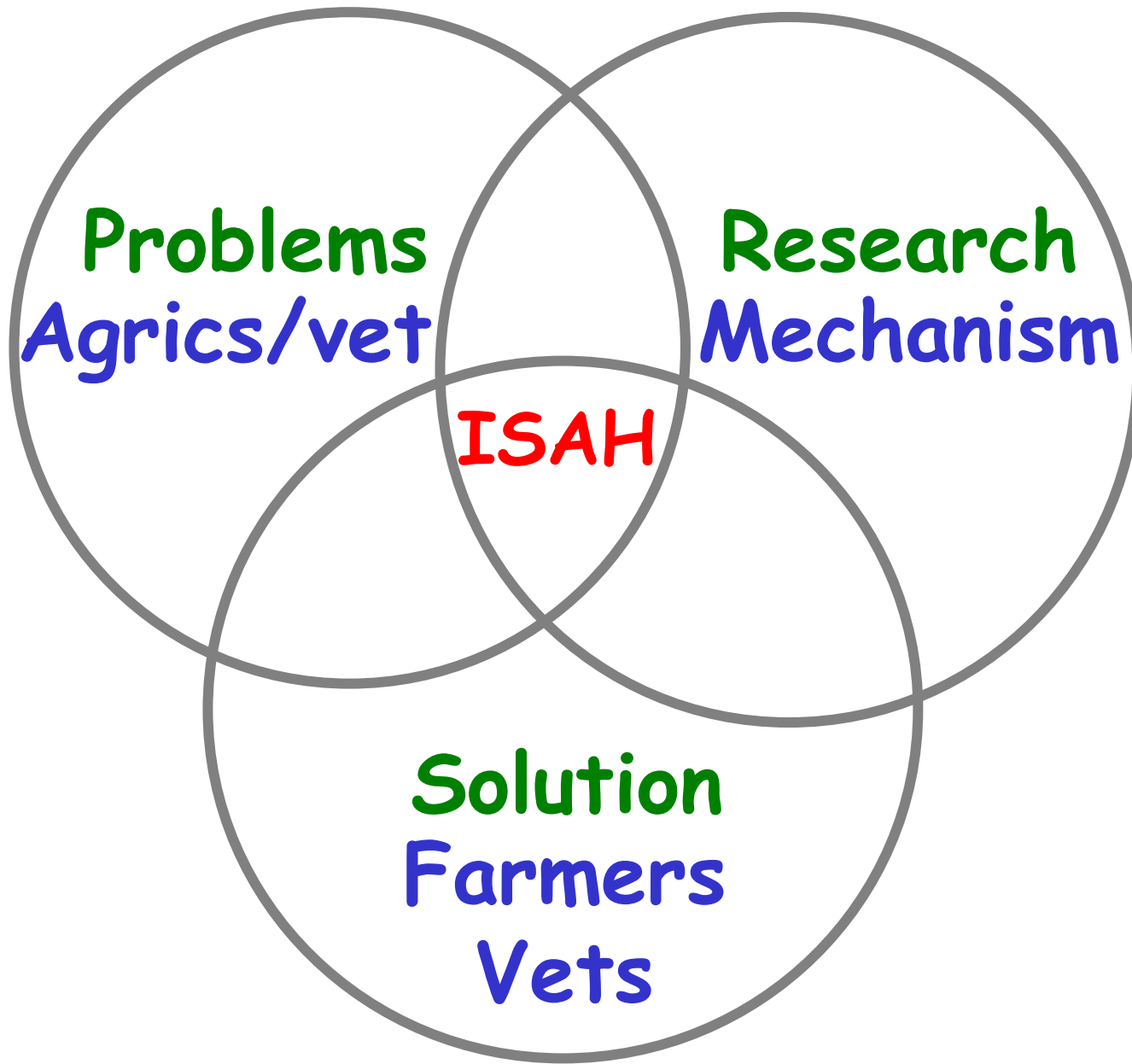


Environmental stress
affects reproduction
in sheep and cows

Hilary Dobson



ISAH Tartu 2007



Problems
Agrics/vet

Research
Mechanism

ISAH

Solution
Farmers
Vets

Problems - environmental

Genetics

Feeding

Housing

Production-related diseases

Research - mechanisms

Solutions

Problems - environmental

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Solutions

Sheep - breed to increase lambs/ewe

But...(for example) in Cambridge ewes

++	2-3 ovulations	2-3 lambs
F+	4-5 ovulations	4-5 lambs
FF	9-13 ovulations	1-2 lambs

But...(for example) in Inverdale ewes

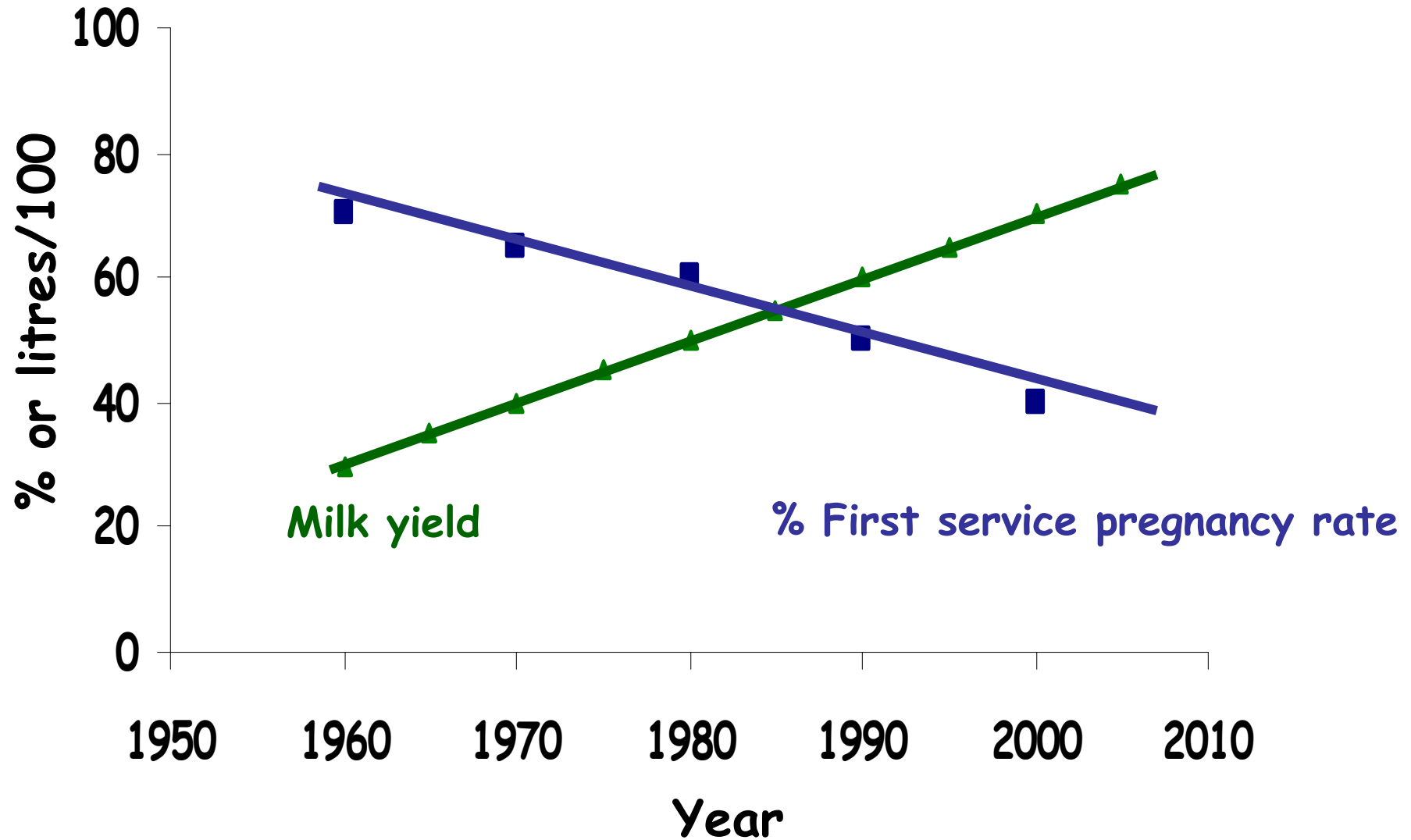
FF=increased incidence of tract aplasia

Dairy cows - bred to increase milk

but...

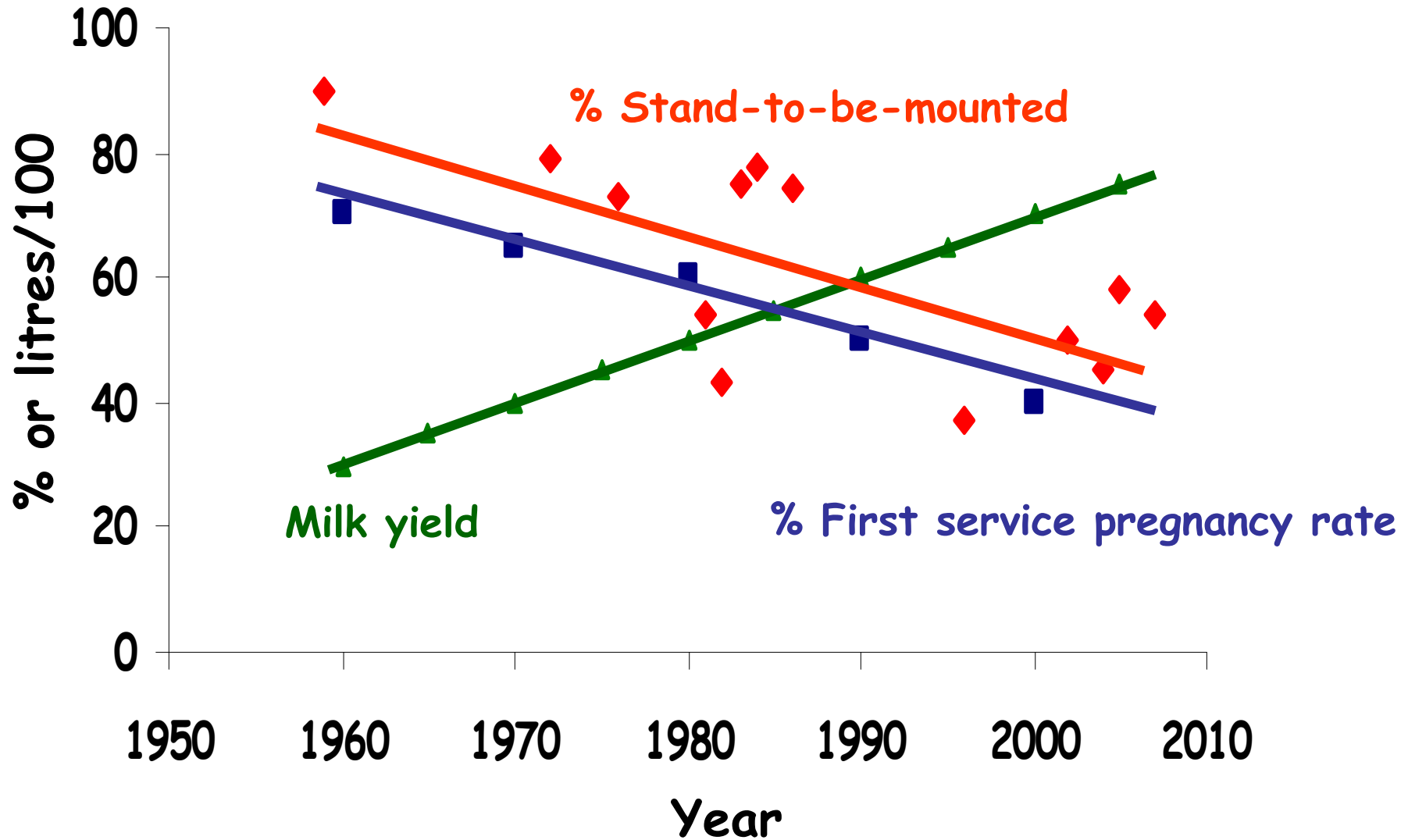
- fertility has decreased with yield

Changes with time



Changes with time

- % cows 'standing' also declining

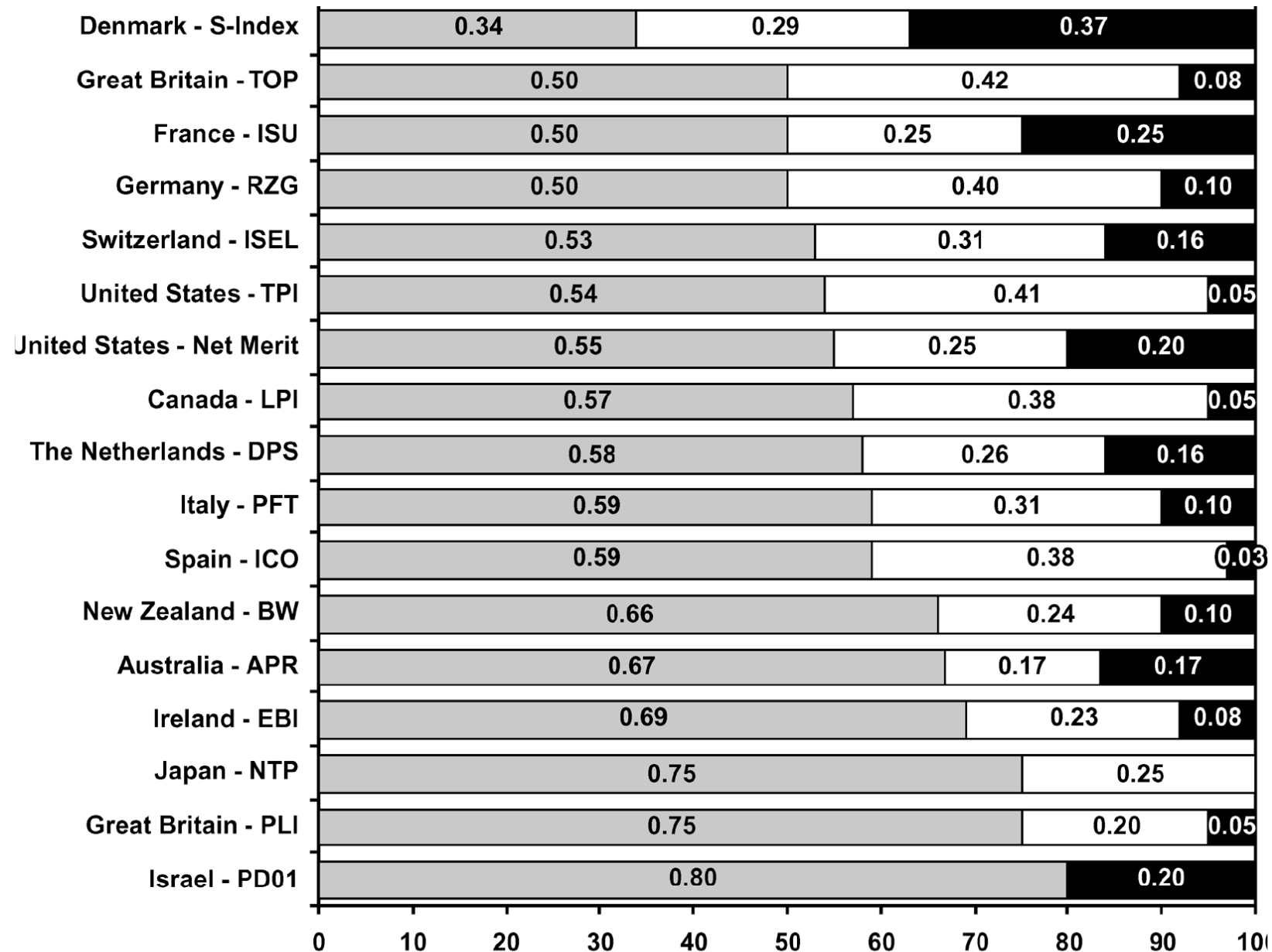


Cows - bred to increase milk

but...

- fertility has decreased with yield
- traits for durability/longevity?

Relative emphasis (%) on production (grey), durability (white), and health+reproduction (black) in selection indices (Miglior et al, 2005).



'Durability' = digestive system
= legs/feet
= udder

Inability to feed and house
high-yielding cows
(ie animal husbandry fails to keep pace)
→ failure to meet genetic potential
for yield, health and fertility

Problems - environmental

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Solutions

Sheep- ↑ fertility with

- 'flushing'
- lupins to ↑ ovulation rate

but also ↓ (lack of food)!

Cows

Dairy - energy deficiency postpartum
= loss of BCS + low fertility

increase BCS → ↑ fertility

Beef - weaning in beef cows
→ ↑ fertility

Problems - environmental

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Solutions

Cows - decrease in fertility with

- cubicles - lameness; straw - mastitis
- slippery floors reduce oestrus display
- hot ($>30^{\circ}\text{C}$) or cold ($<5^{\circ}\text{C}$) extremes
- lighting

Problems - environmental

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Solutions

Sheep

Abattoir study

>15% anatomical abnormalities

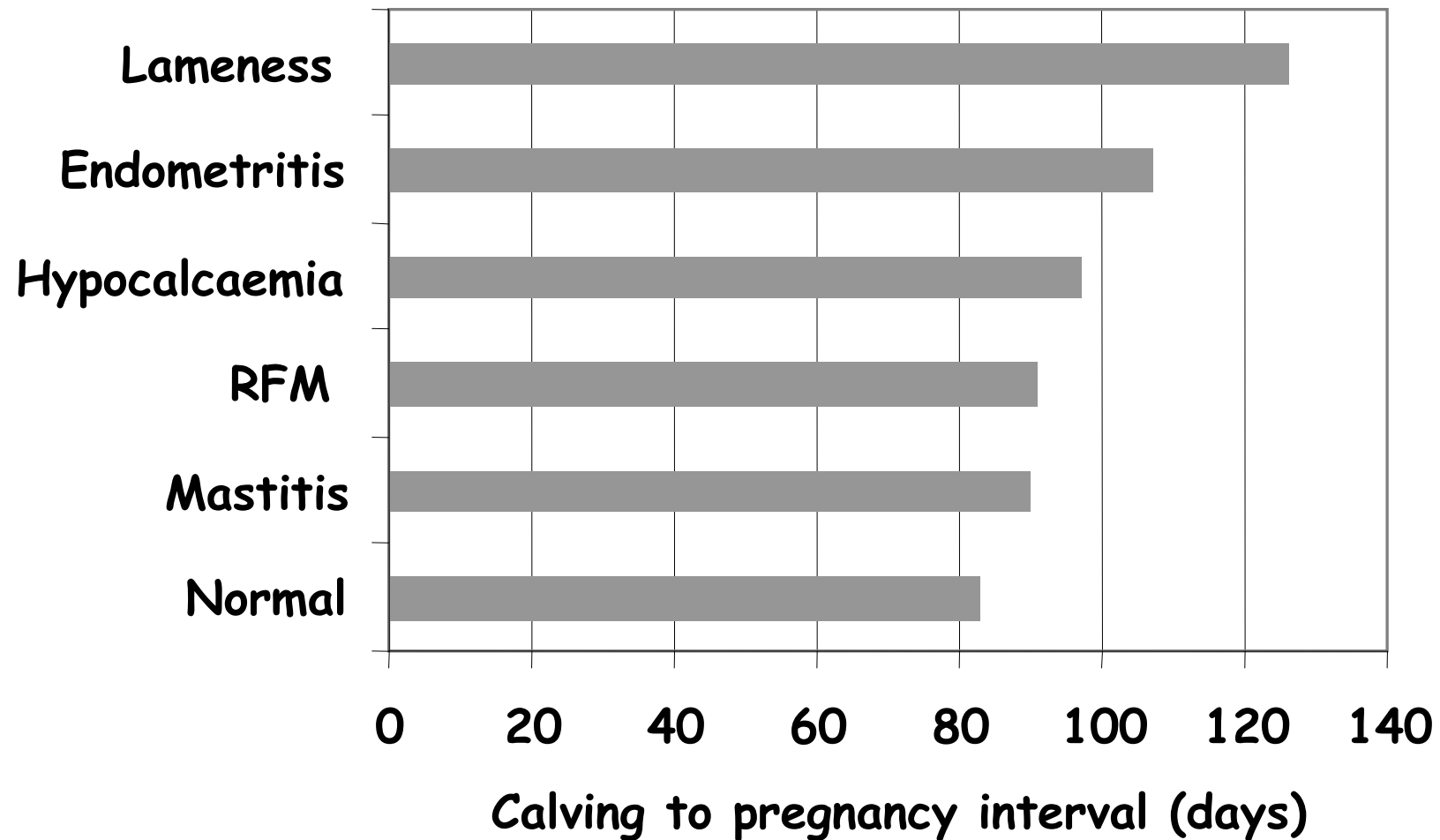
uterine adhesions

blocked oviduct(s)

mucometra

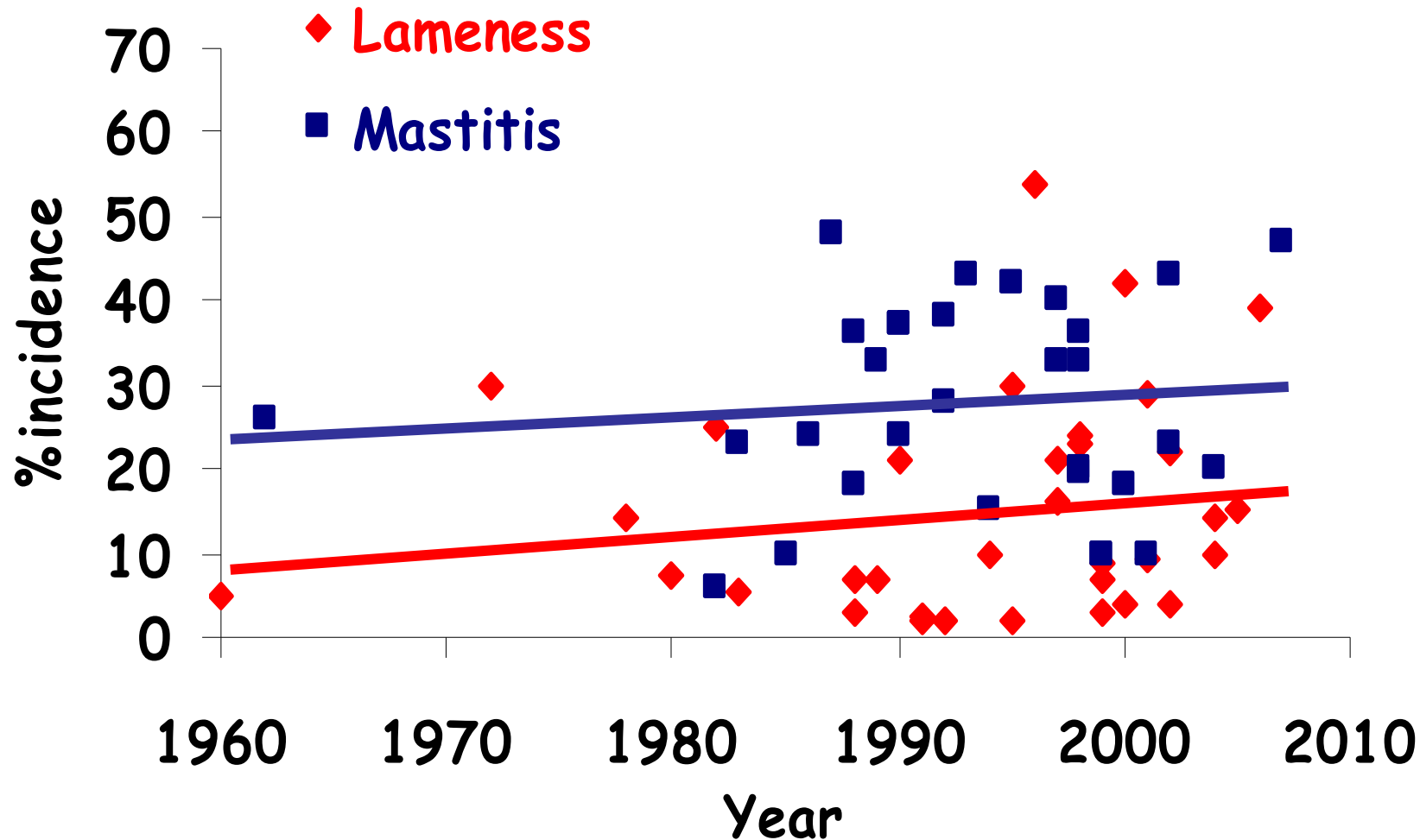
Cows

- clinical diseases decrease fertility



Borsberry & Dobson 1989; Collick et al, 1989)

Incidence of lameness and mastitis



Lameness incidence $15.2 \pm 2.2\%$ -UK loss £160M(256M€)pa

Mastitis incidence $27.4 \pm 2.2\%$ -UK loss £100M(160M€)pa

Problems - environmental

Genetics

Feeding

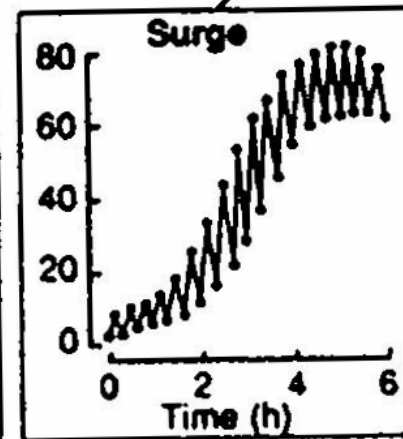
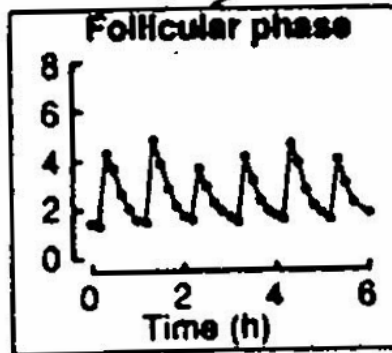
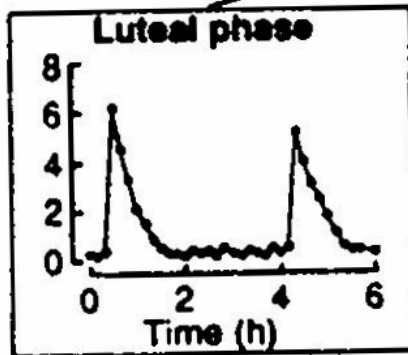
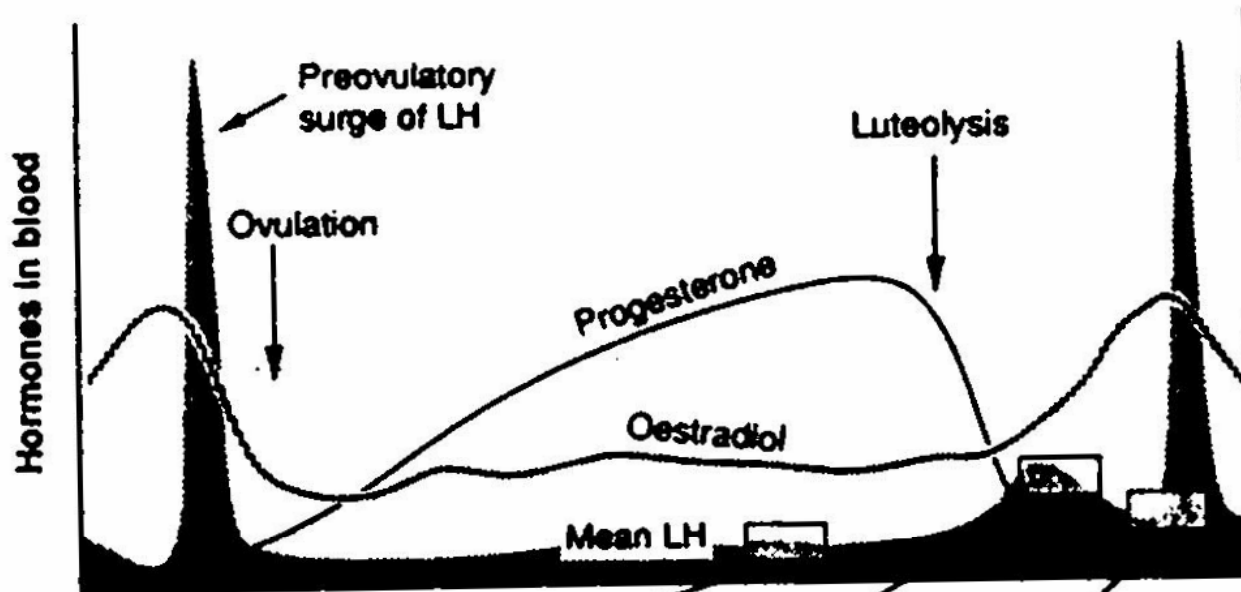
Housing

Production-related diseases

Research - mechanisms

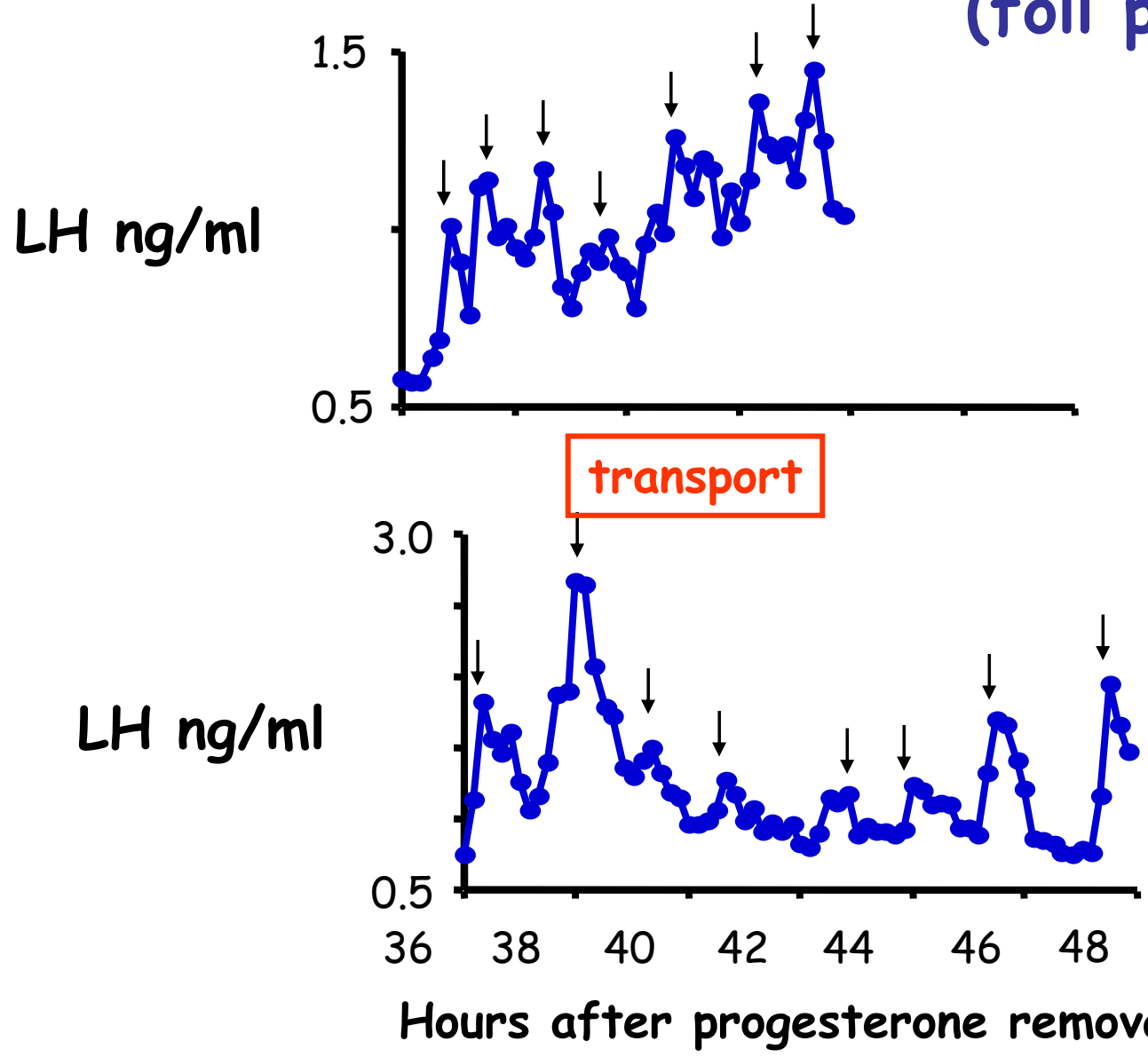
Solutions

Hormones of the oestrous cycle

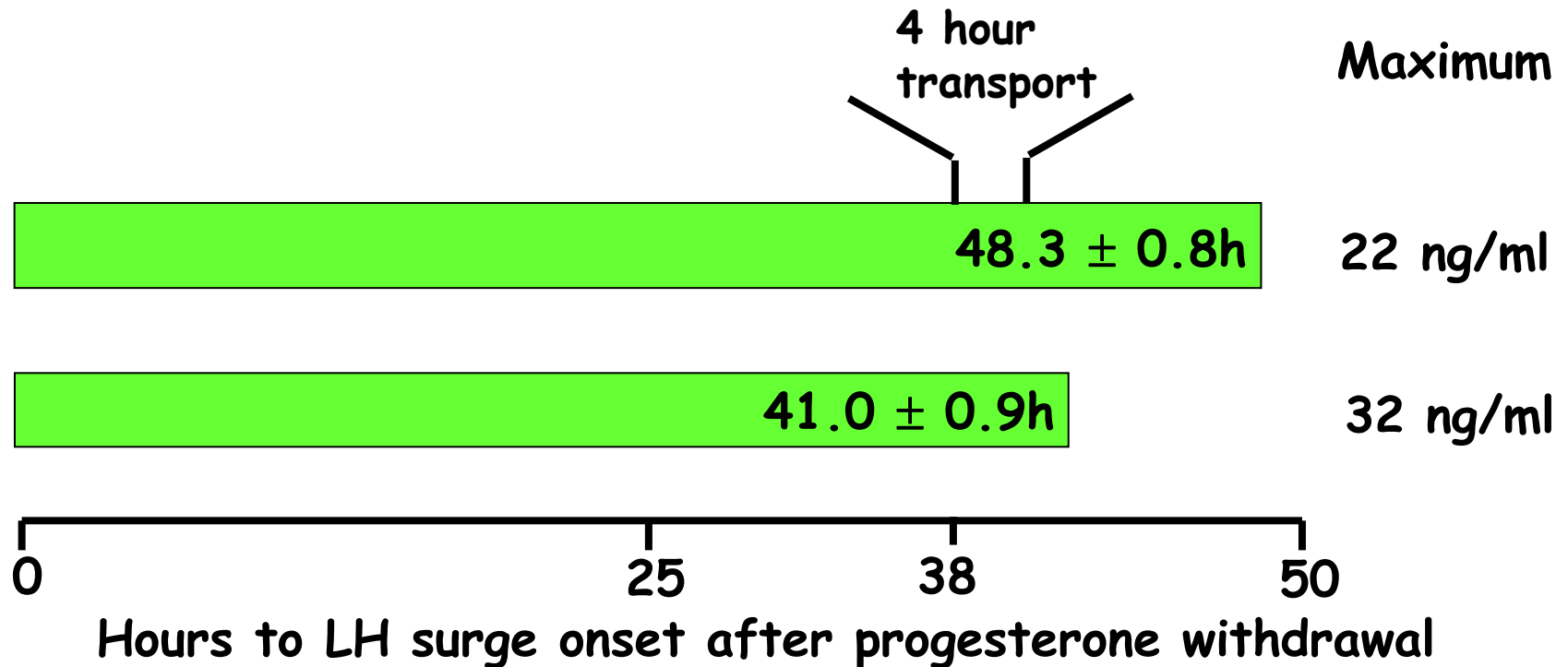


How are hormone profiles
affected by stress
in ewes?

Transport reduces LH pulse freq and ampl
(foll phase ewes)



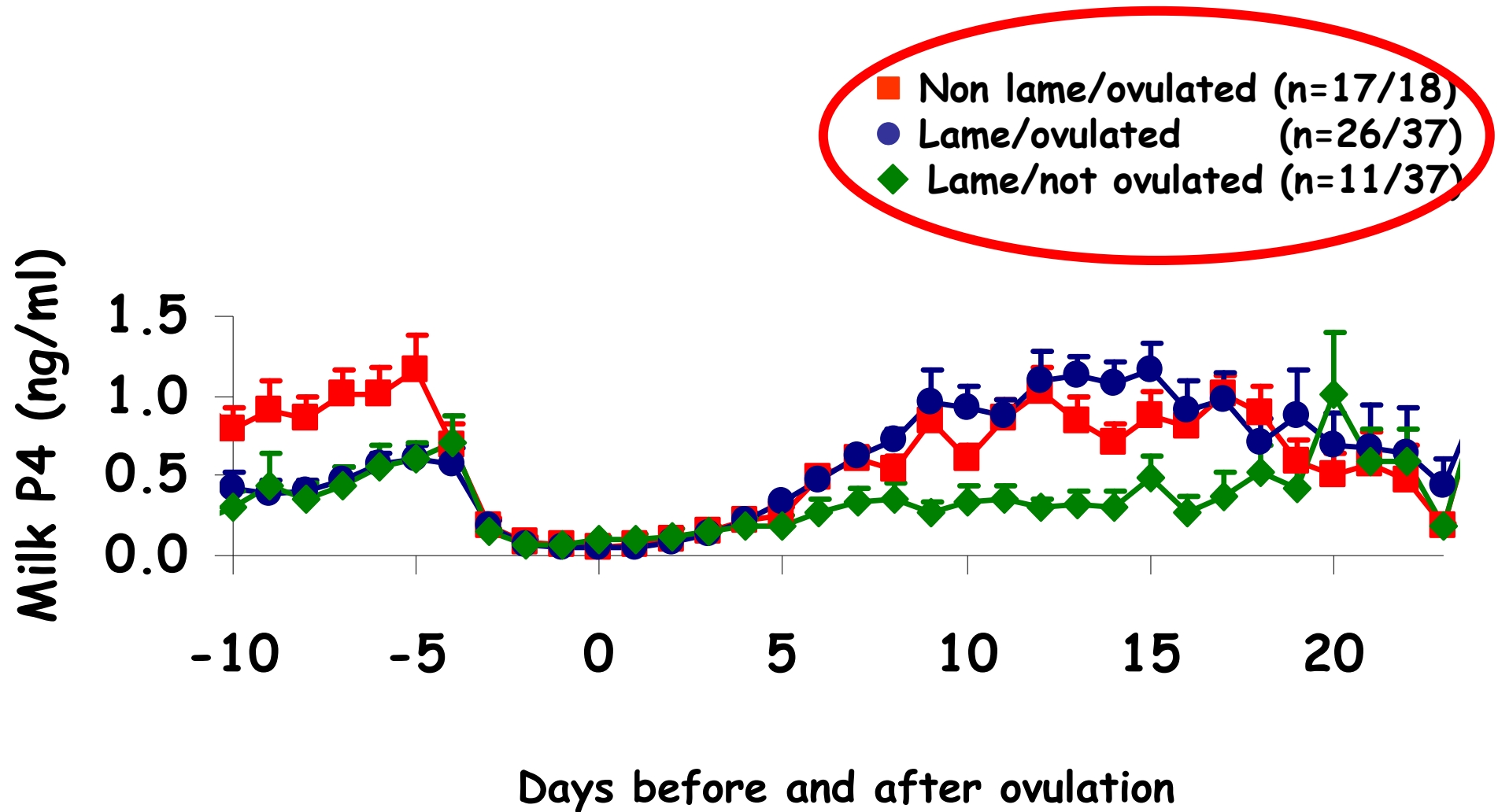
Transport delays and reduces LH surge (foll phase ewes)



Reduced GnRH pulsatility
interferes with LH synthesis/release

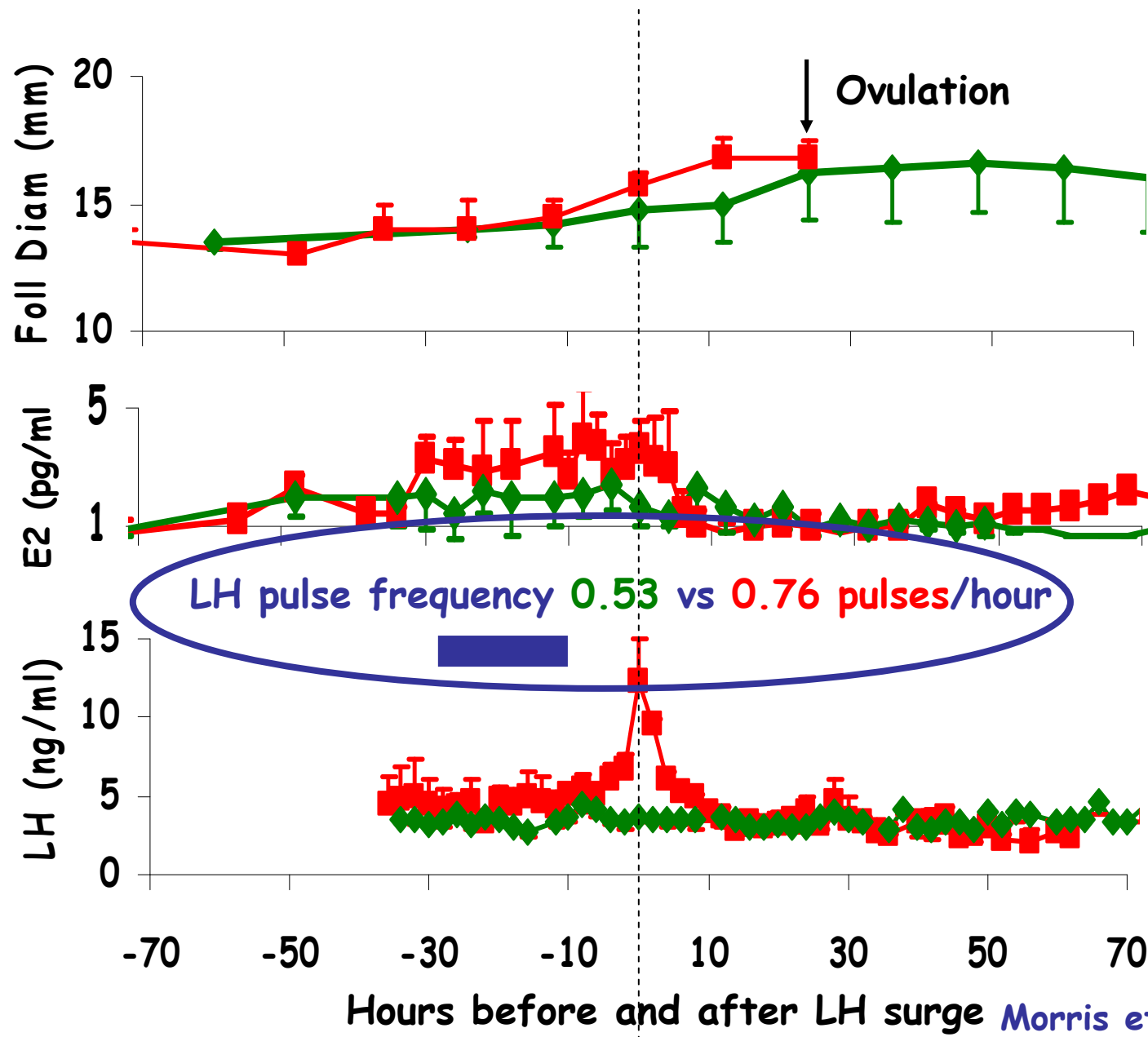
**Are hormone profiles
affected by lameness
in cows?**

Daily progesterone profiles



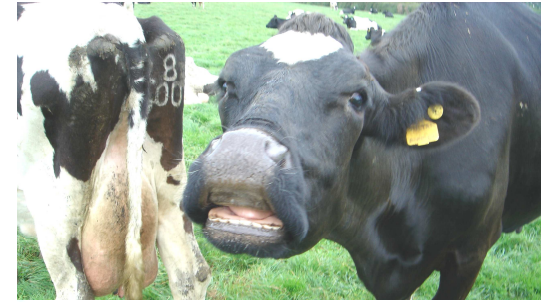
Hourly changes at oestrus

- Non lame/ovulated (n=4)
- ◆ Lame/not ovulated (n=5)

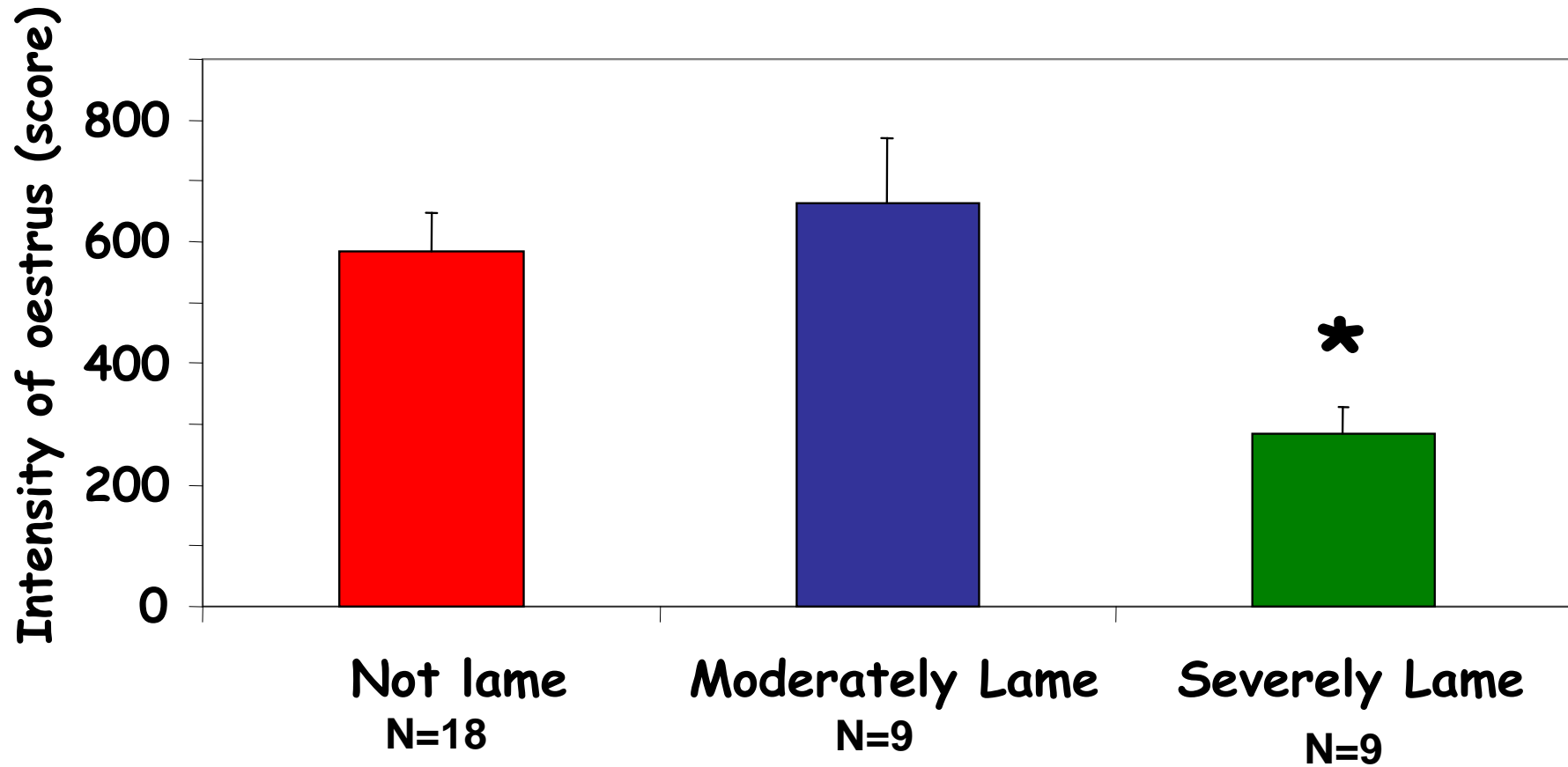


Cattle behaviour Score

Flehmen	5
Sniffing vulva	10
Chin rest	15
Mounting rear	35
Mounting head	45
Stands to be mounted	100



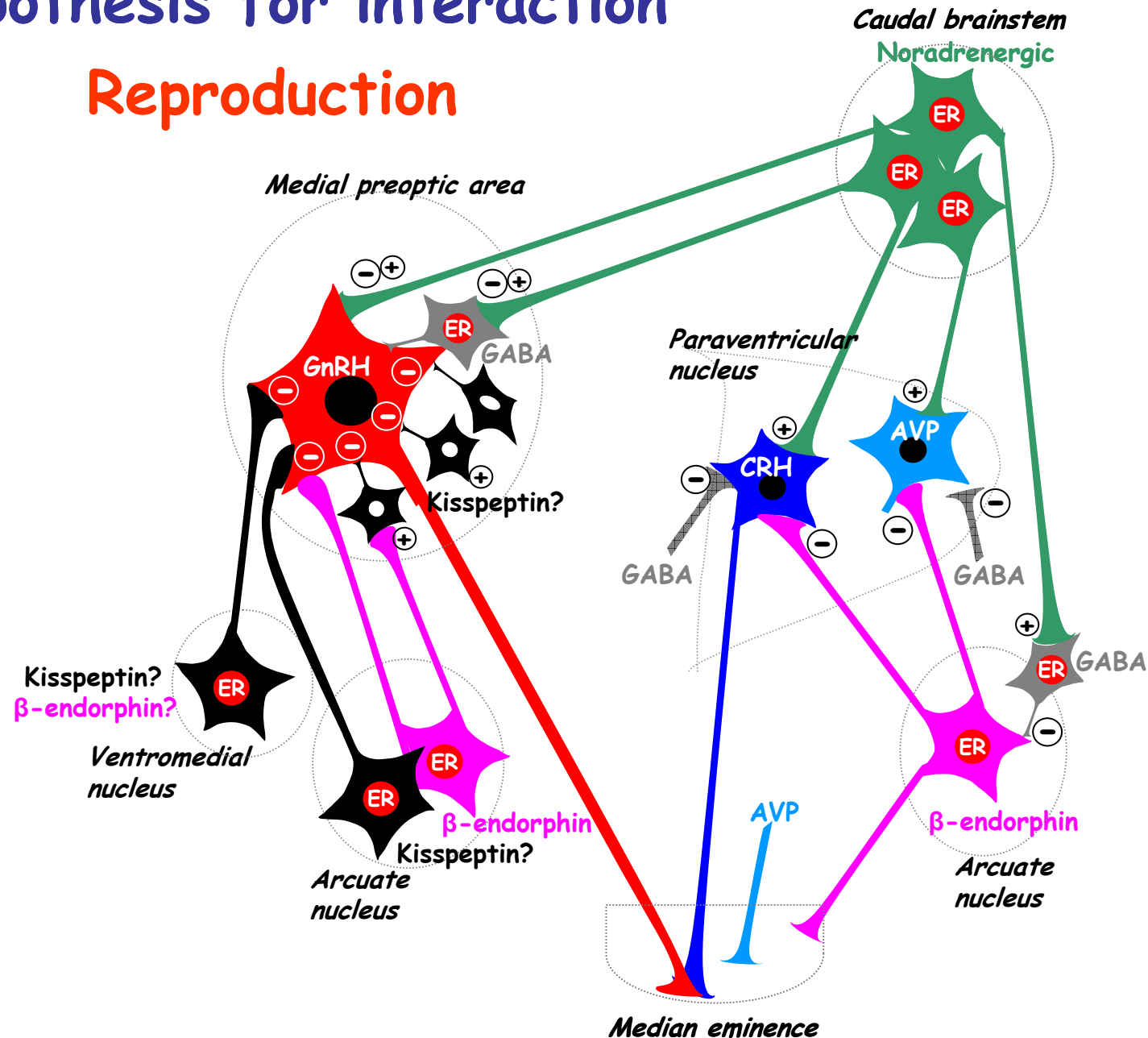
Intensity of oestrus is also affected..



Hypothesis for interaction

Reproduction

Stress



Problems - environmental

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Solutions

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Minimise the stressors

Evolution dictates

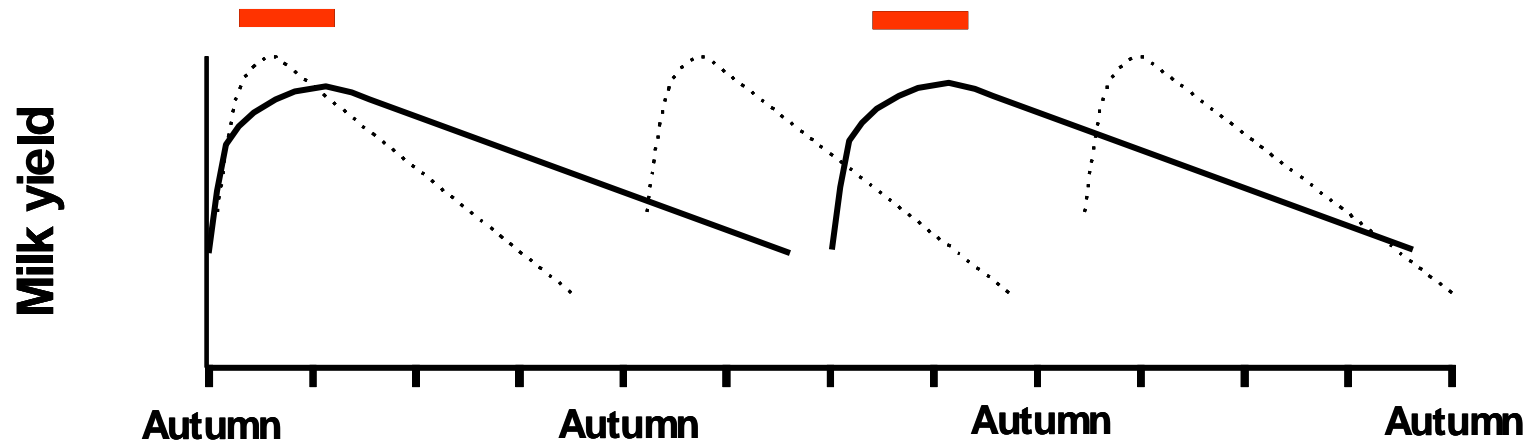
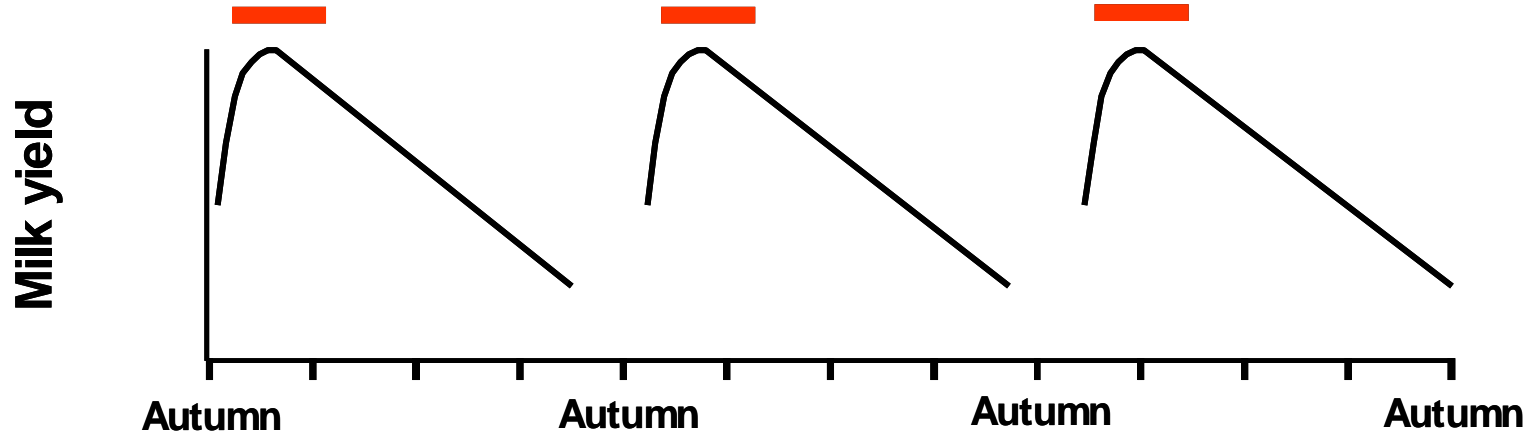
'do not breed until safe'

Do not push off the 'knife-edge'

- sheep or cows

Why calve high-yielders once every year?

Periods of risk i.e. more vet visits



**We need realistic solutions soon
for a sustainable
agricultural industry**



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We are grateful to farmers and
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and to ISAH organisers.