Managing and grouping calves for optimal health and performance

Alex Bach and Marta Terré

IRTA

Introduction

- Current intensive dairy production systems suffer from poor reproductive performance and relative short productive life of dairy cows
- Producing quality dairy heifers is progressively receiving more attention

Introduction

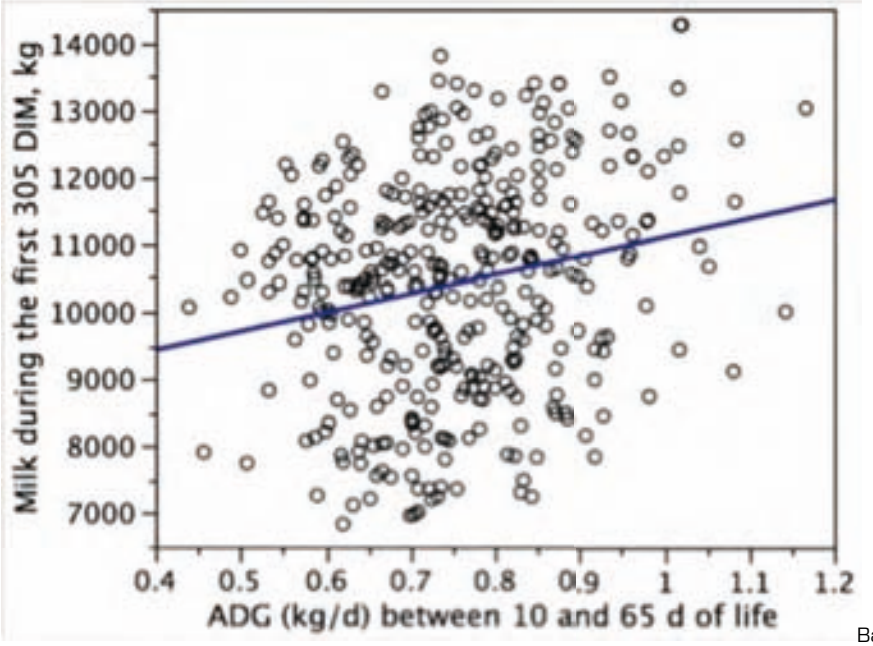
- Feeding methods and management practices applied to today's heifers will influence performance of dairy herds in 2014 onwards
- Long lag usually implies poor motivation "*to be on track*"
- In the recent years, substantial emphasis (and progress) has been placed on suckling calves, but often, the gains obtained at this stage are lost during the transition and the months following weaning

Introduction

- The four most important objectives for young calves:
  - Optimize growth
  - Optimize transition from liquid to solid feed
  - Minimize health disorders
  - Ensure full expression of genetic potential

Introduction

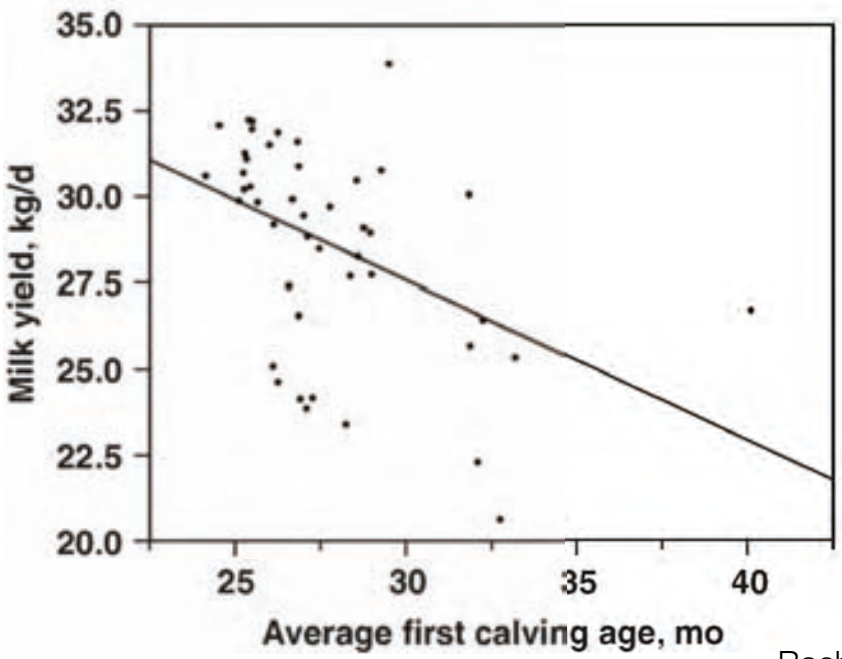
- Rate of growth of young calves is correlated with future milk production



Bach and Ahedo, 2008

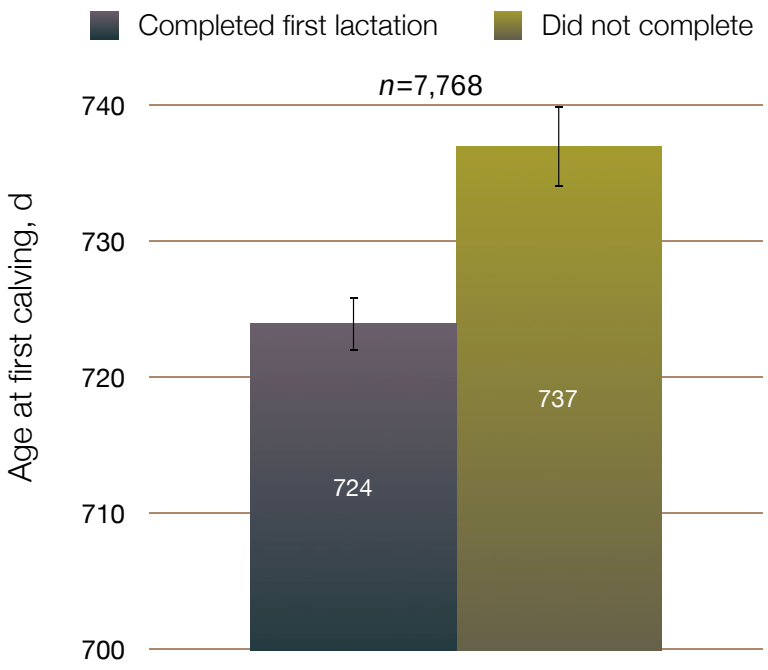
Introduction

- 47 herds within exactly the same ration



Bach et al., 2008

Introduction

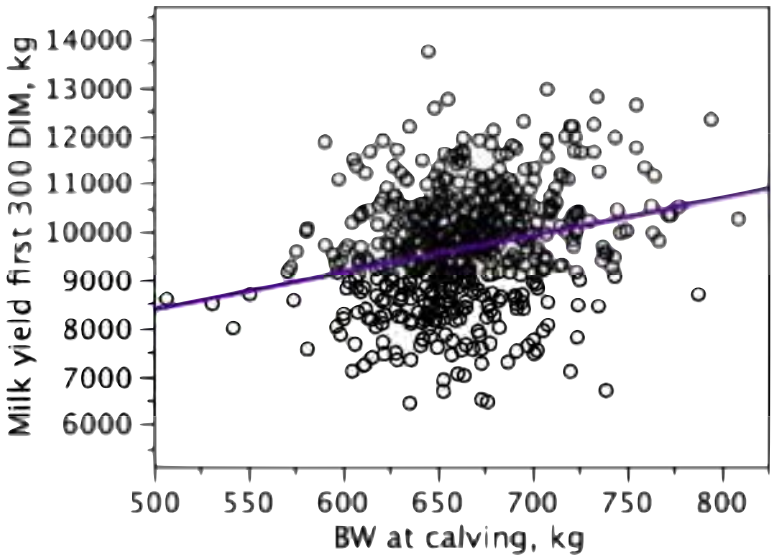


$P < 0.05$

Bach, 2011

Introduction

- For every additional kg of BW at calving, on average, an increase of 14.5 l of milk could be expected in the first lactation (70 kg are equivalent to 1,000 l of milk)



Bach and Ahedo, 2008

Optimize Growth

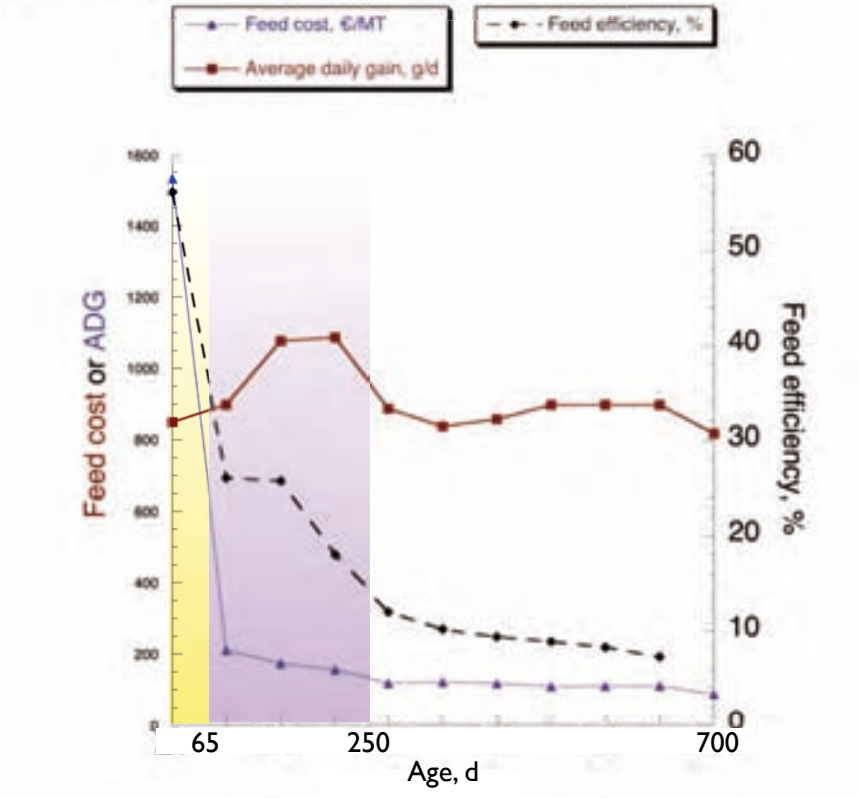
Restricted
- 1038 €: ADG of 0.5 kg/d

Enhanced
- 1009 €: ADG of 1 kg/d

Optimized
- 996 €: ADG of 0.8 kg/d

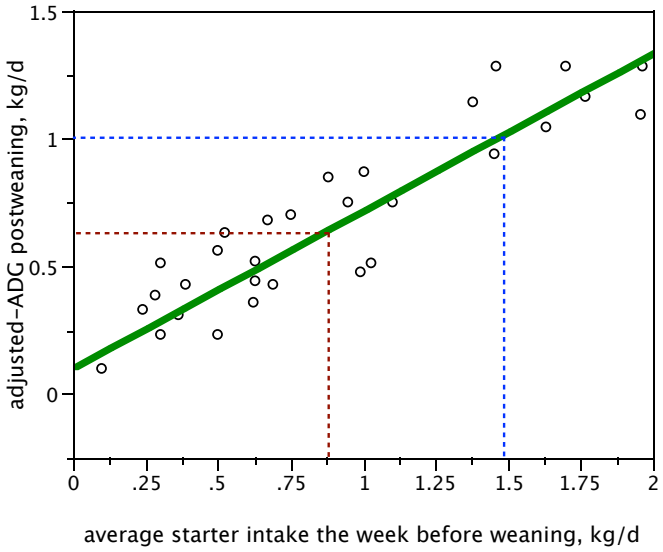
ECONOMICS NEED TO BE BALANCED WITH BIOLOGY AND CONSIDER THE ENTIRE GROWING PHASE

Optimize Growth



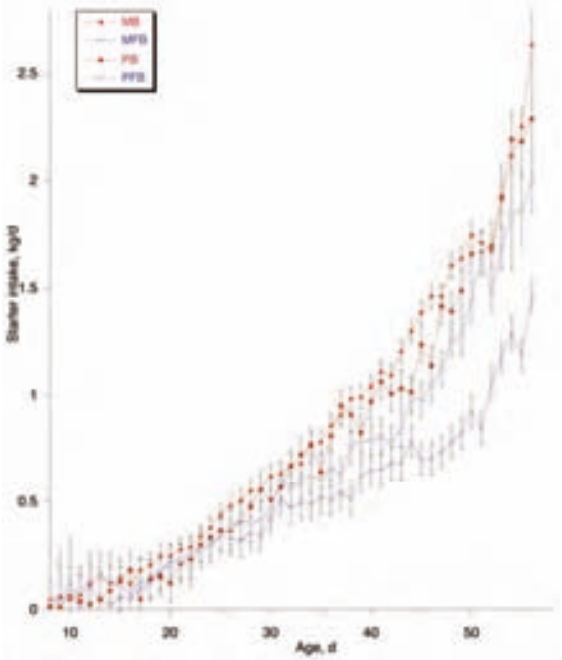
Optimize Growth

- It is commonly recommended to wean calves when they consume about 0.8-0.9 kg/d (Davis and Drackley, 1998)
- If ADG around 1 kg/d is the target, then weaning should not be performed until solid feed intake is above 1.5 kg/d



Optimize Growth

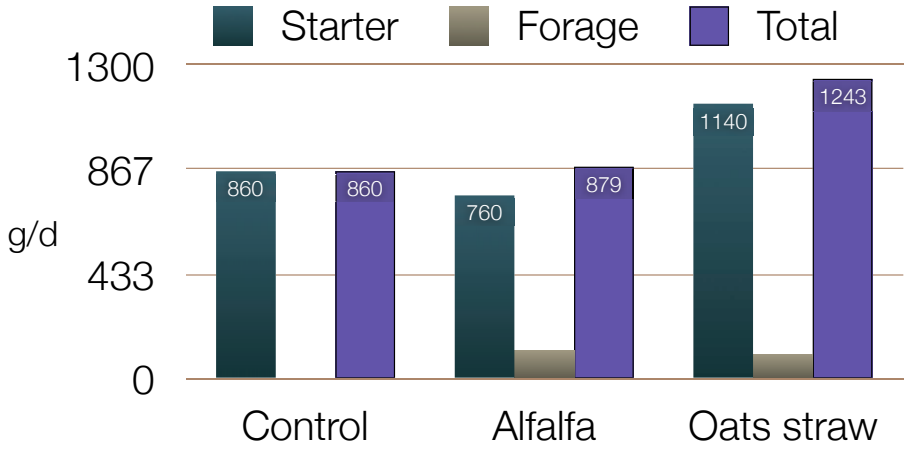
- The problem is that under field conditions, determining solid feed consumption of calves is not easy



Bach et al., 2010

Optimize Growth

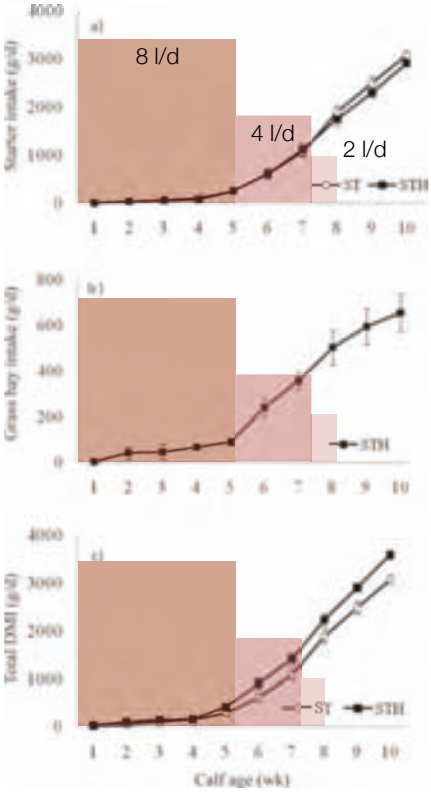
- The most common recommendation for feeding calves is to offer just starter and no forage before weaning (Quigley, 1996; Davis and Drackley, 1998, NRC, 2001).
- Recent evidence (Castells et al., 2012) indicates that offering chopped forages (2 cm) may increase total intake.



Optimize Growth

Optimize Growth

- Khan et al. (2011)
  - Access to starter (ST)
  - Access to grass hay
    + starter (ST+STH)



Optimize Transition

- Transition is a precious moment to foster rapid (and healthy) growth very efficiently
- Feed efficiency is well above 20%
- The risk of bovine respiratory disease is high
- Need to provide adequate environment and nutrients to minimize disease and promote growth

Optimize Transition

- After weaning calves are fed in many different ways...

Optimize Transition

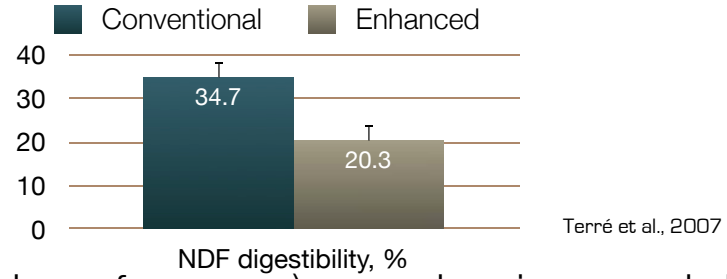
- The progressive implementation of enhanced growth feeding programs (that are effective and desirable) needs to follow with proper feeding after weaning.

- The type of starch provided influences intake, growth, and efficiency (Khan et al., 2007)

	Barley	Corn	Oats	Wheat
Concentrate intake, g/d	976	1402	1017	1187
ADG pre weaning, g/d	496	608	508	569
ADG post-weaning, g/d	712	1221	779	1126
Feed efficiency post-weaning, %	48.0	57.7	49.8	62.2

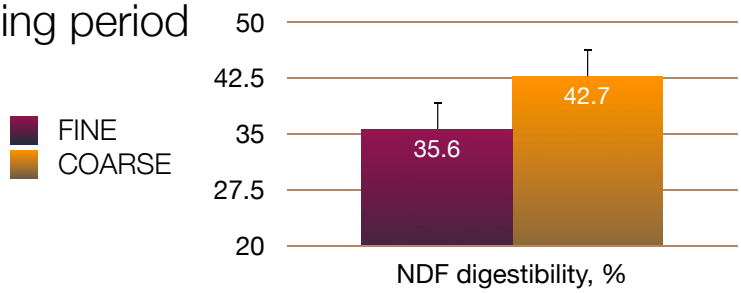
Optimize Transition

- Digestibility of fiber is diminished post-weaning when feeding enhanced growth programs



Terré et al., 2007

- Digestibility (and performance) can be improved by offering chopped hay (not alfalfa) or straw during the suckling period



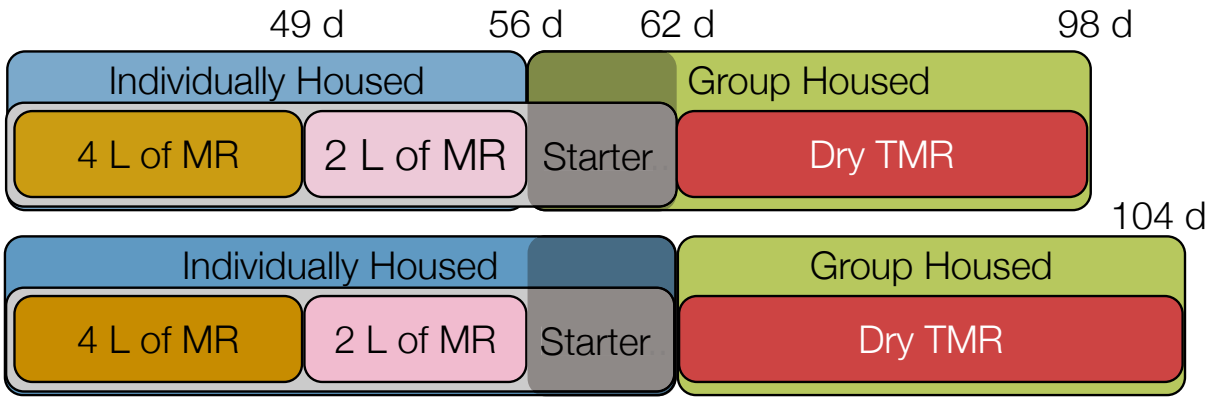
Montoro et al., submitted

Optimize Transition

- General recommendations for calf rearing advocate for keeping the animals individually housed and feeding milk replacer (or waste milk) twice daily.
- The main purpose of keeping calves individually is to minimize the spread of infectious diseases (mainly diarrhea and pneumonia).

Optimize Transition

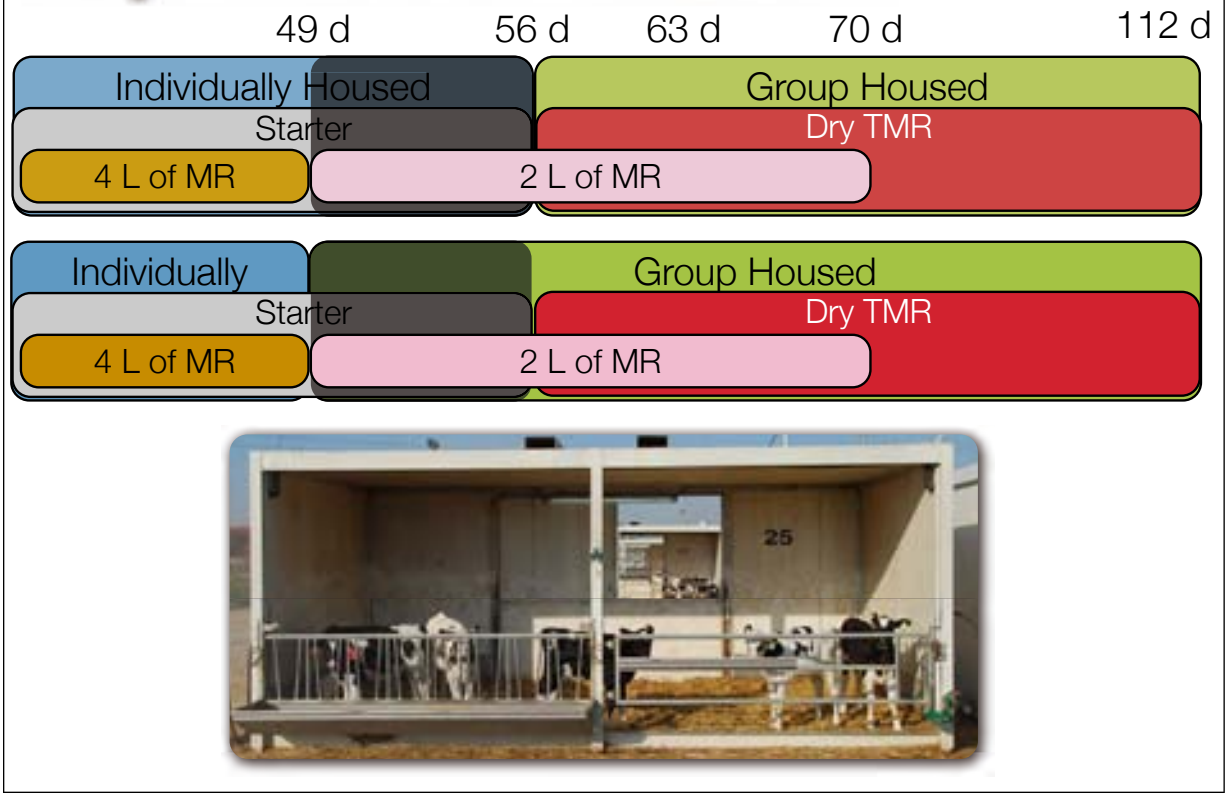
- Three hundred and twenty female Holstein calves were assigned to two different treatments:
  - Allowing the calf to remain individually housed for an additional 6 d after weaning
  - Move the calf immediately after weaning to a different pen forming groups of 8 contemporaneous calves.



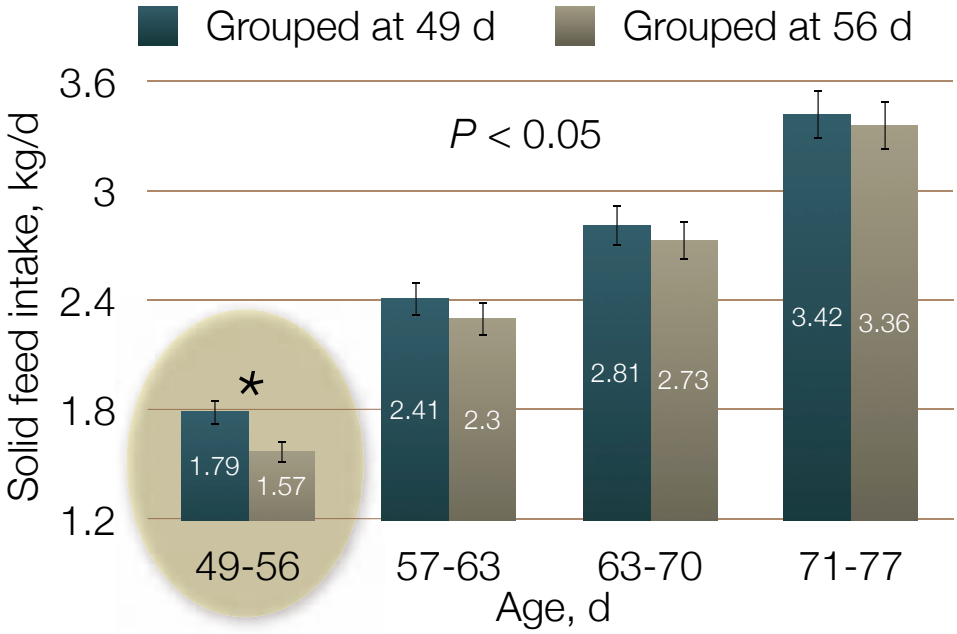
Optimize Transition

Item	Grouped 6 d after weaning	Grouped at weaning	SE	*P*-value
Initial BW, kg	41.8	42.4	0.52	0.51
Initial age, d	12.3	11.6	0.38	0.16
BW before grouping, kg	78.9	76.1	0.66	<0.001
Age before grouping, d	61.9	56.1	0.17	<0.001
ADG before grouping, g/d	751	764	12.0	0.49
Final BW, kg	114.5	113.7	1.04	0.76
Final Age, d	103.9	98.2	0.29	<0.001
ADG after grouping, g/d	847	894	19.9	0.09
Overall ADG, g/d	794	826	11.2	0.05

Optimize Transition



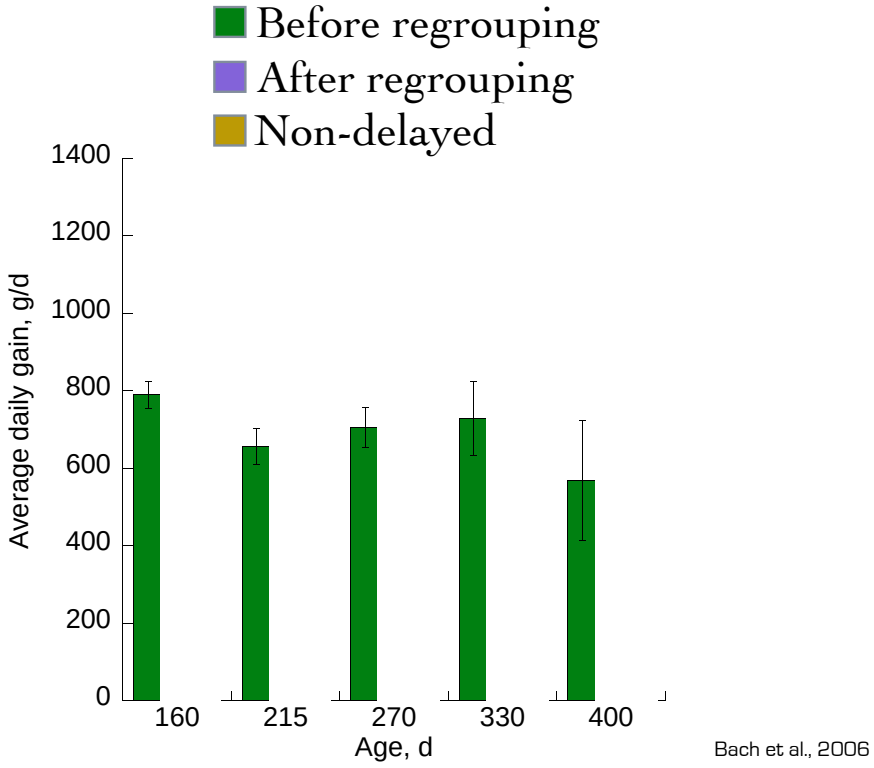
Optimize Transition



Grouped calves consumed more solid feed than those individually housed

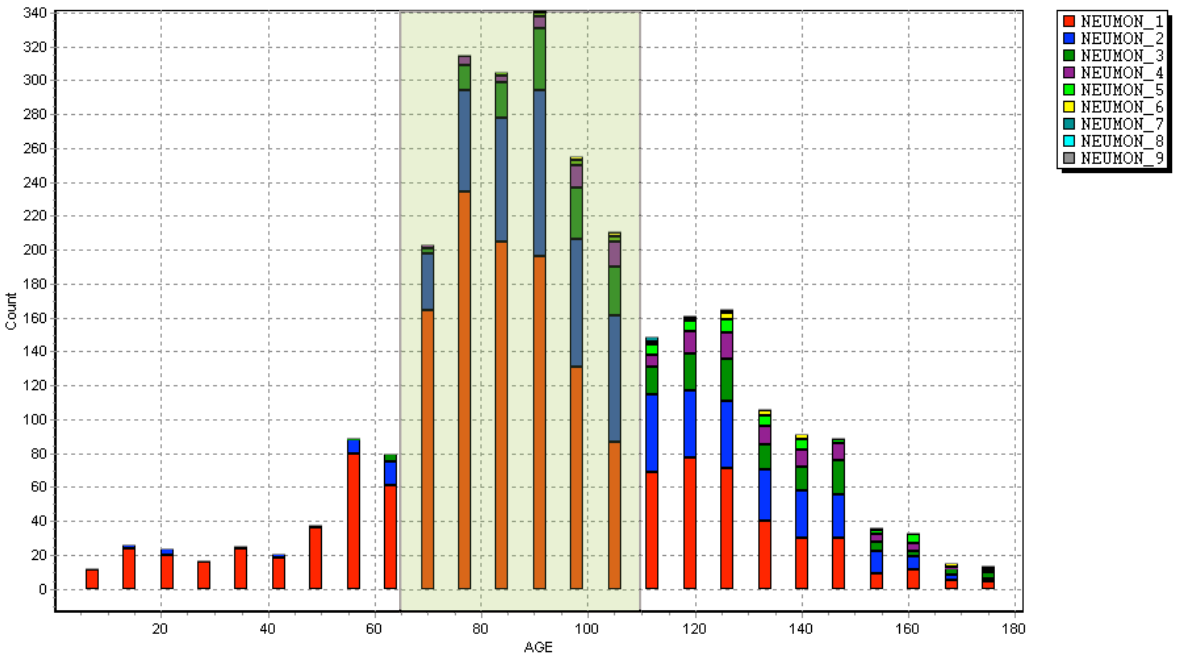
Bach et al., 2010

Management Aspects



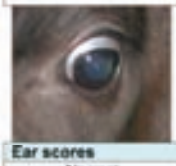
Bach et al., 2006

Minimize Health Disorders



Minimize Health Disorders

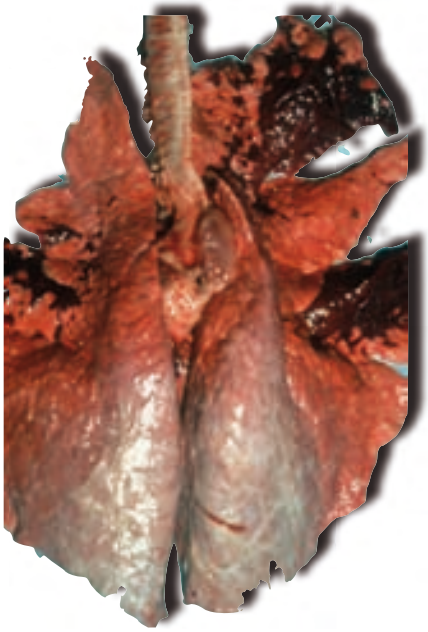
Calf Health Scoring Criteria

0	1	2	3
Rectal temperature			
100-100.9	101-101.9	102-102.9	≥103
Cough			
None	Induce single cough	Induced repeated coughs or occasional spontaneous cough	Repeated spontaneous coughs
Nasal discharge			
Normal serous discharge	Small amount of unilateral cloudy discharge	Bilateral, cloudy or excessive mucus discharge	Copious bilateral mucopurulent discharge
			
Eye scores			
Normal	Small amount of ocular discharge	Moderate amount of bilateral discharge	Heavy ocular discharge
			
Ear scores			
Normal	Ear flick or head shake	Slight unilateral droop	Head tilt or bilateral droop
			

http://www.vetmed.wisc.edu/dms/fapm/fapmtools/8calf/calf_respiratory_scoring_chart.pdf

Minimize Health Disorders

- Immune status of the animal (colostrum)
- Nutrition
- Vaccination program
- Management



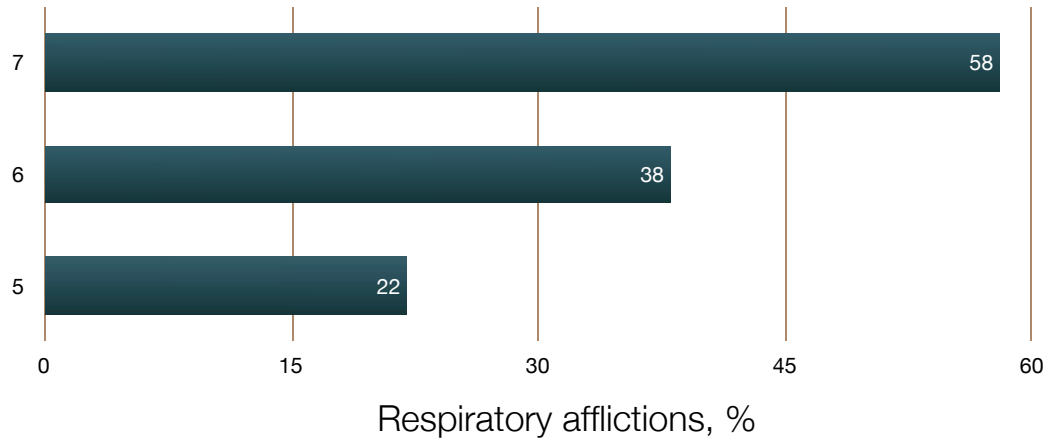
Minimize Health Disorders

5 calves per hutch: 3 m^2 and 7 m^3 per calf

6 calves per hutch: 2.5 m^2 and 6 m^3 per calf - 15%

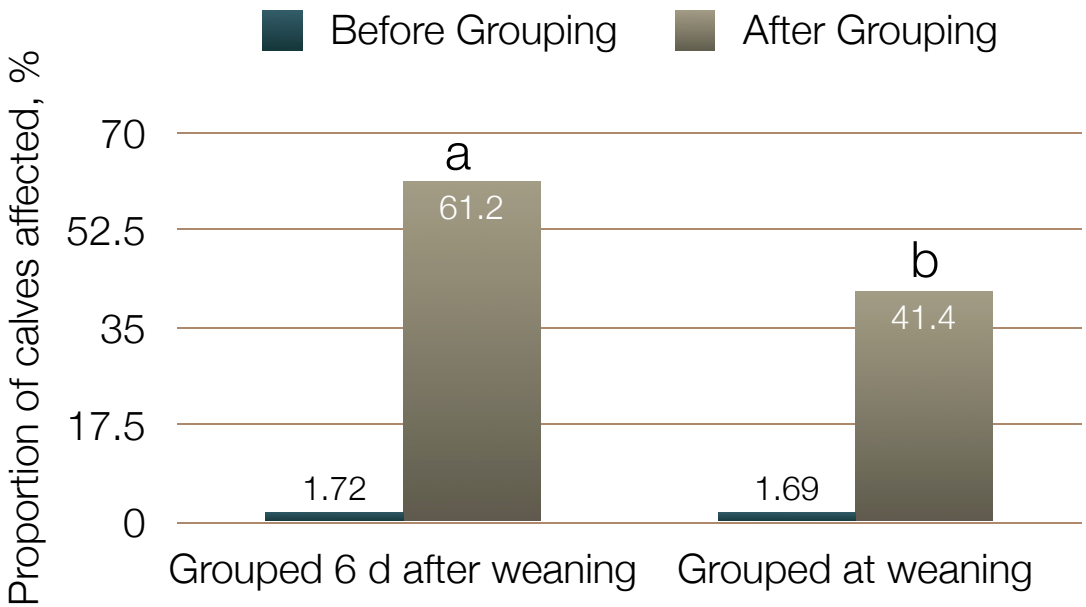
7 calves per hutch: 2 m^2 and 5 m^3 per calf - 29%

Minimize Health Disorders



Minimize Health Disorders

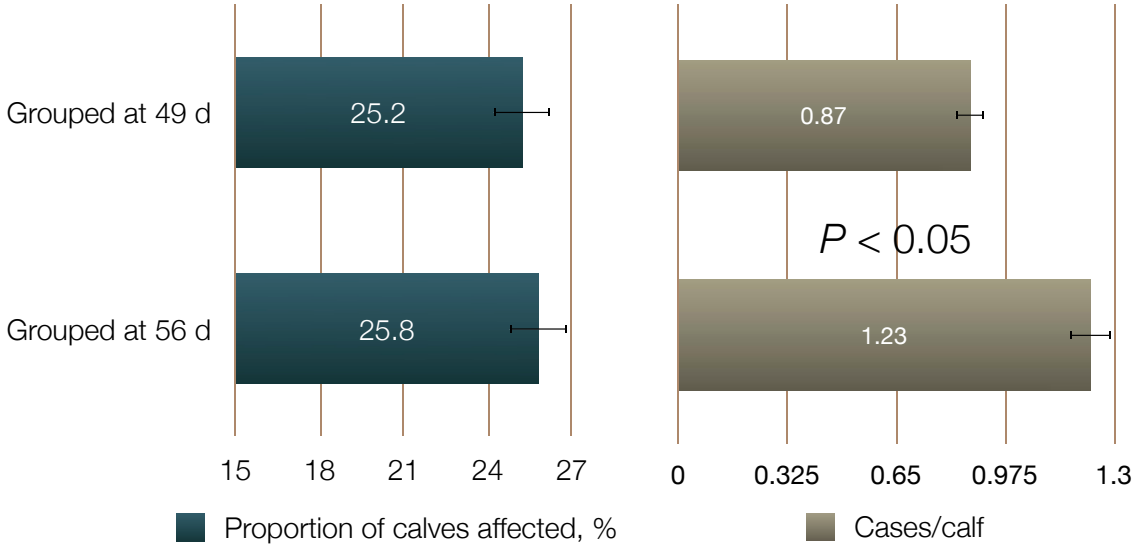
Incidence of Respiratory Problems



Bach et al., 2010

Minimize Health Disorders

Incidence of Respiratory Problems

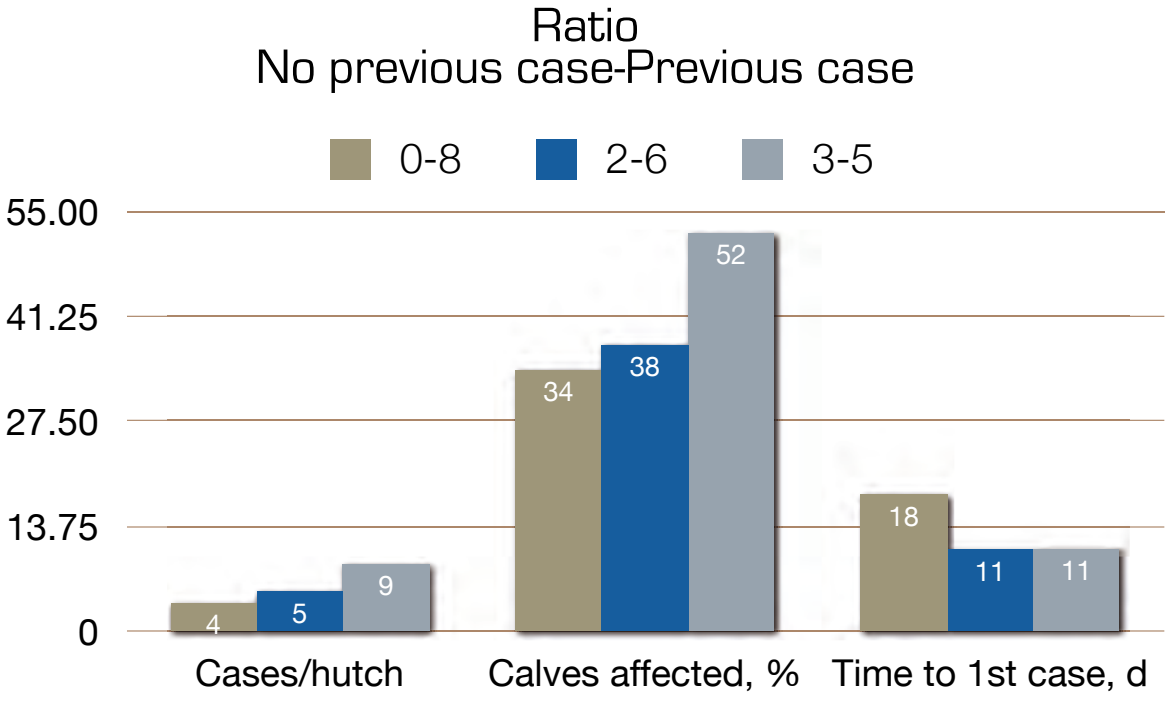


Bach et al., 2010

Minimize Health Disorders

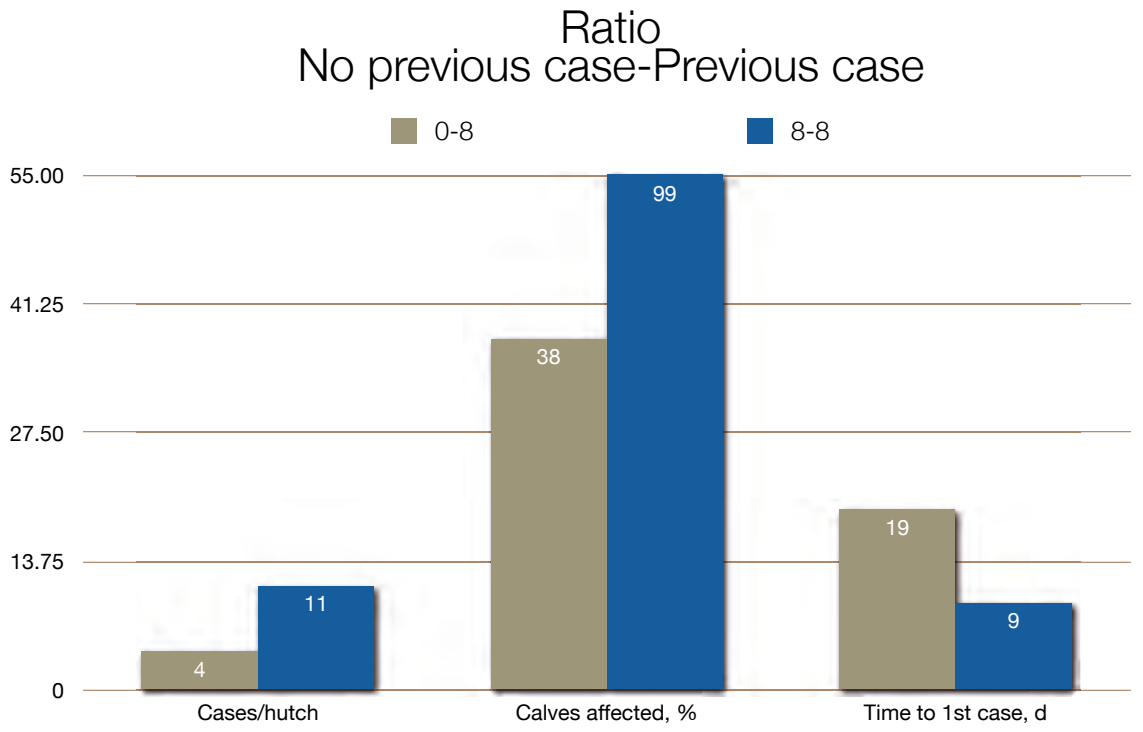
- Can we use records to cope with BRD?

Minimize Health Disorders



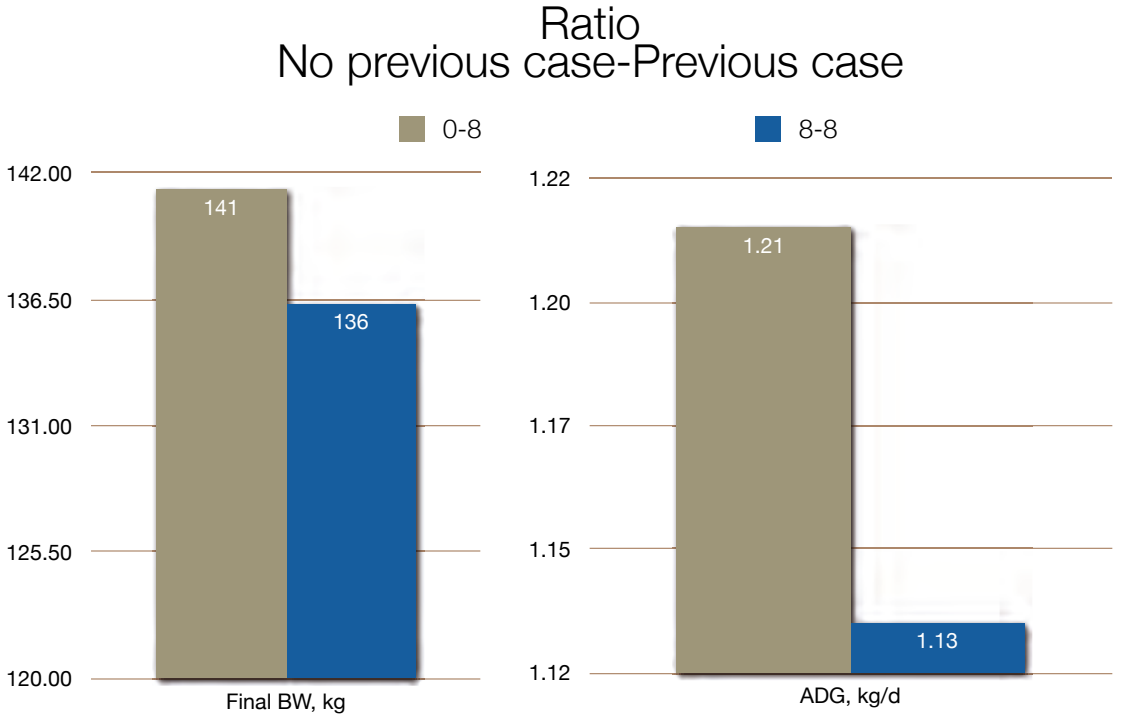
Bach et al., 2011

Minimize Health Disorders



Bach et al., 2011

Minimize Health Disorders



Bach et al., 2011

Ensure Full Genetic Expression

Full Genetic Expression

- The return on the investment allocated from birth to first lactation is commonly not fully recovered until at least the end of first lactation
- Voluntary culling decisions based on profit consist of substituting a cow with a replacement on the basis that the latter is expected to be more profitable and not because the cow being replaced was not profitable
- If the expected longevity/performance of a replacement is not attained, then it is likely that the culling decision will be unprofitable or less profitable than initially expected

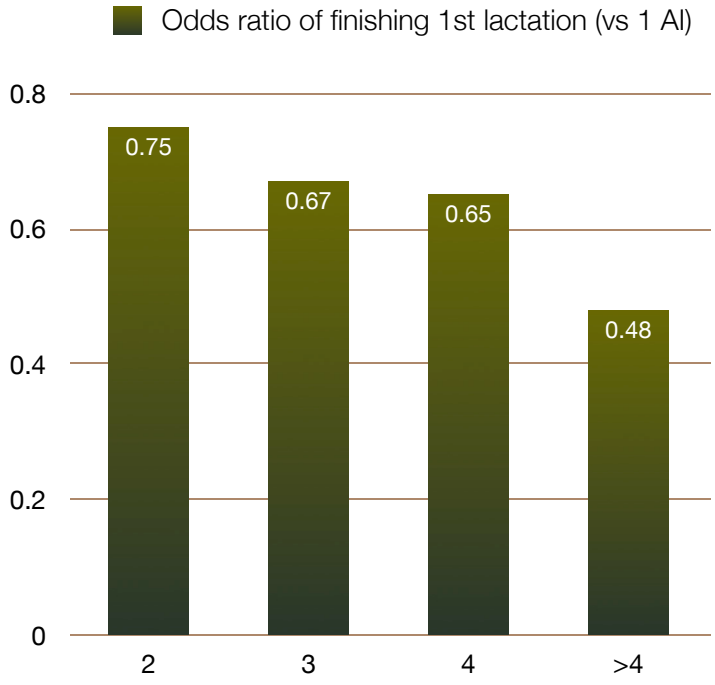
Full Genetic Expression

Authors	X	ADG	Milk	Significance
Holloway and Totusek, 1973	Mom	N/A	+10%	$P < 0.10$
Bar-Peled et al., 1997	Mom 3X vs MR 2X	+100 g	+4%	$P < 0.10$
Shamay et al., 2005	WM 2X vs MR 1X	+300 g	+4%	$P < 0.05$
Moallem et al., 2010	WM 2X vs MR 2X	+100 g	+10%	$P < 0.05$
Davis Rincker et al., 2009	MR 2X	+200 g	+4%*	$P < 0.10$
Terré et al., 2009	MR 2X	+100 g	+6%	NS
Raeth-Knight et al., 2009	MR 2X	+150 g	+5%	NS
Morrison et al., 2009	MR 2X	+150 g	-1%	NS

226 kg Milk/100 g
$P < 0.05$

Bach, 2012

Full Genetic Expression

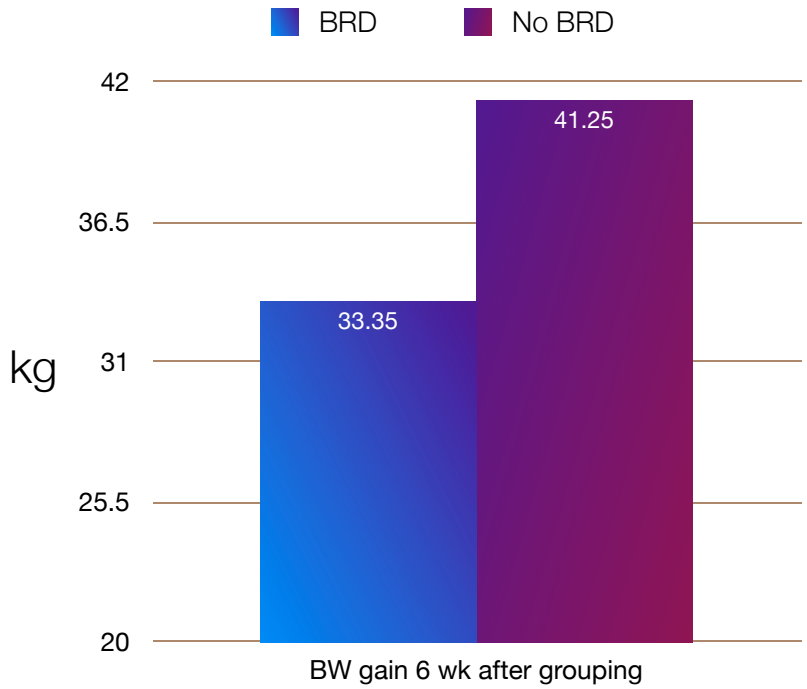


Bach, 2011

Full Genetic Expression

n=2,771	0	1	2	3	> 4	*P*-value
Final BW, kg	624	618	624	625	598	0.21
Final age, d	661	665	671	666	670	0.03

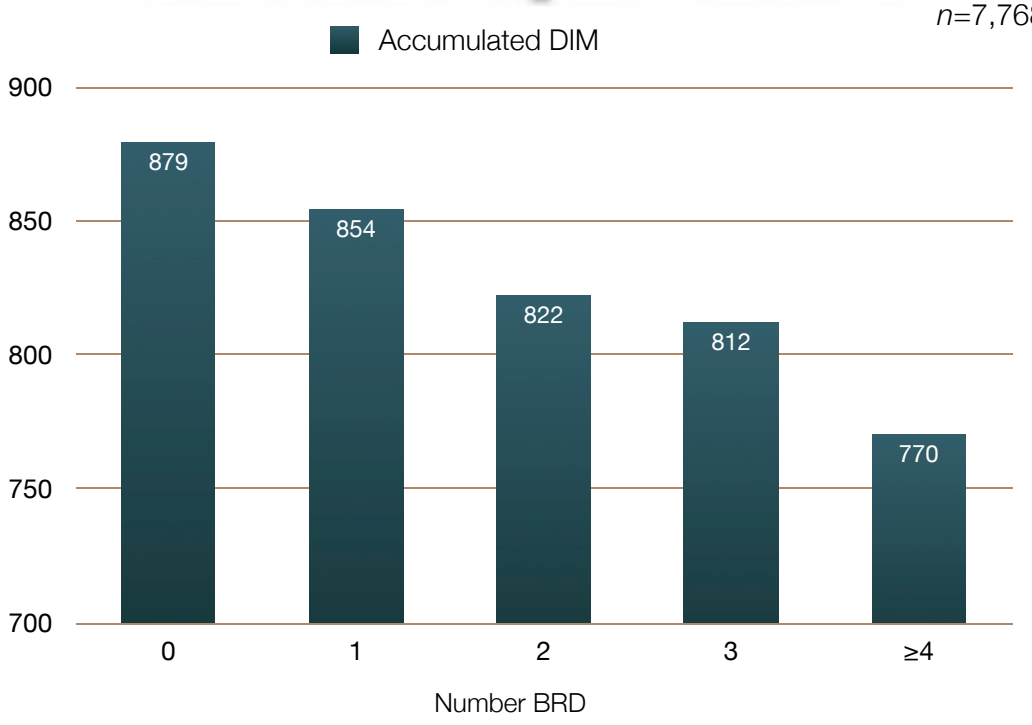
Full Genetic Expression



Stanton et al., 2010

Full Genetic Expression

n=7,768



Bach, 2011

Take Home Messages

- Significant progress has been made feeding young calves. Attention needs to continue after weaning
- Avoid “management by feeling”
- Weaning should be performed in groups
- Offer chopped poor-quality hay before weaning to improve intake and digestibility after weaning
- Regular BW checks of heifers ensures success
- BRD incidence my compromise overall productive life of dairy cows
- Group animals based on their BRD history