

FEEDING THE HIGH PRODUCING DAIRY HERD

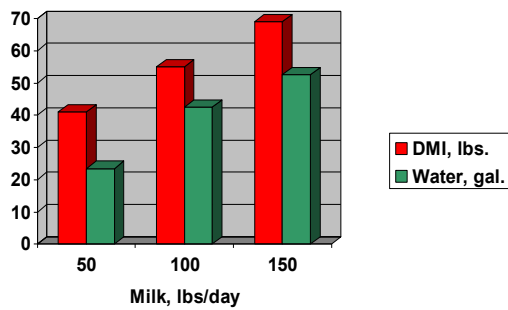
Dr. L. E. Chase
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 Cornell University



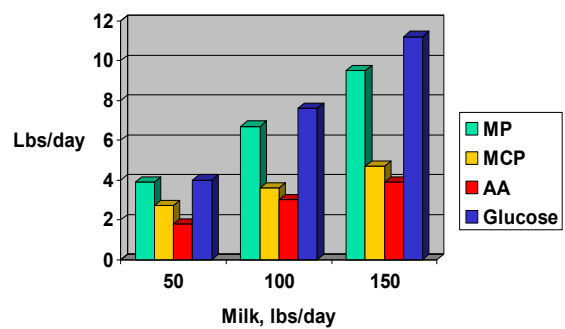
What is A High Producing Dairy Herd?

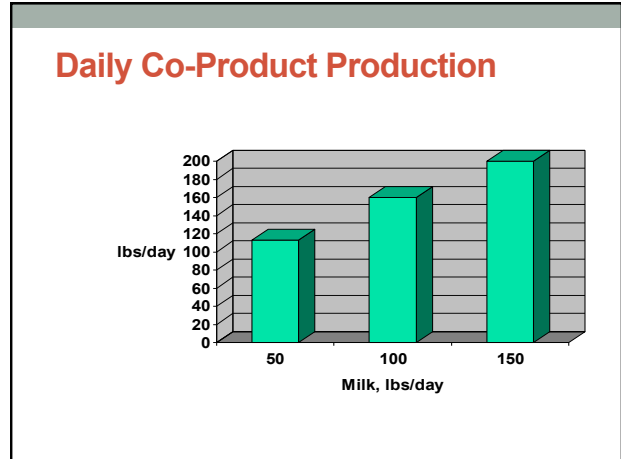
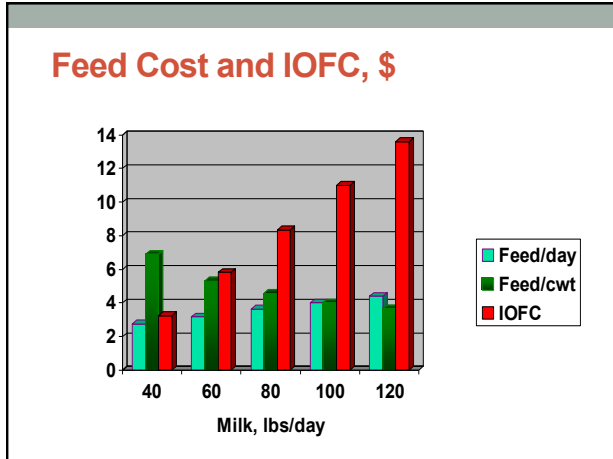
- How many are there?
- What is the highest herd average?

Daily Inputs Required



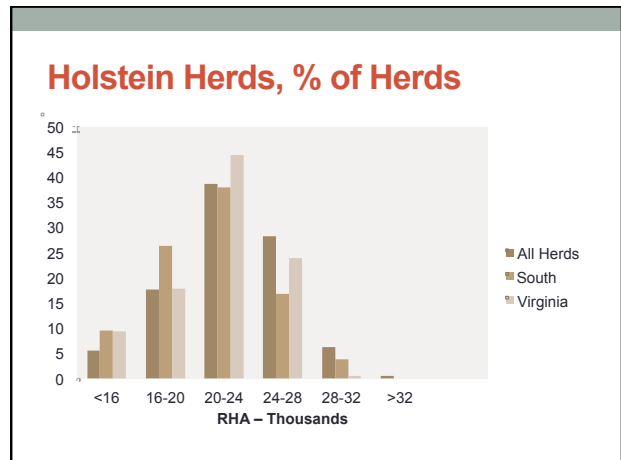
The Cow Needs

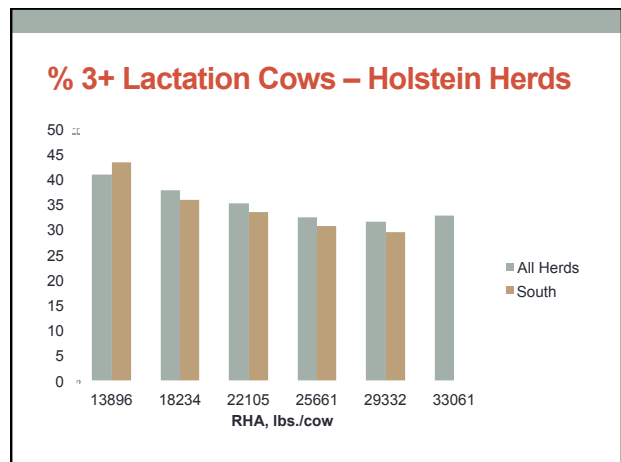
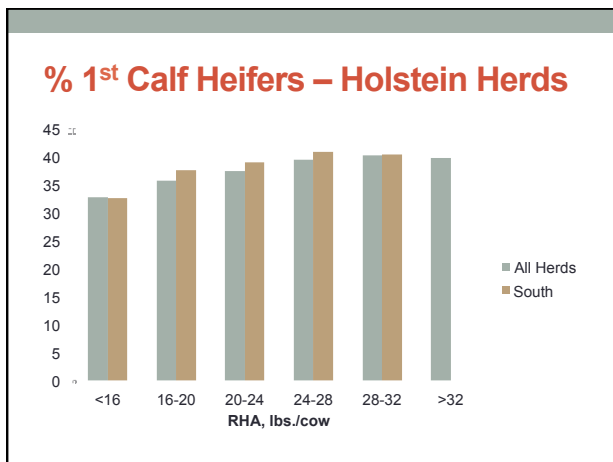
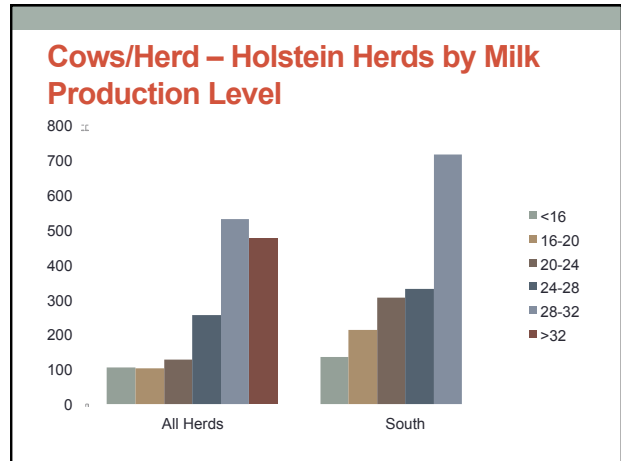
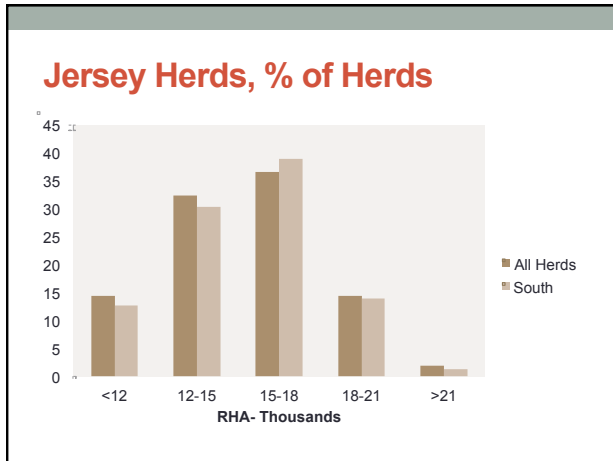


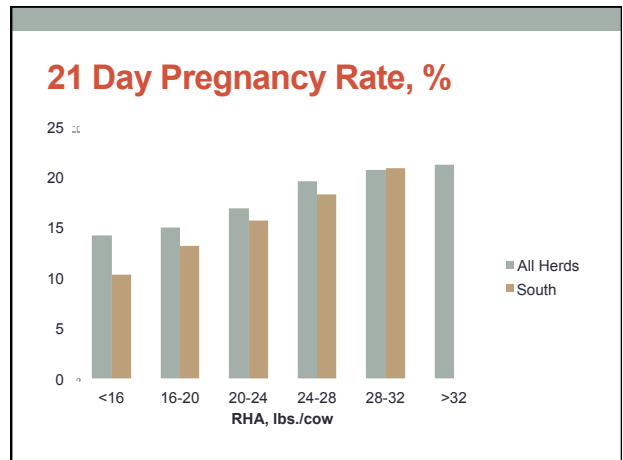
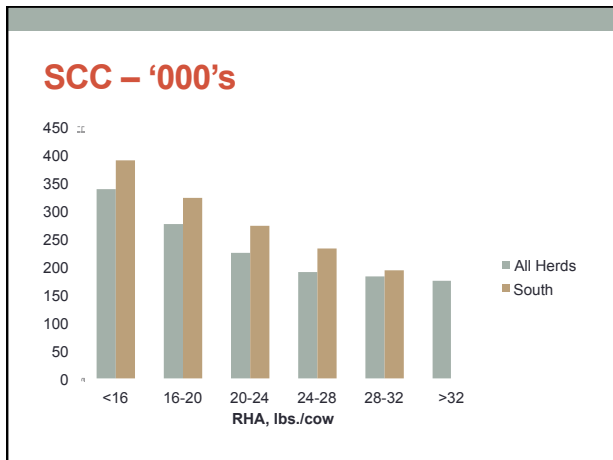
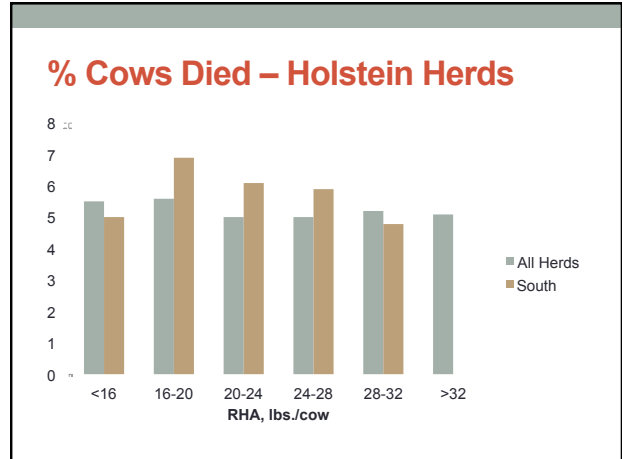
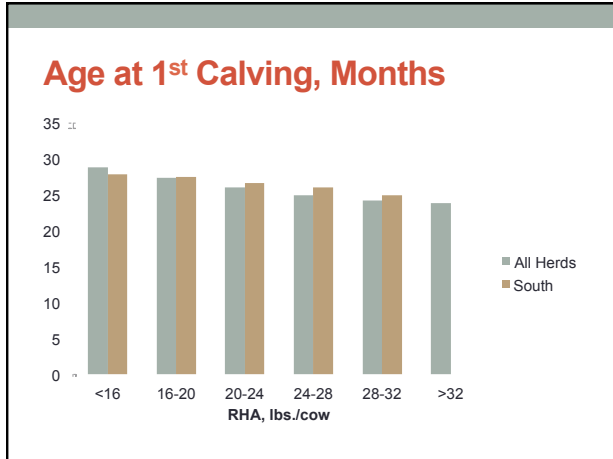


Raleigh DHI Data – 1/16

- Used the Dairy Metrics program to query the database.
- Search criteria:
 - Holstein and Jersey herds.
 - Total herds and herds in the South.
 - Sorted by milk production groups.
- Goal – Define some herd parameters associated with milk production levels.
- Holstein Herds:
 - All herds = 10,121
 - South = 806 (Virginia = 259 herds)
- Jersey Herds:
 - All herds – 568 (Virginia = 9 herds)







Interim Summary

- Higher producing herds have:
 - More 1st lactation heifers and less older cows.
 - Lower age at calving for 1st calf heifers.

Similar number of cows that die. -
Lower somatic cell counts. -
Higher 21 day pregnancy rates.

Highest Herds

- Holstein -
 - Highest is 35045 lbs./cow.
 - 44 herds > 32,000 lbs./cow.
 - South = 31,875 lbs./cow. (highest herd)-
South = 30 herds >28,000 lbs./cow.
- Jersey herds -
 - Highest herd is 22,638 lbs./cow.
 - 10 herds are > 21,000 lbs./cow.
 - Highest South herd is 21,067 lbs./cow.

Rations in High Producing Herds

- How do high producing herds get enough units of nutrients per day into the cows?
- A. Increase ration nutrient density?
- B. Increase DMI?

Ration Questions

- A large dairy sells a TMR to a neighboring small farm. Milk production on the large dairy is 78 lbs./cow/day while it is 86 lbs./cow/day on the small farm. How do you explain this?
- A high group of cows is averaging 120 lbs. of milk per day on a TMR "formulated" for 85 lbs. of milk. How do you explain this?
- A high group of cows is averaging 120 lbs. of milk per day but the top cow in the group is producing 180 lbs. of milk. How do you explain this?

What Do High Producing Herds Feed?

- 25 herds.
- Holstein herds fed TMR's.
- Northeast and Midwest herds.
- Milk = 30,842 lbs./cow (28,031 to 36,729 lbs./cow).
- Milk fat, % = 3.75 (range = 3.21 to 4.26%).
- Milk true protein, % = 3.05 (range = 2.9 to 3.22).
- All rations run through the CNCPS 6.1 model.

Forages Fed and NDF

Item	Mean	Range
% Forage in Ration	52.9	45 – 62.8
Corn Silage, % of Ration DM	32.2	18.8 – 49
Corn Silage, % of Forage DM	62.1	35.2 – 80.9
Ration NDF, %	30.1	24.5 – 32.8
Forage NDF, % of Ration DM	22.9	19.75 – 28.2

Other Forages Fed

Forage	Number of Herds	% of Total DM	% of Forages Fed
Straw	4	1.2	2.3
Dry Hay	12	3.47	6.5
Hay crop Silage	25	18.9	37

Ration Protein and Amino Acids

Item	Mean	Range
CP, %	16.7	14.3 – 18.1
MP, g/day	3007	2501 – 3718
MP bacteria, % of total MP	46.3	38.9 – 52.6
Lysine, % of MP	6.5	5.87 – 6.94
Methionine, % of MP	2.16	1.76 – 2.55
Lysine:Methionine ratio	3.06:1	2.54:1 – 3.76:1

Starch, Sugar and Fat

Item	Mean	Range
Ration Starch, %	26.7	21.3 – 30.1
Ration Sugar, %	4.4	2.7 – 8.3
Ration Fat, %	5.3	4.2 – 6.6

Energy Sources Fed

- HMSC = 10
- Corn grain = 21
- Whey = 6
- Molasses = 10
- Sugar = 4
- Whole cottonseed = 13
- Tallow = 9
- Bypass fat = 20

Protein Sources Fed

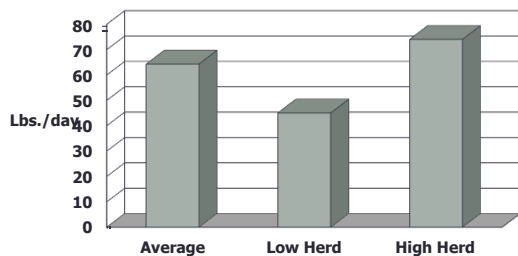
- Corn gluten feed = 9
- Corn germ meal = 4
- Corn gluten meal = 2
- Distillers = 13
- Soybean meal = 14
- Roasted soybeans = 8
- Expeller SBM = 20
- Canola meal = 18
- Urea = 12
- Animal protein blends = 7
- Blood meal = 13
- RP methionine = 18

Non-dietary Factors and Milk Production

- 47 herds in NE Spain
- 3,129 cows
- All herds were fed the same TMR
- Mixed at the cooperative and delivered to each herd daily
- Feed **delivered** per cow ranged from 35.4 to 54.3 lbs. of DM

Bach et.al., J. Dairy Sci. 91:3259-3267, 2008

Herd Milk Production



What Were the Key Differences in These Herds?

- Age at 1st calving was negatively correlated with milk production
- Stalls/cow were positively related to milk
- Herds that pushed up feed produced 8.3 lbs. more milk
- Herds that had refusals produced 3.5 lbs. more milk.

These factors accounted for >50% of variation in milk production

Corwin Holtz - 2010

- 7 Big Management Areas That Make a Difference
 - 25% = Cow Comfort
 - 25% = Forage Quality
 - 15% = Transition/Dry Cow Mgmt.
 - 15% = Reproduction
 - 10% = Routine
 - 5% = Social interaction
 - 5% = Nutrition
- Holtz-Nelson Consulting Group

Feeding Management and Milk Production

- Sova et. al., JDS – 2013 -
 - 22 free-stall herds in Ontario.
 - Herd size = 162 cows.
 - Average group size – 83 cows.
 - Average days in milk = 187.
 - Average DMI = 54.5 lbs.
 - Average milk production = 75.5 lbs.
 - TMR's were studied for 7 consecutive days.
 - If multiple feeding groups, used the highest producing group.
 - Feeds fed and refused were recorded and sampled daily.

Key Findings

- Feeding 2x versus 1 x =
 - Increase of 3.1 lbs. of DMI.
 - Increase of 4.4 lbs. of milk.
 - Decreased ration sorting.
- Every 2% group-level sorting of long particles was associated with a 2.2 lbs. per day decrease in milk.

• Sova et.al., 2013

Cow Comfort

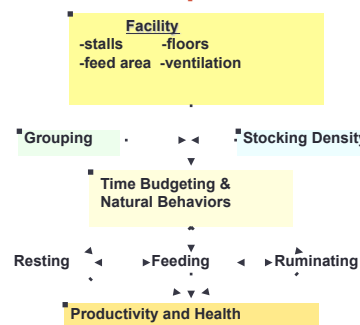
- A 700 cow herd built a new free-stall barn to reduce cows/stall from 1.2 to 1.
 - Predicted milk response was 5-6 lbs./day.
 - Actual was 8-10 lbs. of milk.
- At Cornell, we moved from a 40 year old free-stall barn to a new, sand-bedded free-stall barn in 2013:
 - Resting time increased.
 - Time standing decreased.
 - Milk increased 7-9 lbs. with no ration change.
- Many other herds report increases of 5 – 12 lbs. of milk per cow when cow comfort is improved.

Feed bunk space affects where cows choose to eat (Rioja-Lang et al., 2012)

- Compared 76, 60, 46, and 30 cm of bunk space and preference for:
 - low-palatability feed alone
 - high-palatability feed next to a dominant cow
- Y-maze testing to offer choices

Space (cm)	HPF Dominant	Equal choice	LPF Alone	P
30	0	1	11	<0.001
46	1	3	8	<0.05
60	3	4	5	>0.05
76	5	2	5	>0.05

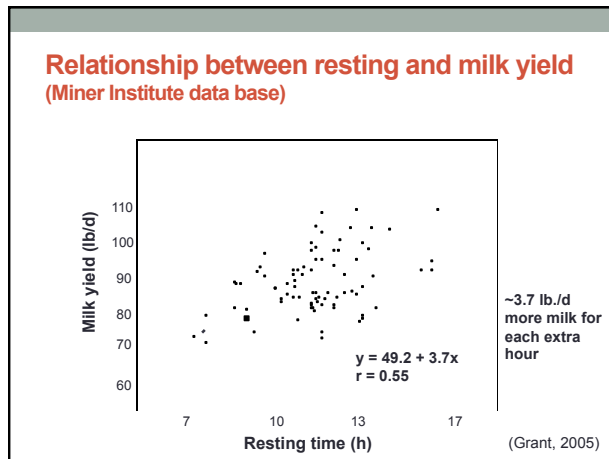
Optimizing Cow Behavior: On-Farm Concept



Feeding environment and efficiency

Feeding environment affects cow behavioral, productive, and efficiency responses

- Refusal amount
- Feed accessibility & overcrowding
- Frequency of feeding
- Uniformity of feed delivery



Kentucky High Producing Herds

- Smith et. al., The Professional Animal Scientist – 2013.
- Surveyed 23 Kentucky dairy herds with > 22,000 lbs. of milk. Average milk = 23,736 lbs. (range = 22,028 to 27,687 lbs. milk).
- 65% of the herds were partial confinement and 35% were total confinement.
- Average number of cows = 191 (range 25 to 1,590).
- 74% of the herds milked 2x.

Kentucky Herds – Management Practices Adopted

- Regular forage testing = 100%.
- Fans, sprinkler or both = 91%.
- Rations balanced at least yearly = 87%.
- Separate far-off and close-up groups = 70%.
- Kernel processor = 70%.
- Electronic feed management program = 57%.
- Push up feed regularly = 52%.

Kentucky Herds – Feed Additives

- Use rumen buffers = 91%.
- Use yeast cultures = 78%.
- Use organic or chelated minerals = 65%.
- Use mycotoxin binders = 65%.
- Use bypass = 57%.
- Use ionophores = 57%.
- Use direct-fed microbials = 43%.
- Use anionic salts = 35%.

“What 1 Management Practice Has Contributed the Most to Your Current Level of Milk Production?”

- Attention to detail = 8 responses.
- Nutrition = 5 responses.
- Cow comfort = 4 responses.
- Quality forages = 4 responses.
- Record keeping = 3 responses.
- Genetics = 3 responses.
- Consistency = 2 responses.
- Many others had 1 response each.

Survey of Kentucky dairy herds.

Milking Frequency, % of Herds

Survey	2x	3x	4x
Michigan, 2006	39	61	
Wisconsin, 2010		100	
New York, 2000	20	72	8
Kentucky, 2013	74	26	
Wisconsin, 2004		83	17
Wisconsin, 1997	33	67	

Number of Feedings/Day, % of Herds

Survey	1	2	3+
Minnesota, 2010	70	22	8
Wisconsin, 2010	20	60	20
New York, 2000	44	41	15
Wisconsin, 1997	20	40	40
Wisconsin, 2004	100		
Wisconsin consultant	67	22	11

Number of Feed Pushups/Day, % of Herds

Survey	0	1-3	3-6	>6
New York, 2000	13	26	35	26
Wisconsin, 1997		17	67	16
Wisconsin, 2004	33	17	17	33
Wisconsin, 2010	20		20	60
Wisconsin consultant	11	11	56	22

Phil Helfter – Norco Farm - 1999

- **“Nutrition is not the key to my success”**
- Northern NY herd.
- 800 cows.
- Consistently > 100 lbs. of milk per cow shipped.
- “If a cow gets sick, it’s my fault”

J. Kollwelter WI- 2013

- I really believe by the year 2020 we should be able to push 50,000 pounds of milk.
- 210 cows, currently 40,280 lbs. milk.
- CI = 13.2, CR = 60%, AFC = 22-23 months.
- “Nothing replaces walking the pens, looking at cows and being observant”
- “There are no secrets. Cow comfort, feeding a balanced ration, good genetics....all the information is out there”
- “I don’t push the cows – I just set them up to succeed”

Gordie Jones - 2014

- Rules that still apply:
 - Cow comfort is first
 - Forage is king
 - And better forage is better
 - Preg rate means you keep cows
 - Dry cow program stops early fresh cow losses
 - Milk quality is EVERYTHING

Dr. Herb Bucholtz – Michigan State - 2006

- “To achieve high per cow milk production, there are no magic ingredients or herd management techniques. It is a combination of overall excellent management of all aspects involved in feeding and managing the entire dairy herd”

Jim Barmore - 2006

- “Dairy producers need to spend more time on feeding management (feed delivery, feeding frequency, ration variation) vs. ration formulation. I see very few problems today in ration formulation and several opportunities for improvement in feeding management.”

Dairy Consultant - Wisconsin

What Have We Learned?

- Ration nutrient specifications in high producing herds are “similar” to the nutrient profiles of many other herds.
- These herds use a wide variety of forages, feed ingredients and feed additives to obtain the final ration nutrient parameters.
- These herds generally tend to have more 1st lactation animals, a lower AFC, lower SCC, higher 21 day pregnancy rates and fewer fresh cow problems.

Summary

- My key points from working with and observing these herds:
 - They have comfortable cows.
 - High quality forages.
 - High and consistent DMI.
 - A “cow person” that observes and manages the cows on a daily basis.

