Abnormal progesterone profiles as a sign of functional imbalance

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Take home message

- **A dairy cow shall produce :**
  - **Milk – short term income**
  - **Progesterone and LH – long term income**
- **The dairy man shall:**
  - **Understand the function of the luteinising hormone, LH**
  - **Focus on housing, nutrition, uterine conditions and hoof maintenance**

Topics

- Progesterone profile
- Commencement of first luteal activity
- Luteal phase and cycle length
- Inter-luteal classification model
- Housing, nutrition and reproduction
- Herd survey
- Results
- Conclusion

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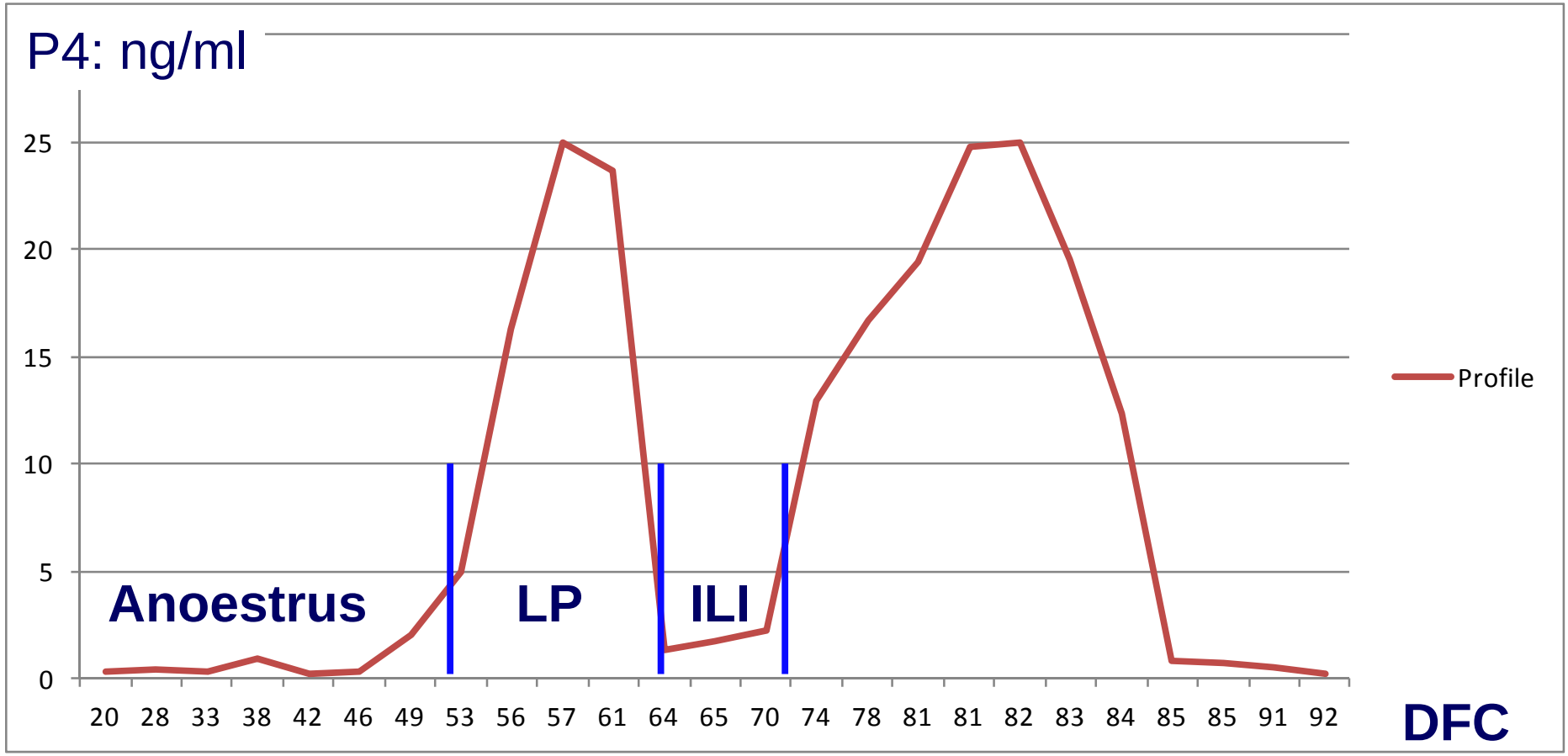
Progesterone profile



LP = Luteal Phase; ILI = Inter-Luteal Interval

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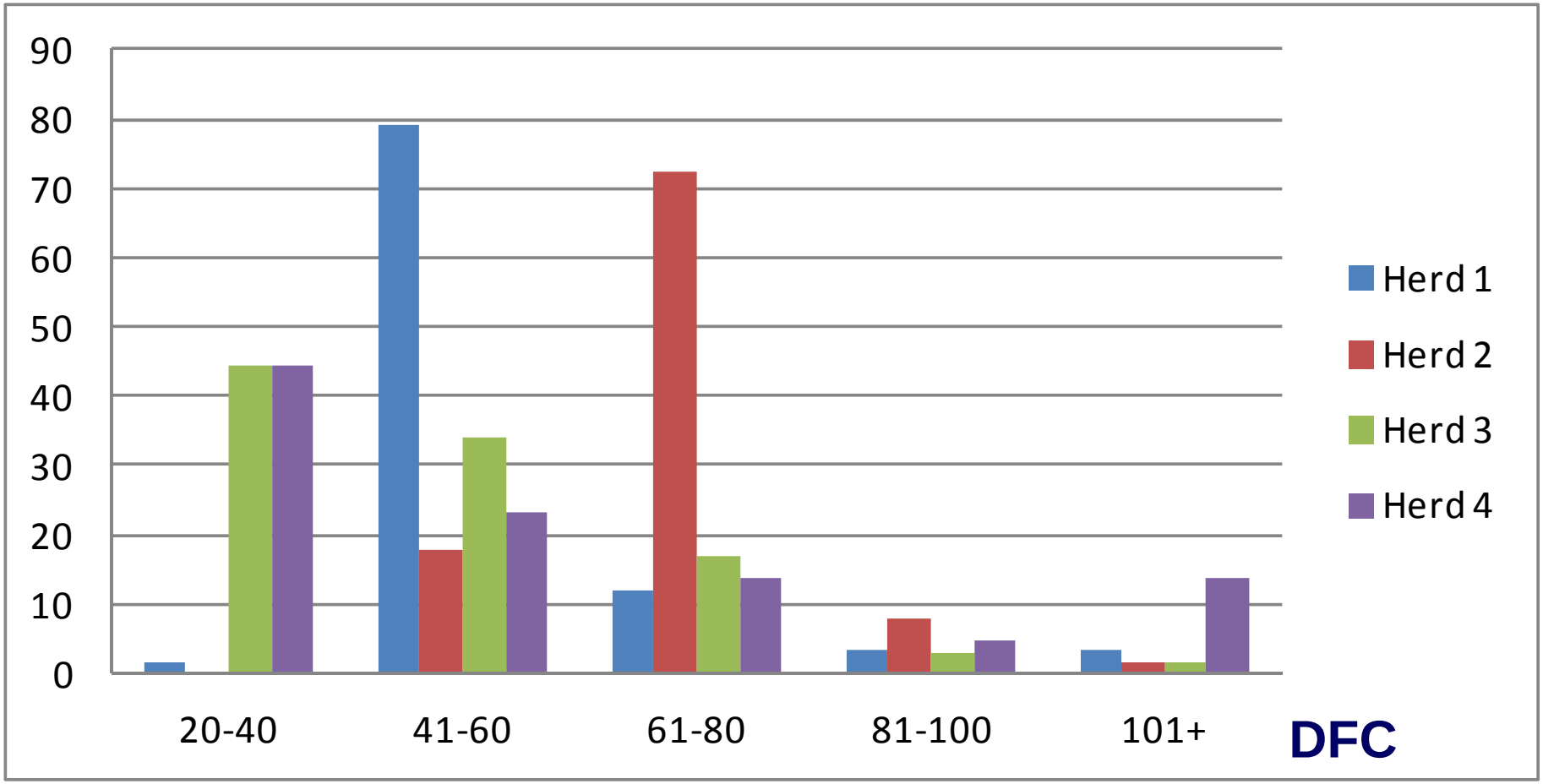
Commencement of first luteal activity



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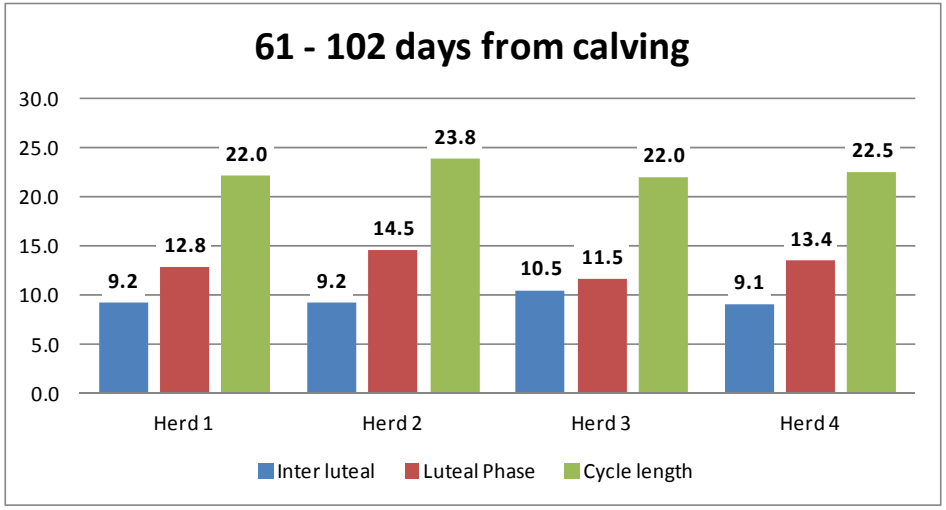
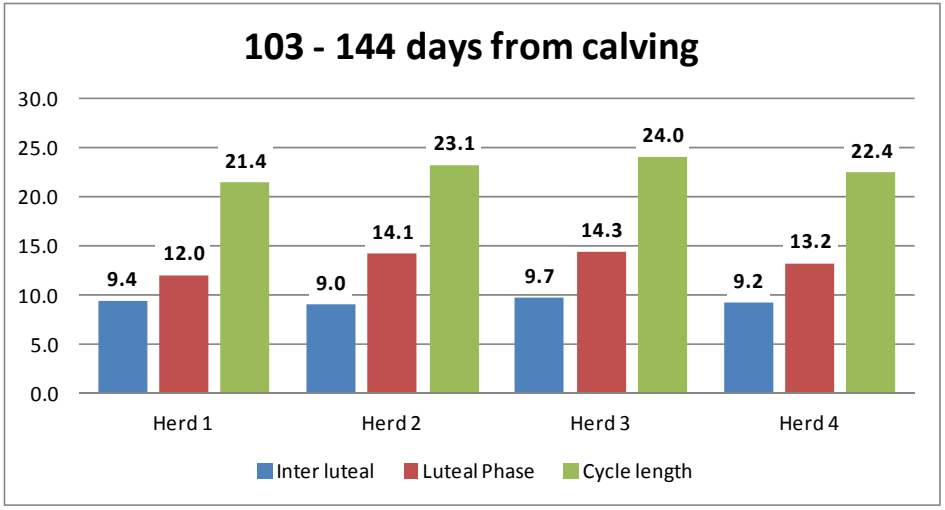
Luteal phase and cycle length





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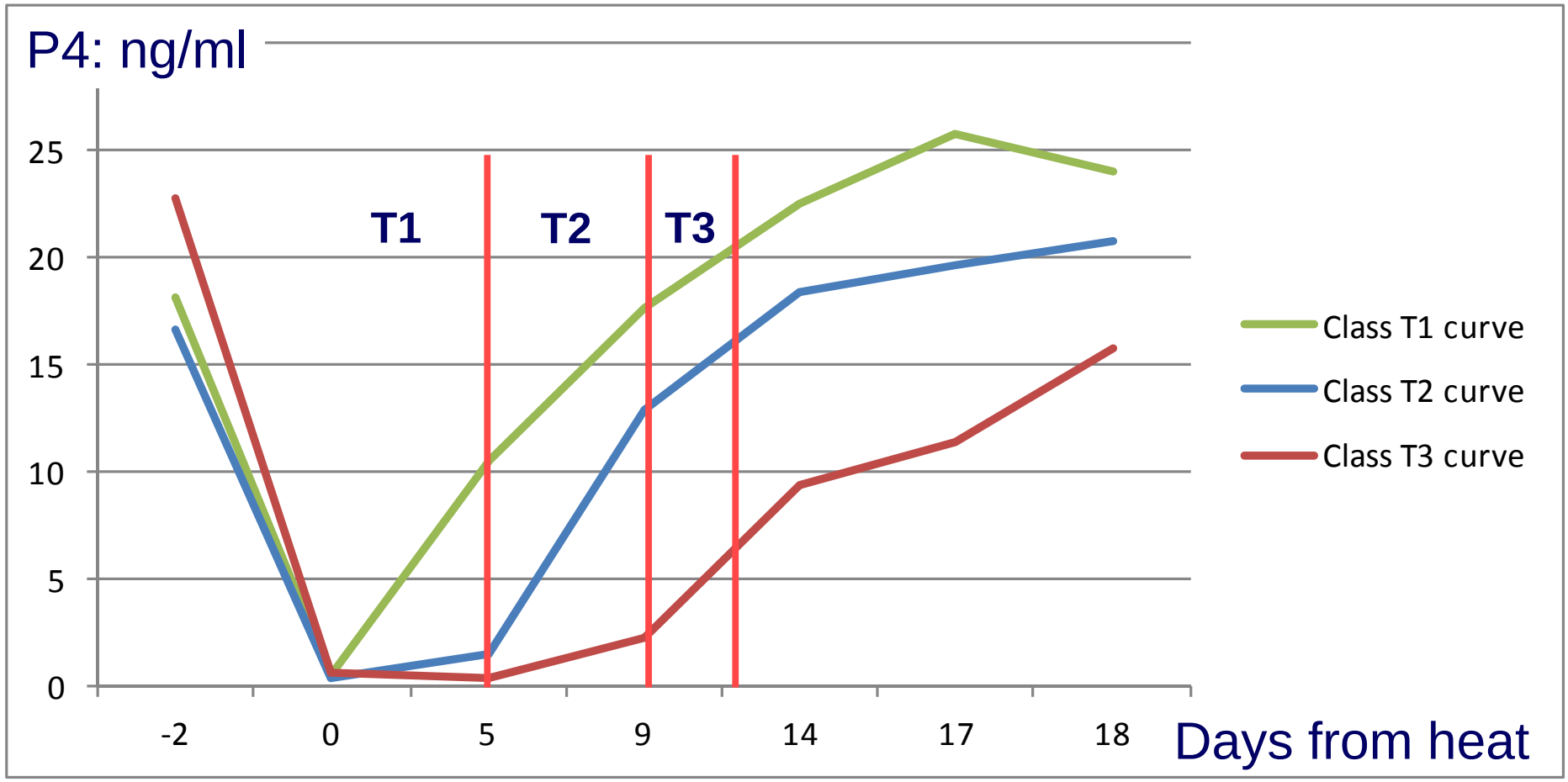
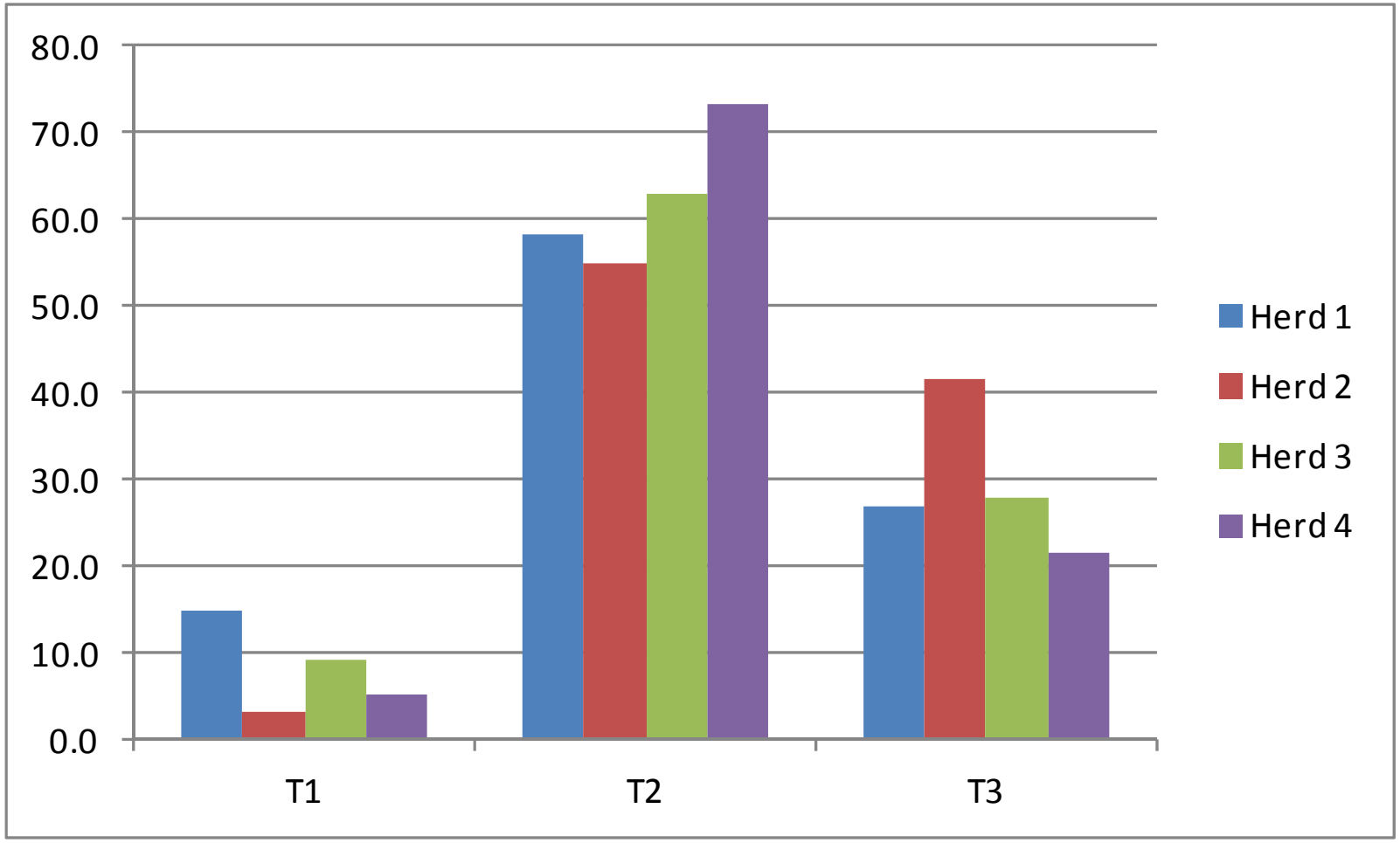
Inter-luteal interval classification model



Classification result

	Herd 1			Herd 2			Herd 3			Herd 4		
Number of cows	69			34			32			35		
Total heats	134			65			63			82		
Included heats	127			60			53			79		
Days from heat	T1	T2	T3	T1	T2	T3	T1	T2	T3	T1	T2	T3
Distribution	%	%	%	%	%	%	%	%	%	%	%	%
< 61	1.6	7.9	0.8	0.0	0.0	0.0	3.7	7.4	3.7	0.0	2.5	2.5
61 - 102	5.5	29.1	9.4	0.0	33.3	1.7	0.0	16.7	20.4	1.3	13.9	2.5
103 - 144	3.1	11.8	7.1	3.3	11.7	16.7	1.9	16.7	1.9	0.0	16.5	3.8
145 - 186	1.6	6.3	5.5	0.0	5.0	15.0	0.0	14.8	1.9	0.0	13.9	7.6
> 186	3.1	3.1	3.9	0.0	5.0	8.3	3.7	7.4	0.0	3.8	26.6	5.1
Total	15.0	58.3	26.8	3.3	55.0	41.7	9.3	63.0	27.8	5.1	73.4	21.5

Distribution of the classification



Housing, nutrition and reproduction

- Overstocking: > 1 cow per cubicle or eating place
- Too short cubicles leads to not all cows are resting
- Too much NEB in the first 30 days postpartum leads to need for recovery of body weight to restore the balance
- Overload of negative impacts on the homeostasis push the cow into survival mode - increased release of glucocorticoids that reduces the release of LH

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Investigation scheme for herd survey

Visual observation	Herd 1	Herd 2	Herd 3	Herd 4
Milk yield, > = greater than 10.000 kg; < = less than 10.000 kg				
Cubicle, brisket rail position, + = OK; - = not OK				
Cubicle, width, + = OK; - = not OK				
Silage quality, where +++ = excellent				
Cows per cubicle in the period from calving to conception				
Cows per eating place in the period from calving to conception				
Legs / hoof health, +++ = less then 10% with				
Dry cow management, where +++ = excellent				
Body Condtion Score, fertile period, 1 - 5				
Stress score, where 0 = no stress and 1 = fight for space				

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Herd Survey

Visual observation	Herd 1	Herd 2	Herd 3	Herd 4
Milk yield, > = greater than 10.000 kg; < = less than 10.000 kg	>	<	<	<
Cubicle, brisket rail position, + = OK; - = not OK	+	-	-	-
Cubicle, width, + = OK; - = not OK	+	-	-	-
Silage quality, where +++ = excellent	+++	++	++	++
Cows per cubicle in the period from calving to conception	0.9	1.1	1.1	1
Cows per eating place in the period from calving to conception	0.9	1.1	1.1	1
Legs / hoof health, +++ = less then 10% with	+++	++	++	++
Dry cow management, where +++ = excellent	+++	++	+	+
Body Condtion Score, fertile period, 1 - 5	2.25	1.75	1.75	2
Stress score, where 0 = no stress and 1 = fight for space	0	0.8	0.5	0.4

Results

- Herd 1 was used as reference to compare with herd 2 – 4
- Herd 2 – 4 had prolonged cycle length of up to 2.6 days
- The length of a normal luteal phase corresponds closely to research done by Lamming et al. 1998
- The ILI classification shows that herd 2 – 4 have more than 90 % of the cows in class T2 and T3.
- The commencement of luteal activity differ from herd to herd
- Numbers does not do it alone – observations of the cow's conditions are useful input

Conclusion – the case study showed:

- Prolonged ILI (abnormal progesterone profiles) showed imbalance in the herd
- The imbalance were related to negative impact on the cows from housing, resting area (cubicles), hoof maintenance and feed quality
- Abnormal progesterone profiles can be a potential sign of functional imbalance
- The ratio between duration of progesterone and LH releases can be a useful management tool to monitor the herds functional level.

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