Improving herd fertility

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Outline

- Introduction
- Current state of play in NZ
- How to improve fertility?
- Conclusions

Animal Health Centre

- Clinical vet business
- Research business
- Nutritional consultancy
- 40 vets
- 10 sites
- 300,000 cows
- 1,000 dairy herds

The NZ dairy industry

- One major farmer owned co-operative collects >90% of milk
- Predominantly export (95%)
  – Butter, cheese, casein, milk powder etc.

- Low input/low output/low cost system
- Predominantly pasture fed
  – Rye grass/white clover
  – Increasing use of maize silage
- Highly seasonal calving/breeding system
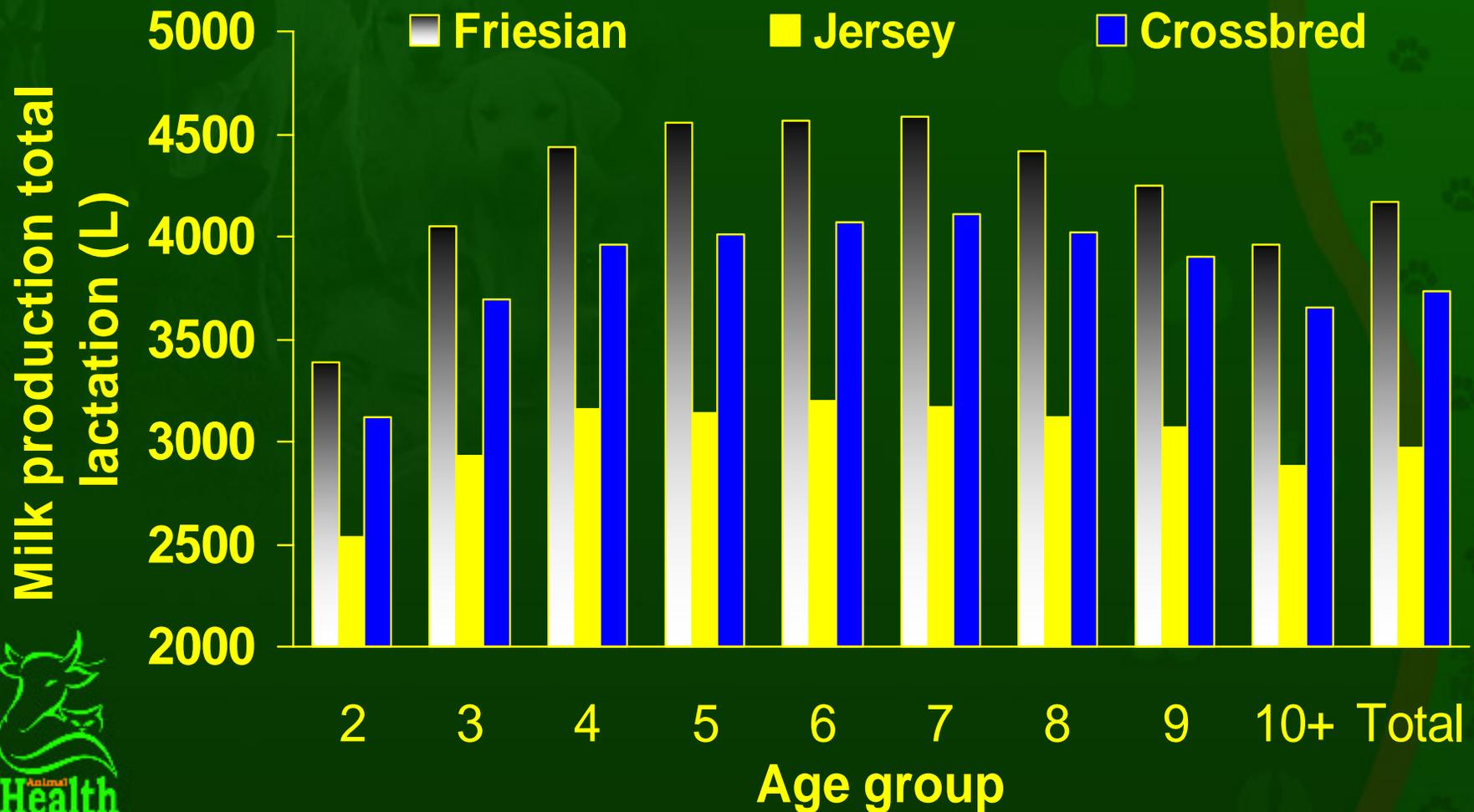
The dairy industries

|	NZ	Ireland
No. cows	3.92 m	1.09 m
No. herds	11,630	21,000
Cows/herd	337	55
Farm size (Ha)	121	40
Cows/Ha	2.8	1.7
Volume (L/cow/annum)	3791	4600
Milksolids/cow (kg/annum)	330	370
Farmer payment ($NZ/kg MS)	5.60	
Farmer payment (Euro/L)	0.26	0.34

Cow breeds:
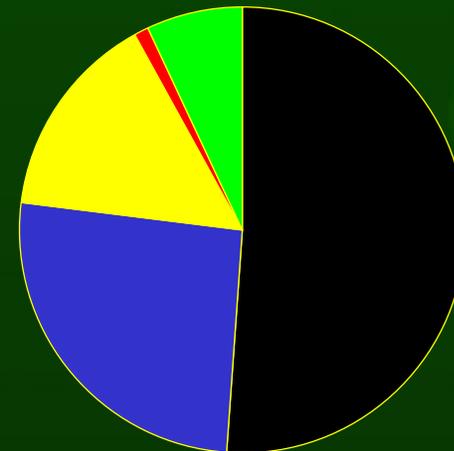
Legend:
- ☐ Friesian
- ☐ F x J cross bred
- ☐ Jersey
- ☐ Ayrshire
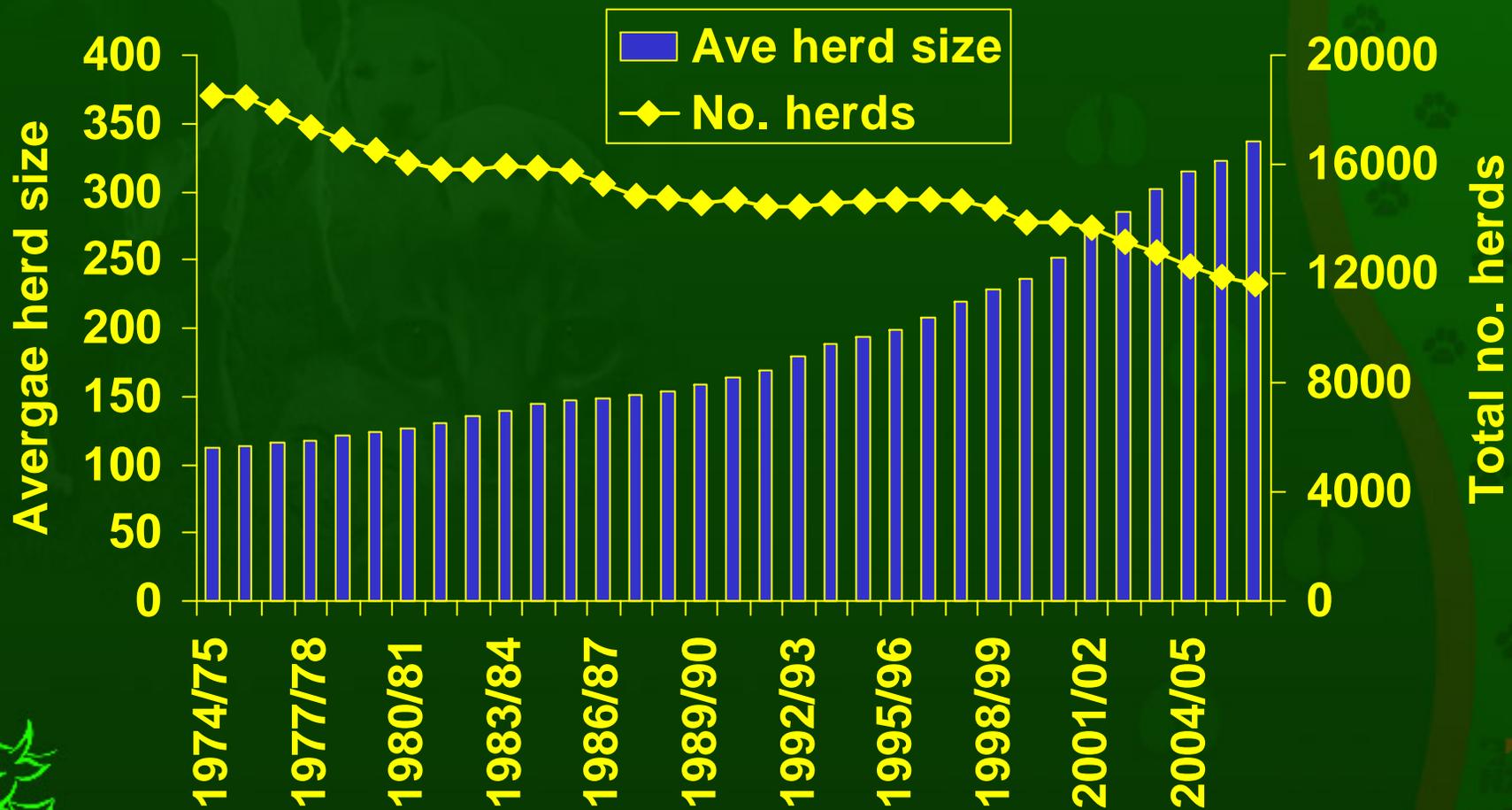- ☐ Other

Milk production by age and breed

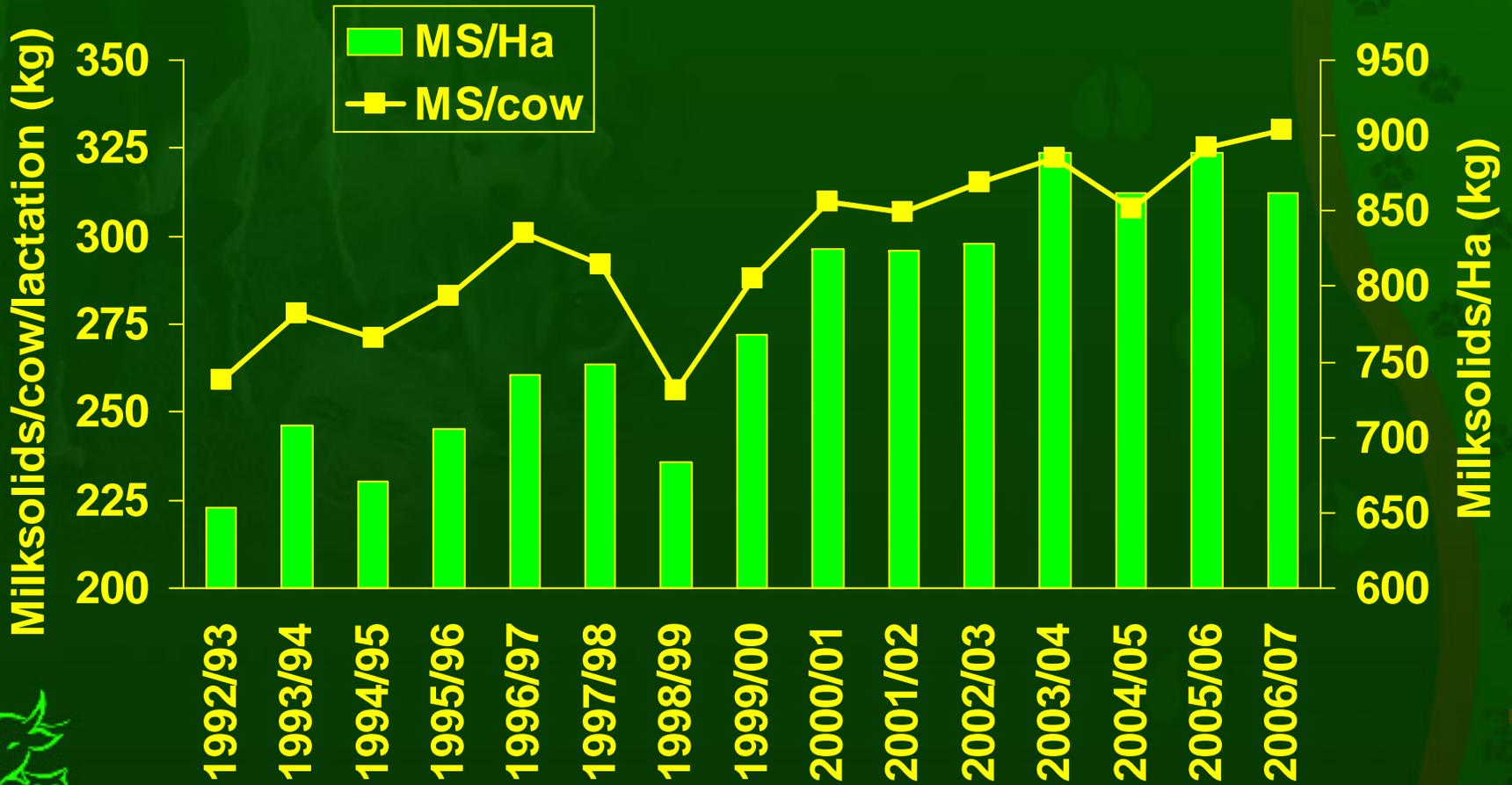The pasture growth rate and energy requirements for dairy cows
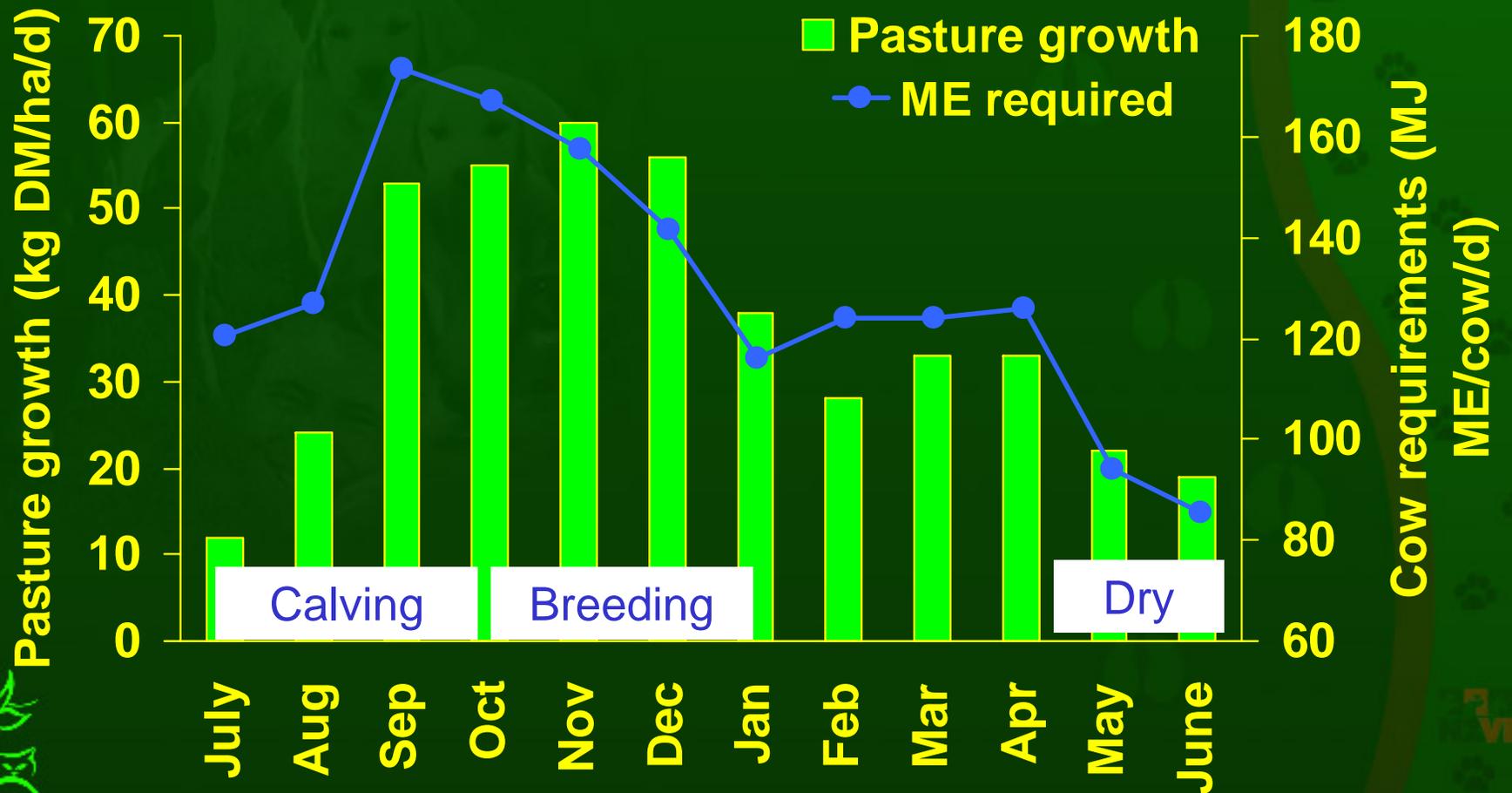
Changes in the dairy industry

- ↑ herd size
- ↑ /cow & /Ha production
- ↑ feed inputs
- ↑ % Holstein-Friesian genetics
- ↓ profitability and ↑ feed & land prices
- ↓ Staff availability and skills
- Changes in regulatory/consumer environment

Dairy statistics 2006/07 lic.co.nz/publications

Dairy statistics 2006/07 lic.co.nz/publications

Current reproductive performance of NZ herds?

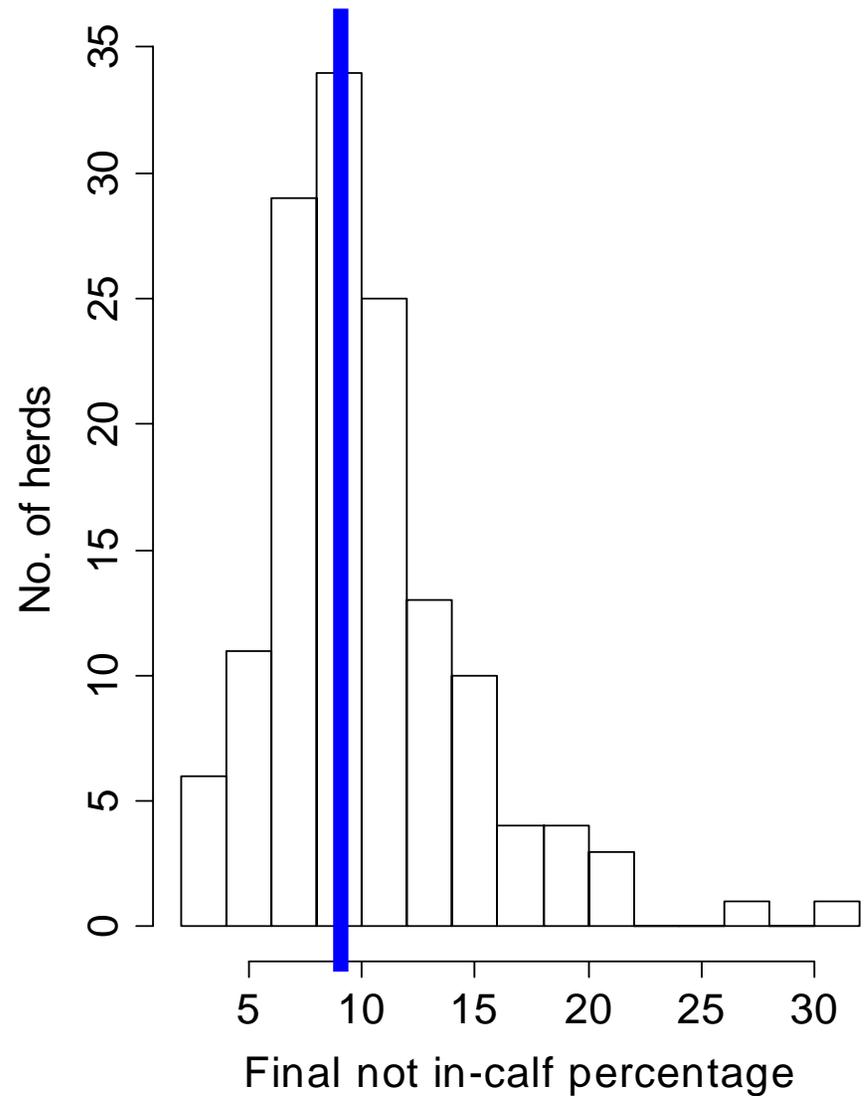|	
Cows NDO pre PSM (%)	20
Conception rate to 1st service (%)	53
3-week submission rate (%)	81
8-week in-calf rate (%)	80
Empty rate (%)	11

Based on data from Xu and Burton 2003 and McDougall and Compton 2005

Herd reproductive performance

(n = 141 herds; 2003/04)

Compton and McDougall 2005
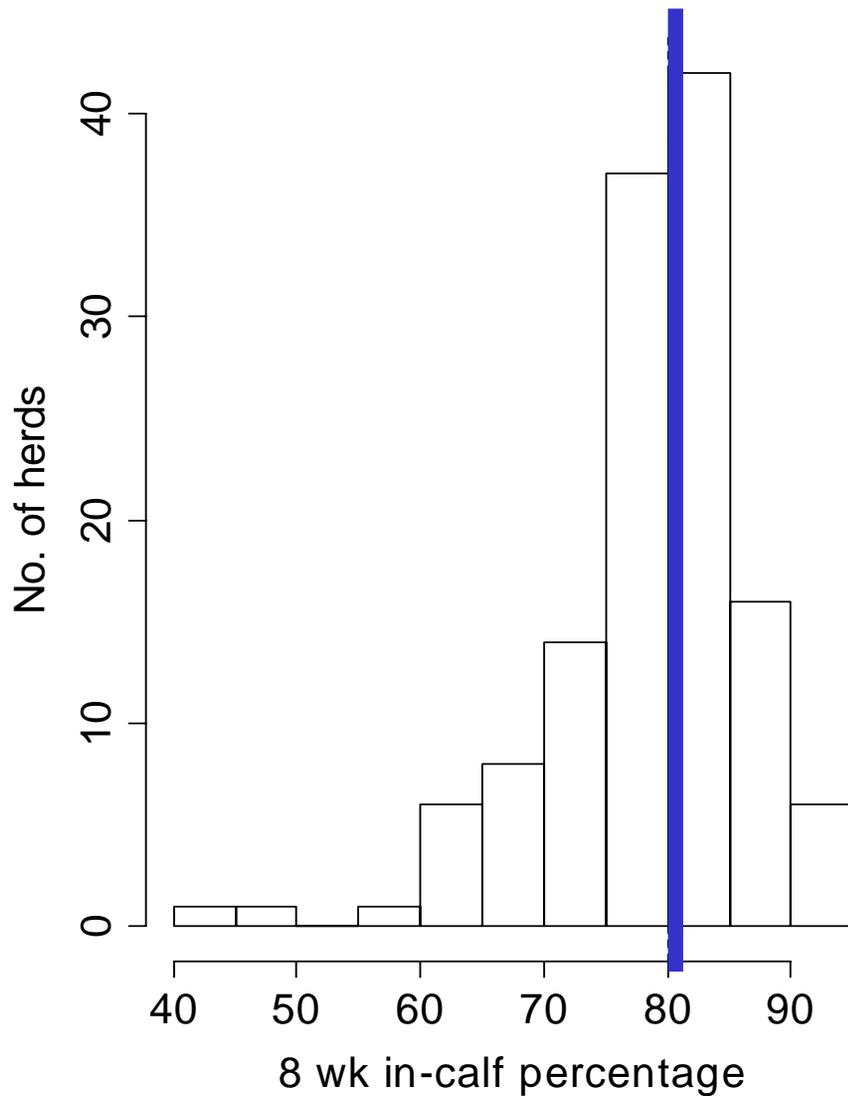
How important farmers believe fertility is to their business
(n = 200 herdowners; Fowler and Tiddy, 2006)

14
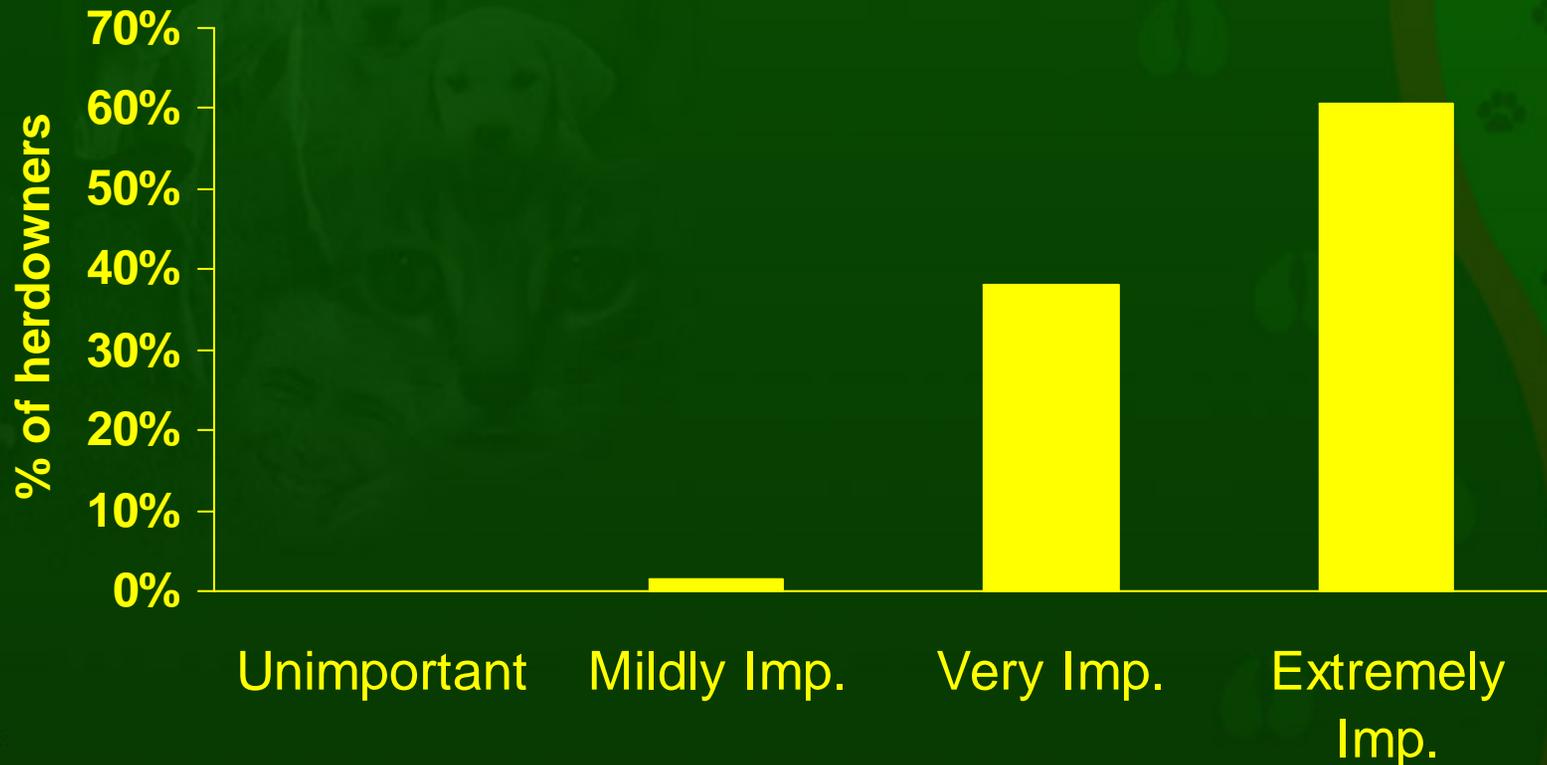
Degree of satisfaction with current herd fertility (n = 199 herdowners; Fowler and Tiddy, 2006)

Reproductive performance of NZ cows

Insem. in 3 wks — Calved in 6 wks — Milk solids/cow
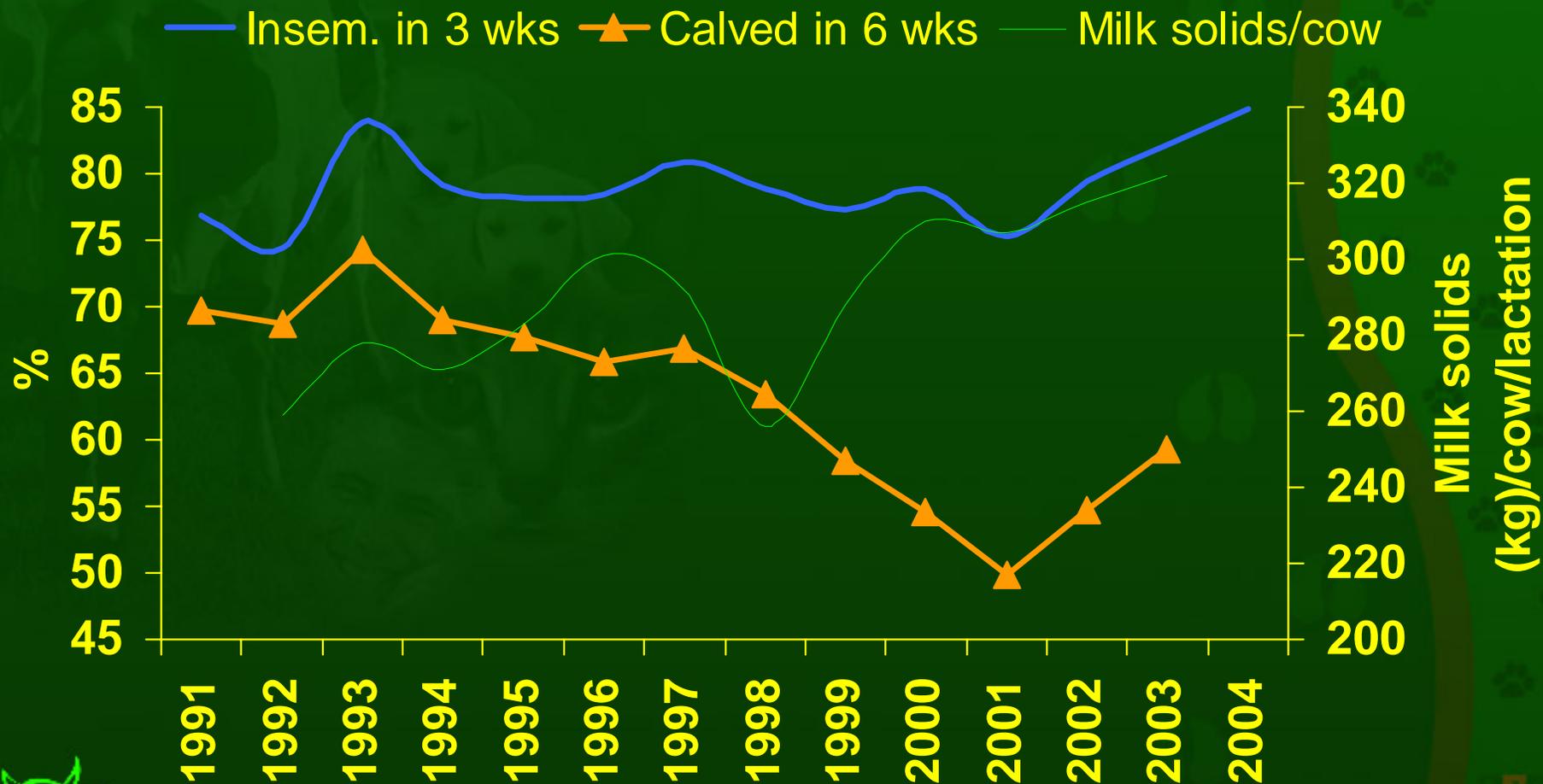
Harris 2005; www.lic.co.nz

Note denominator for 'calved by 6 weeks' = total cows present at start of **previous** breeding season (less non-reproductive deaths/culls; excludes heifers)

Herd Fertility

❖ Is like a cake

❖ Herd Management areas

- 7 ingredients

| Calving Pattern | Heifer Mgt. | Body condition and nutrition | Heat Detection | Genetics & AB Practices | Bull Mgt. | Cow Health |
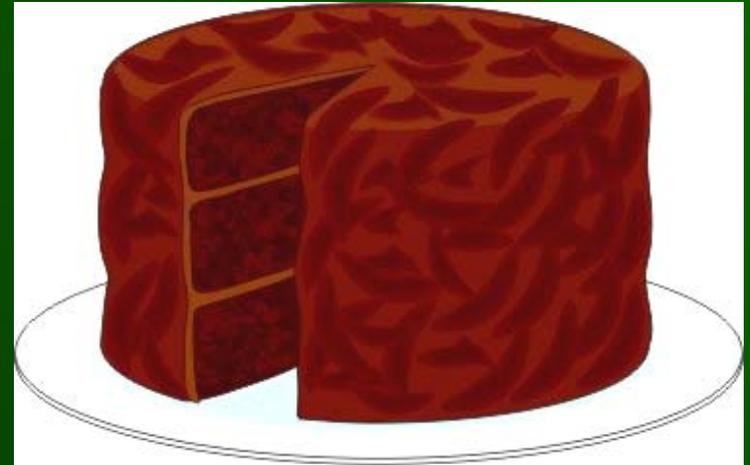
Factors affecting reproductive performance?

Cow level

- Calving date
- Age
- Breed
- Peripartum + other disease
- BCS and BCS change
- Non-cycling
- Milk yield & protein %

Genetics

- Bull selection
- Production interaction with reproduction
- Genetics x environment?

Herd level/managerial

- Seasonal vs. split calving
- Once a day milking
- Nutrition
  - Milk protein %
  - Heifers
- Oestrus detection systems
- Breeding management
  - Timing of AI
  - AI technique
  - Semen handling
  - Use of hormones
- Cow group management
- Herd size
- Farm business structure
- Farmer age & education
- No. labour units on farm
- "Skill"

8 week in calf rate

McDougall and Compton NZVJ 2006
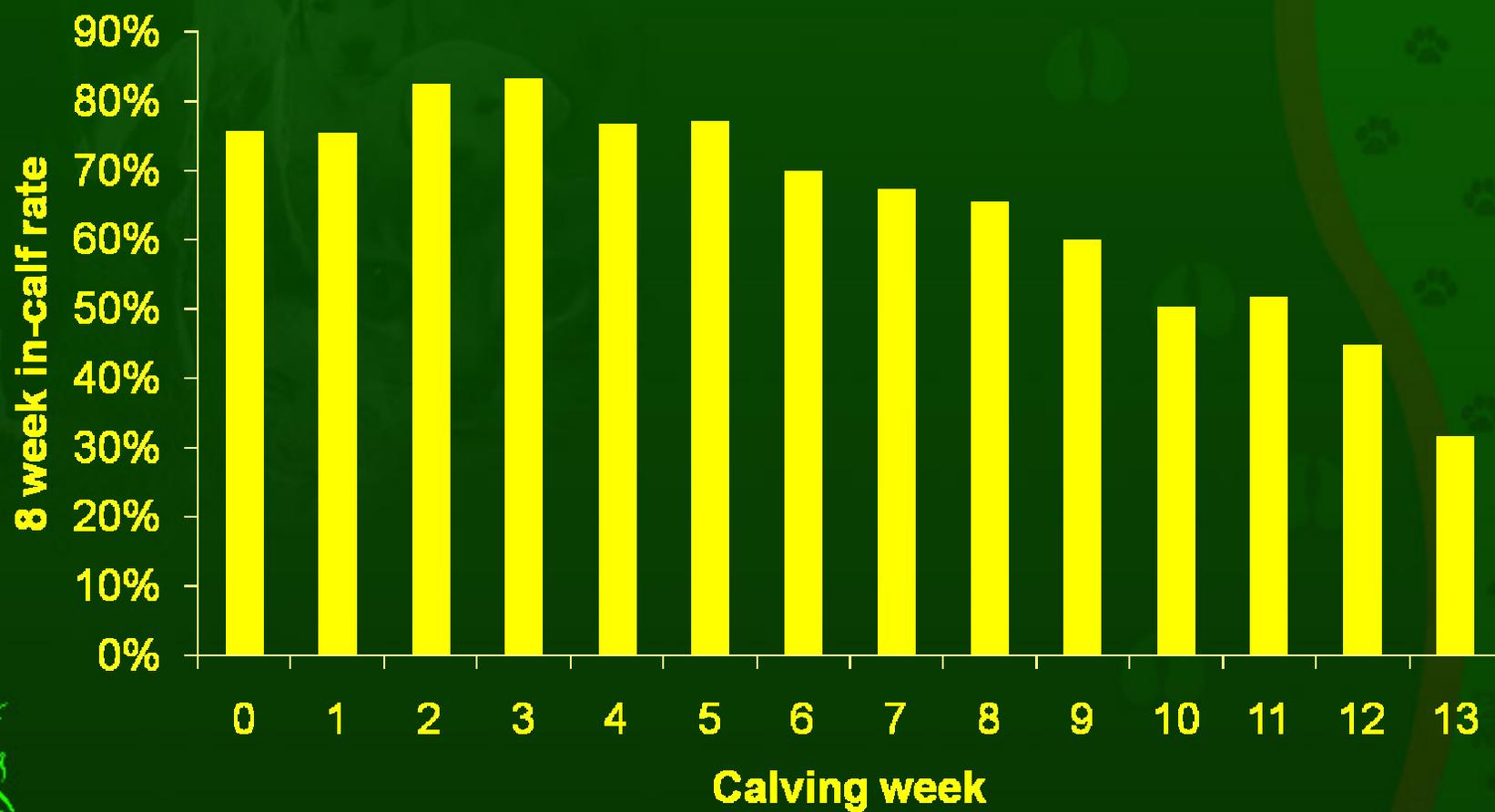
8 week in calf rate by BCS at start of breeding

Compton and McDougall 2006
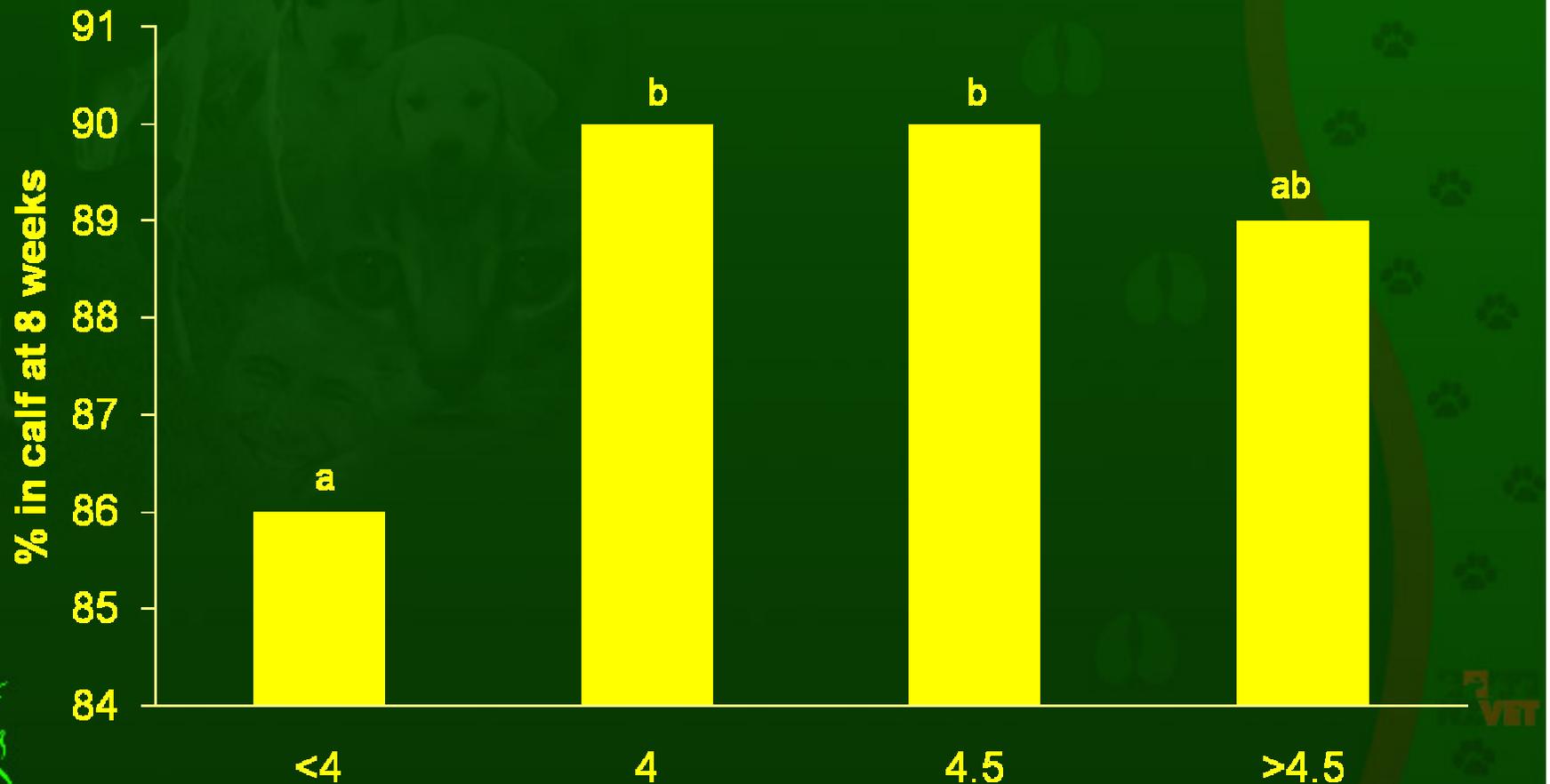
BCS of 2523 cows from 6 herds

Compton and McDougall 2006

Macdonald and Montgomery 2005 Dexcel field day:
http://www.dexcel.co.nz/data/usr/fd%5F2005%5F3%2D8%2Epdf
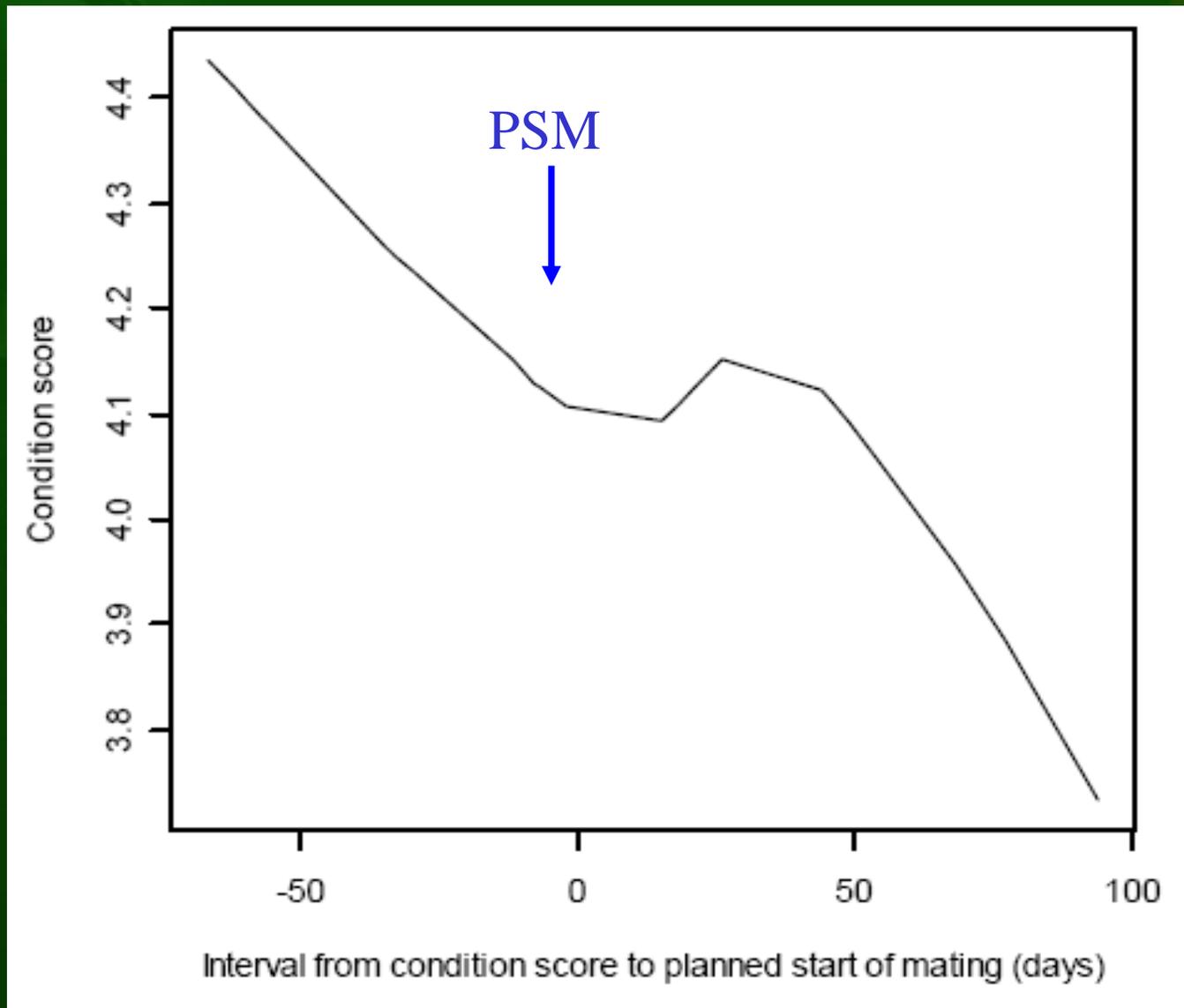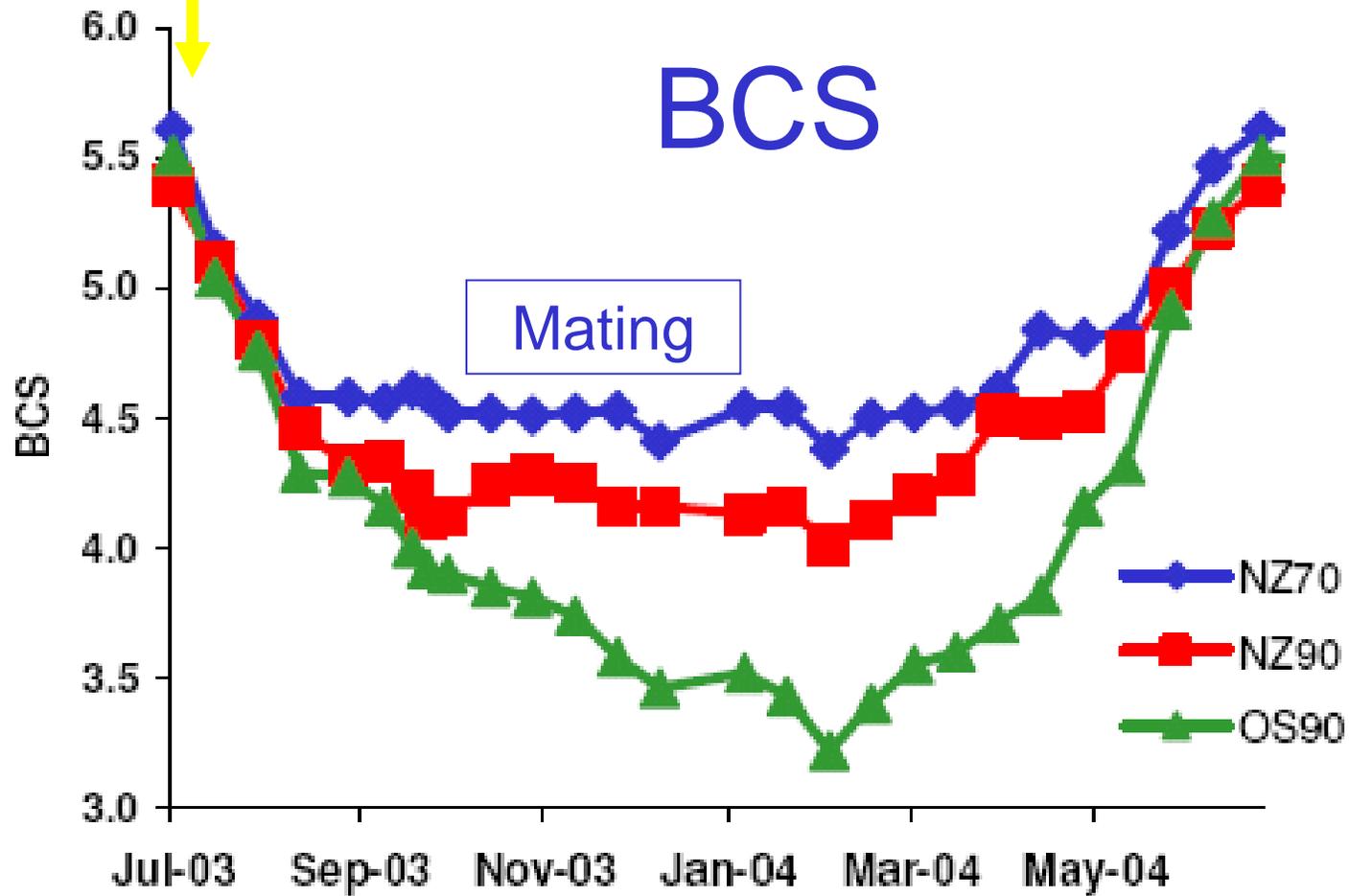
Genes vs. management?

- Complex
- Heritability of reproduction only 5%?
  - (18% for calving to first ovulation)
  - Long term solution
  - Slow change via changes in Fertility BW
  - Cross breeding
- Thus 95% management?
  - 'permanent' environment effects?
- Need to work with genetics available

Dexcel strain trial

	NZ70	NZ90	OS90	P
Calving date	29-Jul	27-Jul	6-Aug	*
CIDR (%)	11	8	3	n.s.
PSC-ovn 1	32.2	38.7	28.4	**
% heat detection	89	91	87	n.s.
Con S1 (%)	45	46	39	n.s
Con S2 (%)	54	48	44	n.s
6-wk in-calf	70	69	54	***
8-wk in-calf	80	75	62	***
PSM-con	28.4	29.3	33.6	n.s.
Final preg (%)	0.93	0.93	0.87	*
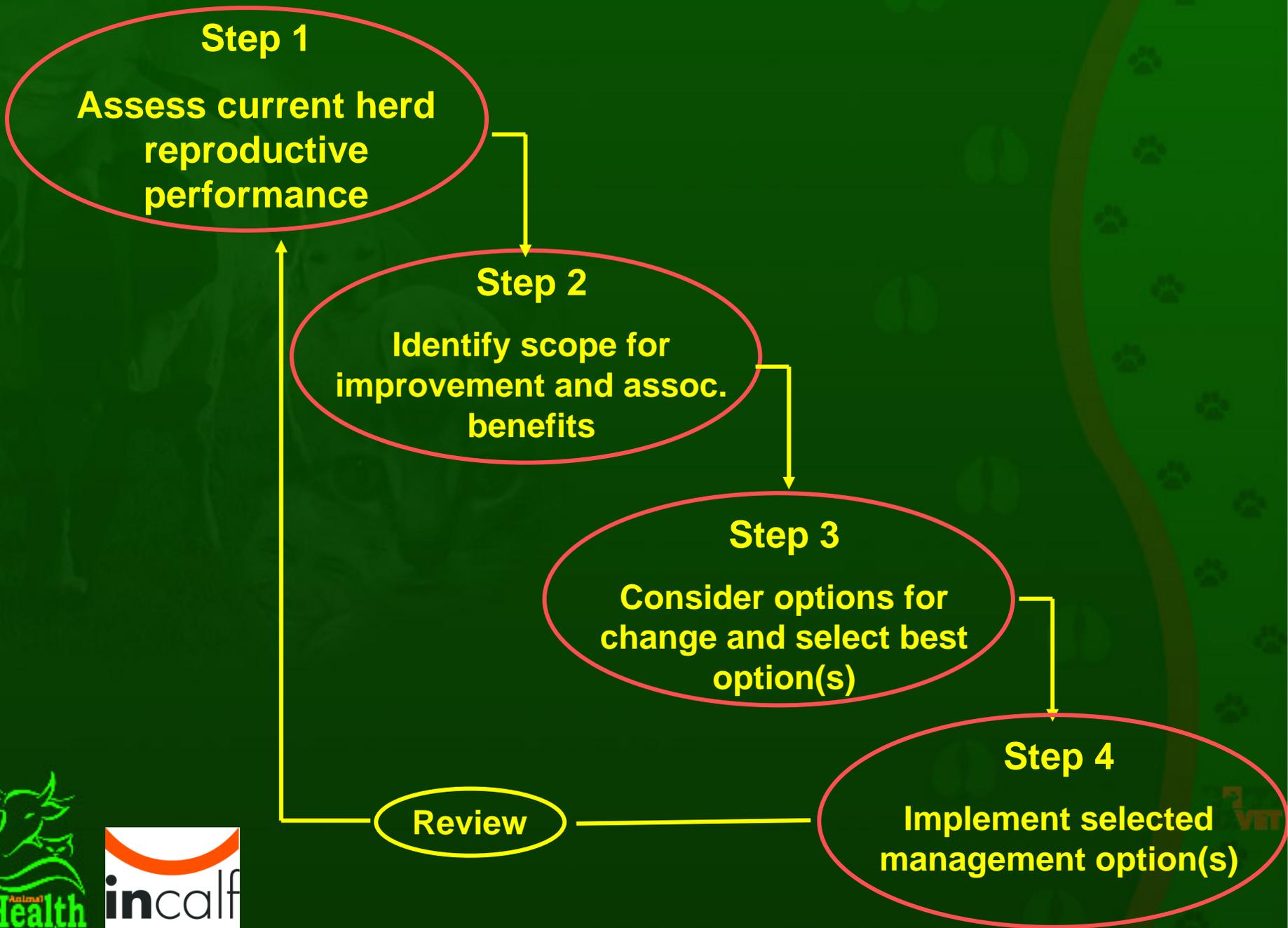
When to assess herd performance?

- Midpoint of calving
- Induction time
- Before start of mating (non-cycler's)
- 3-weeks into mating (submission rates)
- 6-8 weeks into breeding (Non-return rates
- Pregnancy testing

How to assess performance?

- Calculate key performance indicators:
- Electronic databases
  - Mindapro reports (http://www.lic.co.nz)
  - Fertility focus reports (In-calf)
  - 'Herd plus' (http://www.icbf.com/)
- Manual calculations
  - # inductions/total # cows *100 (%)
  - # non-cyclers/total # cows *100 (%)
  - # empties (incl. culls!)/total # cows *100 (%)

Fertility Focus 01/02: Seasonal

SAMPLE

incalf
FERTILITY FOCUS
Version 1.2

Report date:	02/02/04
Herd ID:	11
No of cows included:	238
For cows calved between:	01/07/01 and 06/01/02
Mating start & stop dates: (estimated from AI or rectal pregnancy test data)	08/11/01 – 02/02/02
Planned start of calving:	18/08/02

(1) % herd in calf by

	3 wks	6 wks	9 wks	12 wks
Top result				
Average				
Below average				

6-week in-calf rate
Percentage of cows pregnant in the first 6 weeks of mating

Your herd	77% (77-78%)	☆☆☆☆☆
Aim above	71%	

Not-in-calf rate
Percentage of cows not pregnant after 13 weeks of mating

Your herd	8% (8-9%)	☆☆☆☆☆
Aim below	13%	

(2) The drivers of 6-week in-calf rate

3-week submission rate
% of cows that were inseminated in the first 3 weeks of mating

Your herd	75%	☆☆☆
Aim above	86%	

Non-return rate
% of inseminations that were not followed by a return to heat

Your herd		
Aim above		

Conception rate
% of inseminations that resulted in a confirmed pregnancy

Your herd	59%	☆☆☆☆☆
Aim above	53%	

(3) Key indicators to areas for improvement

Calf and heifer management

Calving pattern of first calvers
Well managed heifers get in calf quickly and calve early.

Calved by	Week 3	Week 6
Your herd	72%	88%
Aim above	73%	92%
	☆☆☆☆☆	☆☆☆

First calver milk production compared with mature cows
Average litres per day

	1st calf	Mature	Ratio
Your herd	19.5	22.9	85%
Aim above			83%
			☆☆☆☆☆

Calving pattern of whole herd
Did late calvers reduce in-calf rates?

Calved by	Week 3	Week 6	Week 9
Your herd	61%	88%	92%
Aim above	61%	94%	100%
	☆☆☆☆☆	☆☆☆☆☆	☆

Heat detection
A high % of early calved mature cows should be inseminated in the first 3 weeks of mating.

Your herd	85%	☆☆☆
Aim above	92%	

AI practice
Variations in conception rates achieved by technicians indicate the need to review AI practice.

	Tech.	2880	3001
	No. of insems	133	100
	Conc. rate	56%	Similar

Performance after week 6
If you use bulls after week 6 of mating, not-in-calf rate helps assess bull performance.

Not-in-calf rate

Your herd	8%	OK
Expected	10%	

Rating	What does it tell me?	What should I do?
☆☆☆☆☆	Top result	Ideal - keep up the good work!
☆☆☆	Average	Getting there - focus on getting the details right.
☆	Below average	Plenty of room to improve - seek professional advice.
	No result	Not enough information provided. Calving and insemination dates, and results from early rectal pregnancy testing may be required.

Induced cows

	% induced	0%	
Calved by	Week 3	Week 6	Week 9
Your herd	0%	0%	0%

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2. Herd Performance (continued)

The performance of your herd has been expressed relative to other recorded herds (with a minimum of 30 calvings)

			Btm 15%	Achievable	Top 15%

c. 21-day submission rate
% of cows submitted for mating within 21 days of MSD, as a proportion of the herd calved up to 21 days after MSD

		Btm 15%		Top 15%
Your Herd	69%	19%		65%
National Average	44%			

d. 42-day submission rate
% of cows submitted for mating within 42 days of MSD, as a proportion of the herd calved up to 42 days after MSD

		35%		80%
Your Herd	79%			
National Average	65%			

e. 1st service conception rate
% of cows pregnant to 1st service as a proportion of all cows calved and submitted

		39%		61%
Your Herd	37%			
National Average	50%			

f. 2nd service conception rate
% of cows pregnant to 2nd service as a proportion of all cows calved and submitted

		37%		70%
Your Herd	14%			
National Average	60%			

g. 6-week pregnancy rate
% of cows pregnant within 6 weeks of MSD (as a proportion of all cows calved and submitted)

		%		%
Your Herd	56%			
National Average	%			

h. Overall pregnancy rate (to-date)
% of cows pregnant (as a proportion of all cows calved and submitted)

		70%		92%
Your Herd	65%			
National Average	83%			

i. Services/conception
Average number of services per confirmed pregnancy

		2.6		1.7
Your Herd	3.2			
National Average	2.2			

j. % Short repeat intervals
% of repeat intervals < 18 days

		5%		10%
Your Herd	0%			
National Average	8%			

k. % Normal repeat intervals
% of repeat intervals between 18 and 24 days

		15%		7%
Your Herd	1%			
National Average	6%			

Targets/Goals?

	Actual*	NZ herd goals‡	Top 25%	Ireland
Late calvers (%)	5		0 [†]	
Non cyclers (%)	20	5	<10	<10
Days to half cows calved	19	13	<18	
Con rate to 1st service (%)	53	71	>55	>60
3-week sub rate (%)	81	91	>90	>90
6-week in-calf rate (%)	68	84	>75	>71
8-week in-calf rate (%)	80	91	>85	
Total length of mating (d)	?	63	85	
Empty rate (%)	11	7	<7	<8

*Based on data from Xu and Burton 2003 and McDougall and Compton 2005
‡ Based on the needs analysis of 200 herdowners conduced by ROMP in Feb 2006
† Based on performance of top 25% of herds that undertook whole herd pregnancy testing with the AHC in 2004/05

Health centre

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What to do if the targets are not being achieved?

- Each herd is different:
- There is NOT a 1-size-fits-all solution
  - Herd specific goals
  - Need to analyse each herd's data separately
  - Develop a plan
- Fertility is multi-factorial: there is not a 'silver bullet'

Possible tools

- Calving pattern management
  - Breed heifers to calve earlier than cows
  - Shortened breeding periods
  - Split calving
  - Focused culling
  - Inductions

- Heifer rearing
  - Contract rearing
& weight gain contracts

Nutritional management

- BCS management
  - Drying off decision making
- Supplementary feeds
  - Maize, palm kernal, tapioca
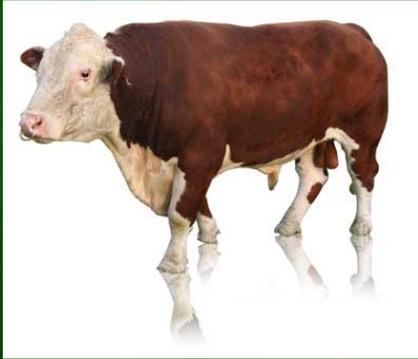- Transition cow systems

- # Genetics
  - – Cross-breeding
  - – Selection of sires on Fertility EBV
  - – 'Short' gestation bulls
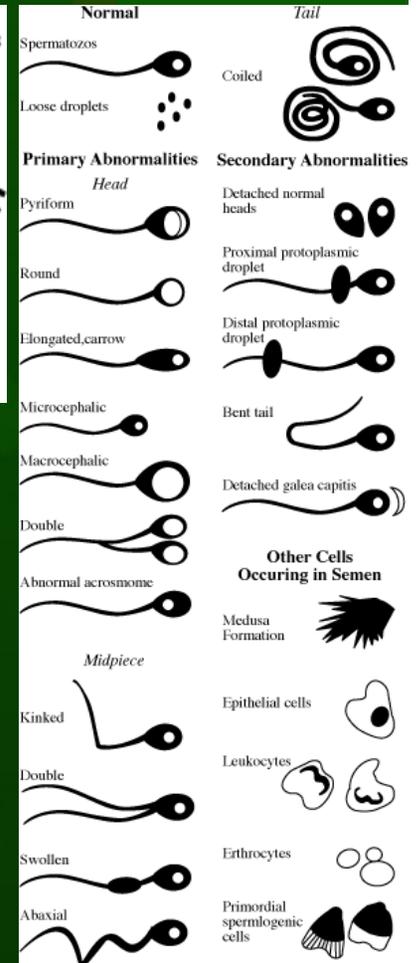 - – 'Easy calving' bulls
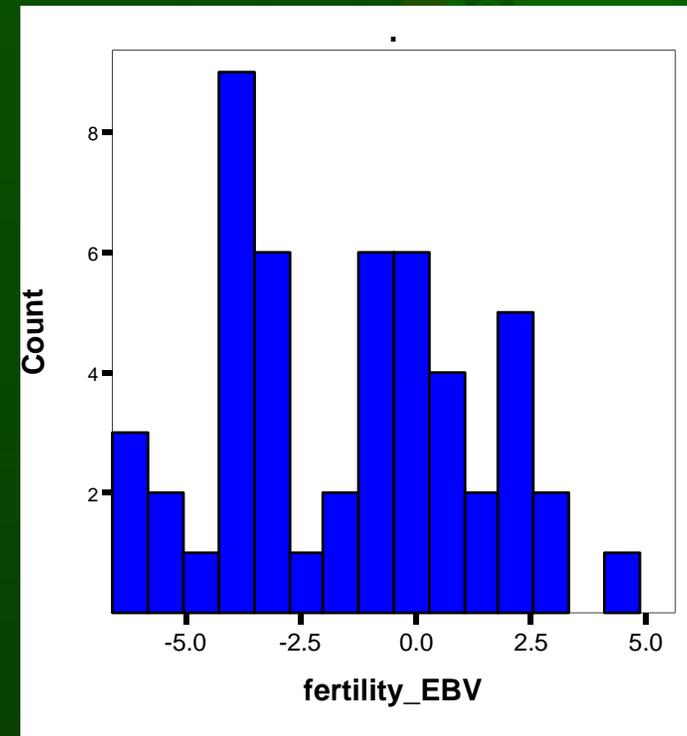
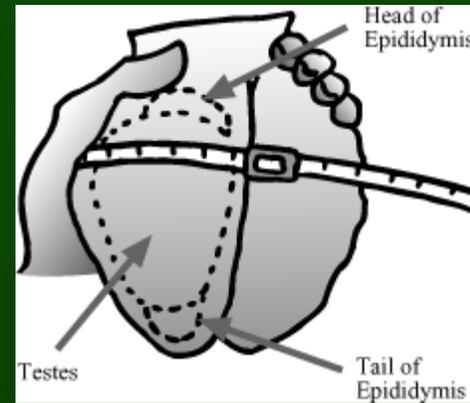

- # Heat detection systems
  - – 1 key individual in charge of detection
  - – Staff training
  - – Use of detection aids: tail paint, KAMARS
  - – Increased frequency of observation
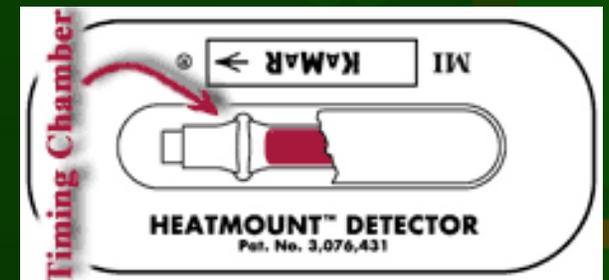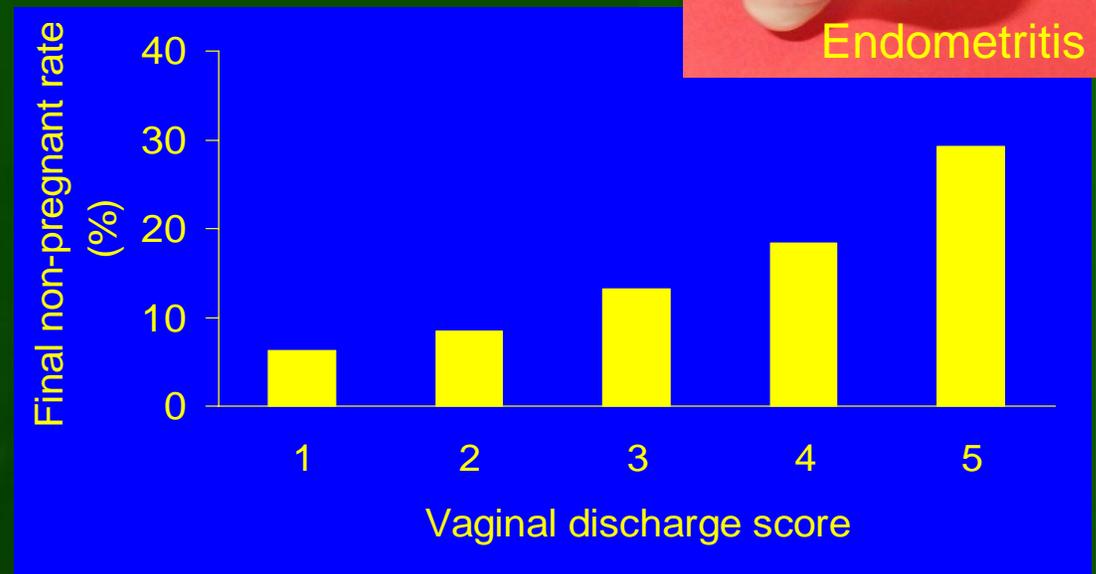
Bull management

- Nutrition & BCS
- Disease
  - EBL, BVD, TB
- Fertility testing
- Rotation policies
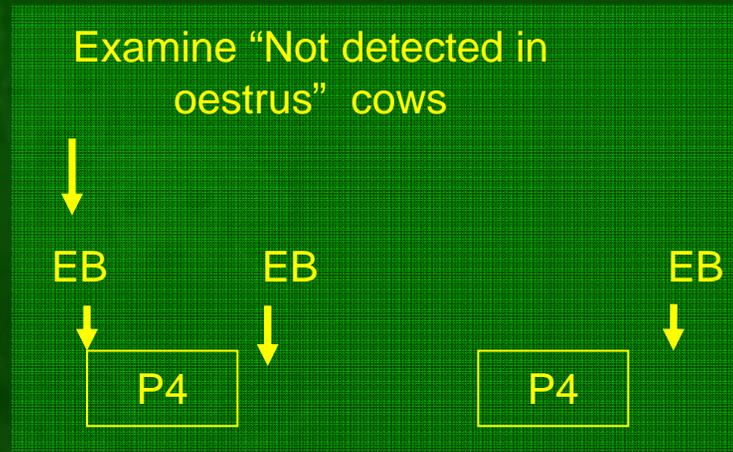- Lameness & injury management

Cow Health

Endometritis

- – Periparturient disease diagnosis and treatment
- – Non-cycler treatments
- – Early pregnancy testing and treatment
- – BVD/neospora vaccination

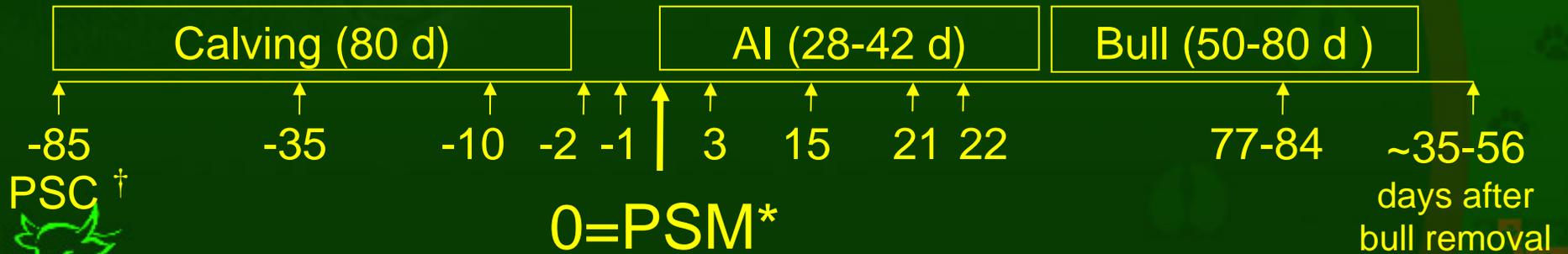|	Cont	P4+ODB	P
28 days submission rate (%)	70	93	*
% pregnant wk 4	35	55	*
Start breeding-conception (d)	40	25	*

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NZ breeding programme

•BCS, nutrition & trace elements
•Tailpaint all cows
•Examine cows with peripartum disease
•'Pick-up' bulls checked

•BCS
•Review performance
•Modify as required

Examine "Not detected in oestrus" cows

EB   EB   EB

P4   P4

Pregnancy diagnosis
(manual or US)

Calving (80 d)	AI (28-42 d)	Bull (50-80 d)

-85   -35   -10   -2 -1   3   15   21 22   77-84   ~35-56

PSC †

0=PSM*

days after bull removal

† Planned start of calving
* Planned start of mating
P4 = progesterone, EB = Estradiol benzoate

Animal Health centre

Conclusions

- Fertility is declining
  - Multiple reasons for this
  - Unlikely to be a 'silver' bullet
- Improving herd fertility requires
  - A thorough assessment of the herd
  - Combined input of veterinarian, nutritionist, AB companies etc.

- BUT top fertility can be achieved by good management