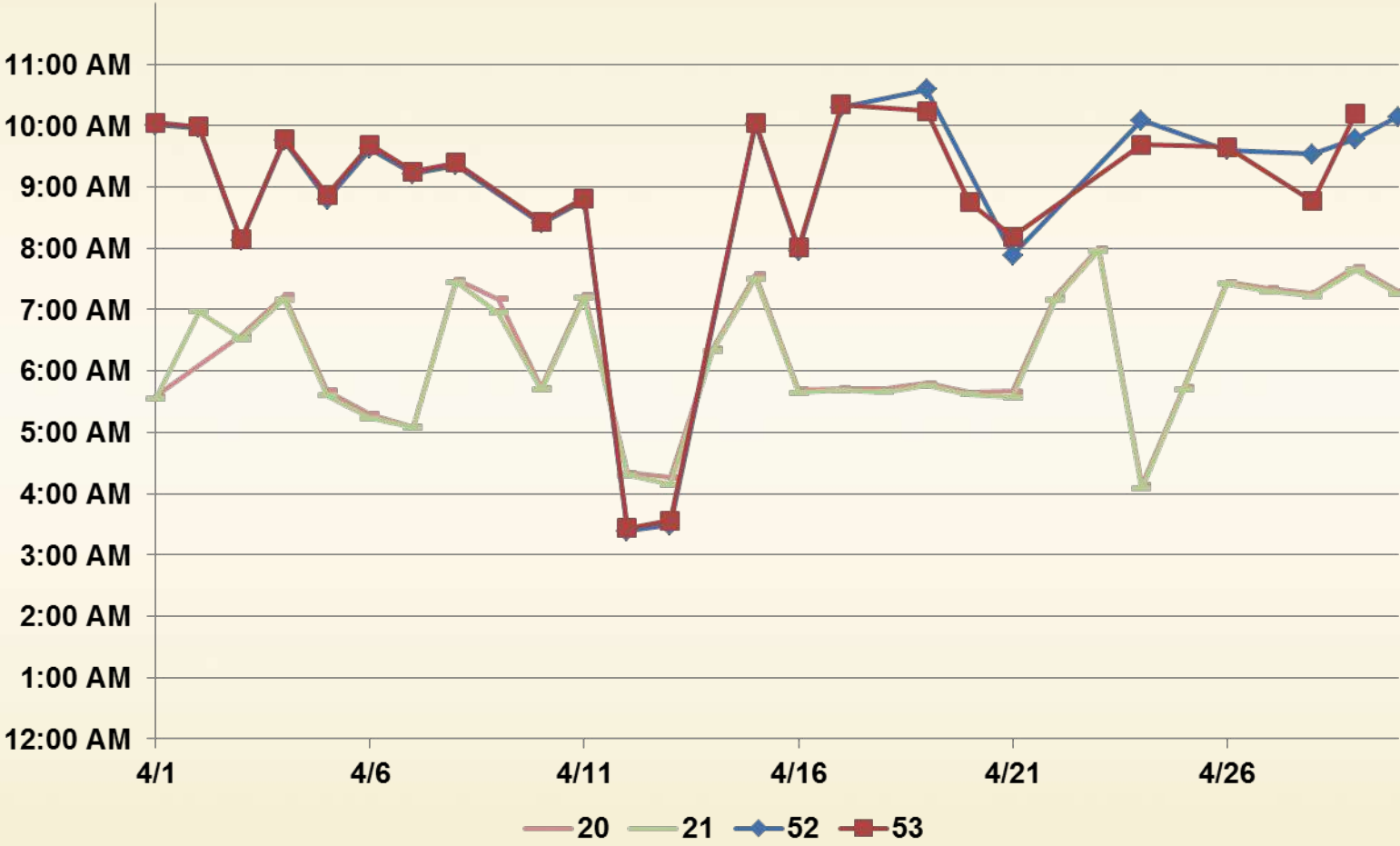
Feeding Times: Closeup Cows and Heifers



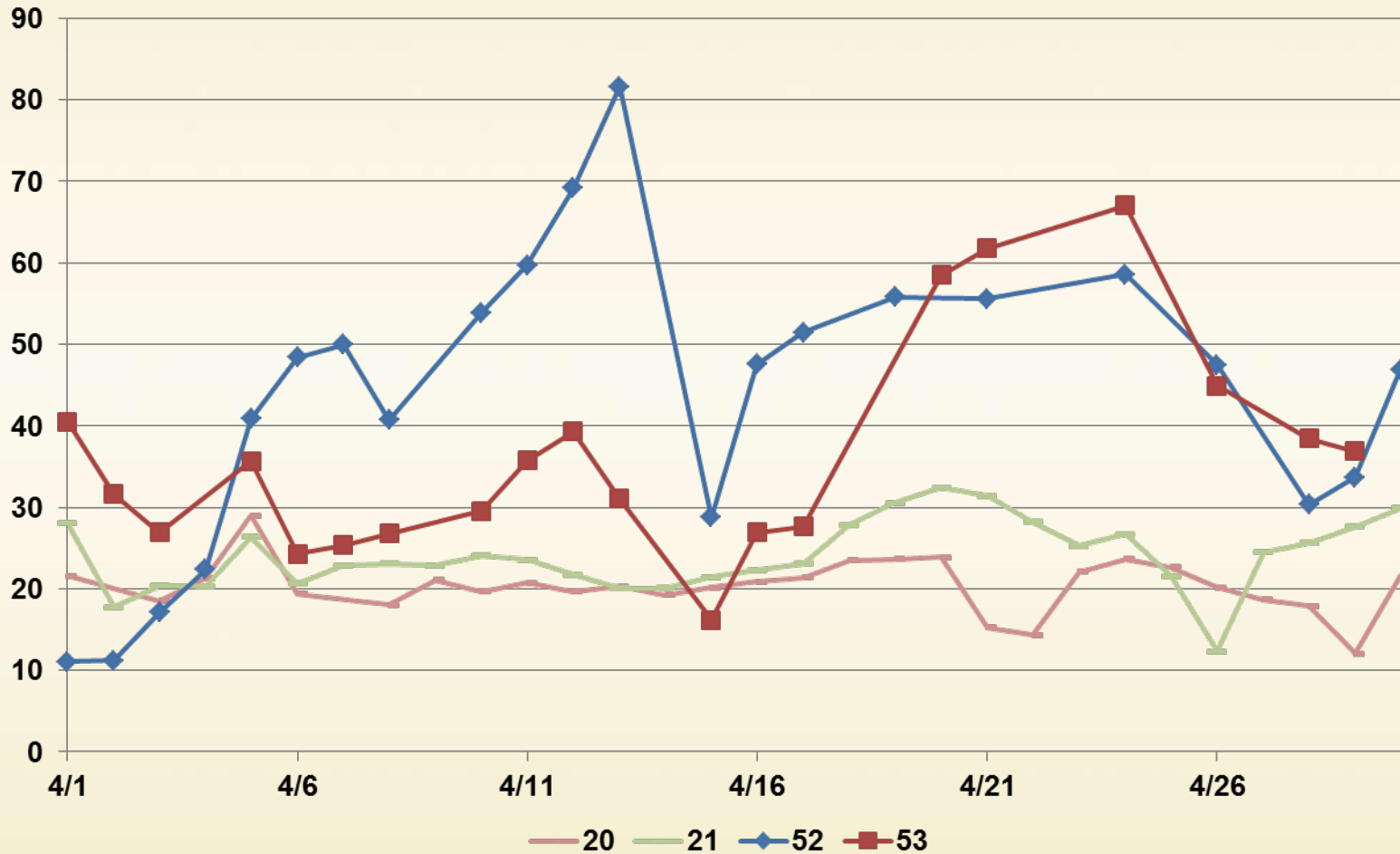
DMI: Closeup Cows/Heifers



First Drop Time: Dry Pens



DMI (lbs DM/hd/day): Dry Pens



Monitor

- One of the challenges of monitoring opportunities for improved dry matter intake in transition cows is that they cause increased variation in DMI and performance and these are very difficult to impossible to detect in pen averages.
- The use of some blood-based markers of energy metabolism (prepartum NEFA and postpartum NEFA and BHB) can provide opportunities to assess energy in transition cows.

There's more to a successful transition
than just good nutrition.

We need to build on good nutrition and
then implement a relatively simple
system that focuses on cow comfort,
bunk management, providing day-to-
day consistency and having the ability
to monitor the results.

Thank You

