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Book of Abstracts p. 435

**Timing of transfer after mating
influence dam cortisol and maternal care
in farm mink**

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Transfer to maternity unit

- Why?
 - Clean delivery environment
 - Introduce distance between delivering mink
 - Cage/nest box prepared for kits

- When?

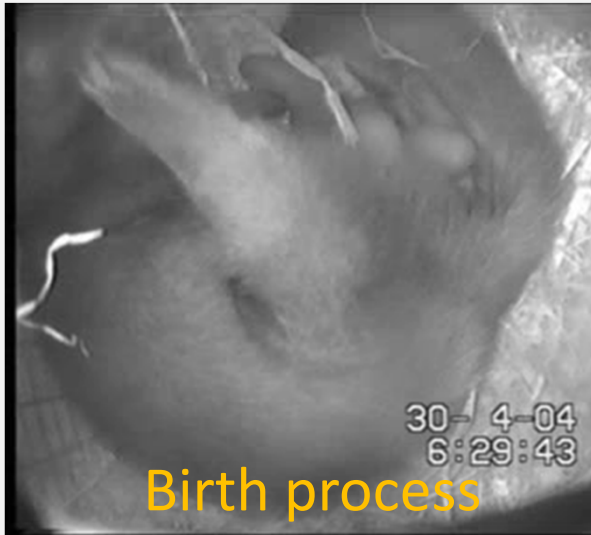
§ 23 "Breeding females should be housed from mid April and until weaning of kits/young in every second cage"

(Danish Ministry of Justice, 2006)

Mink farmers: variable times of transfer into delivery unit

No scientific evidence

Stress prior to delivery: negative impact



Malmkvist et al., *Appl. Anim. Behav. Sci.* 2006; Malmkvist & Palme, *Appl. Anim. Behav. Sci.* 2008

Study aim: Influence of timing of transfer on

- Maternal stress
- Maternal care
- Early kit vitality



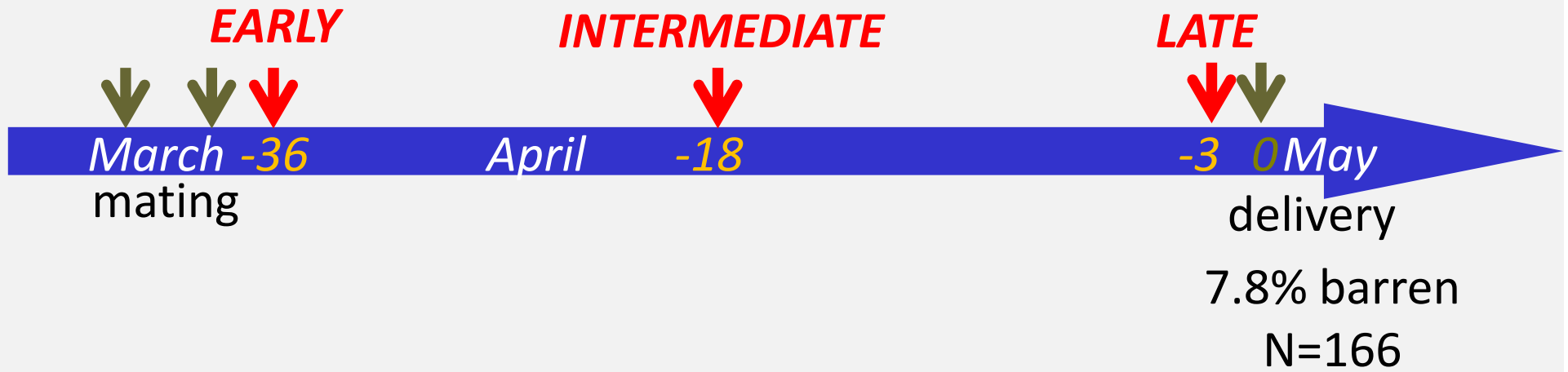
Treatment groups

Time of transfer *relative to expected day of birth*

- EARLY *Day -36* N=60
- INTERMEDIATE *Day -18* N=60
- LATE *Day -3* N=60

In total 180 double-mated yearlings from one line of brown colour type, housed and feed identically

Time of transfer



Results

- Faecal Cortisol Metabolites (FCM)
 - sampled weekly before delivery + day 3 post partum

Non-invasive method for circulating cortisol validated in female mink

Malmkvist et al., *Stress* 2011

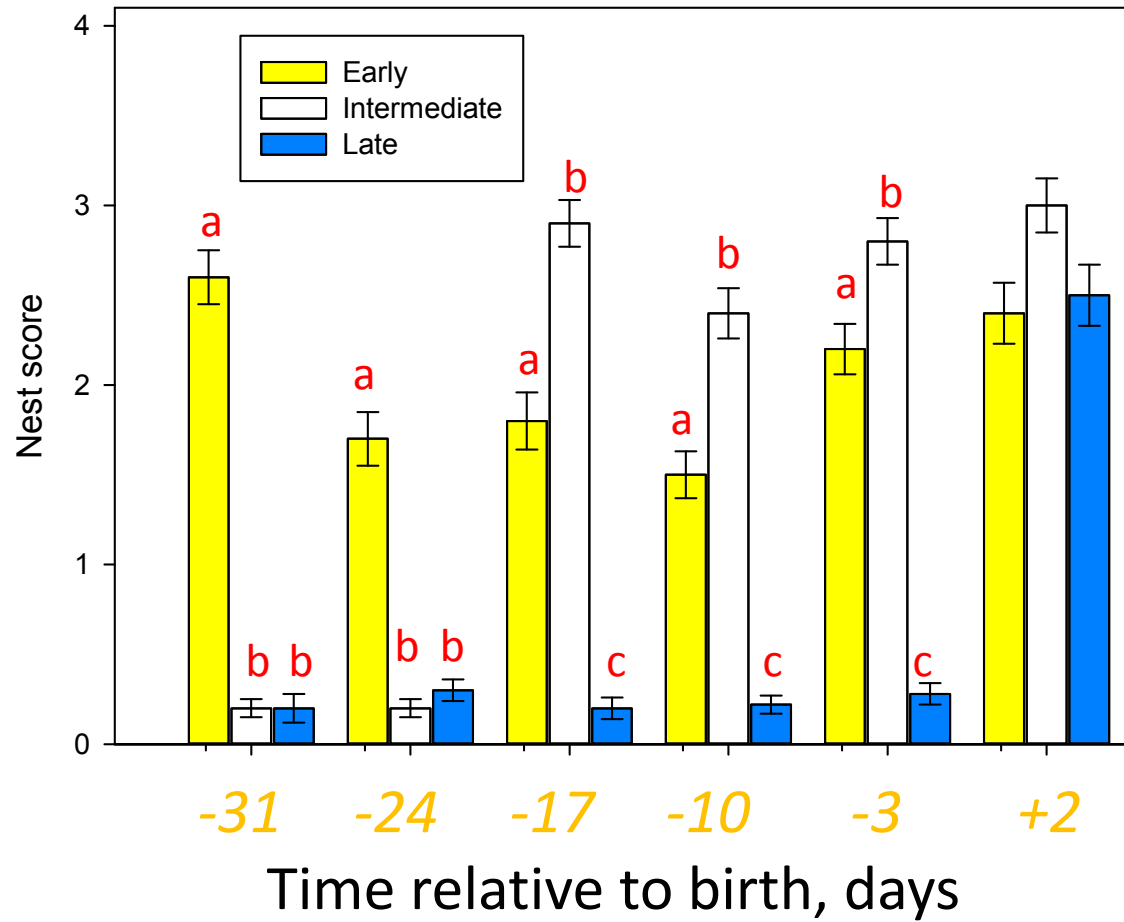
Faecal Cortisol metabolites (FCM), ng/g

	<u>EARLY</u>	<u>INTERMEDIATE</u>	<u>LATE</u>	<i>P-value</i>
Pre-delivery (2-3 w before)	40.5 a ± 5.6	59.9 b ± 5.3	43.0 a ± 5.6	0.002
Day 3 pp	76.4 ± 14.2	47.5 ± 13.8	75.3 ± 14.2	0.054
Kits born Range 1-14	8.4 ± 0.3	7.9 ± 0.3	8.3 ± 0.3	0.39

Nest score

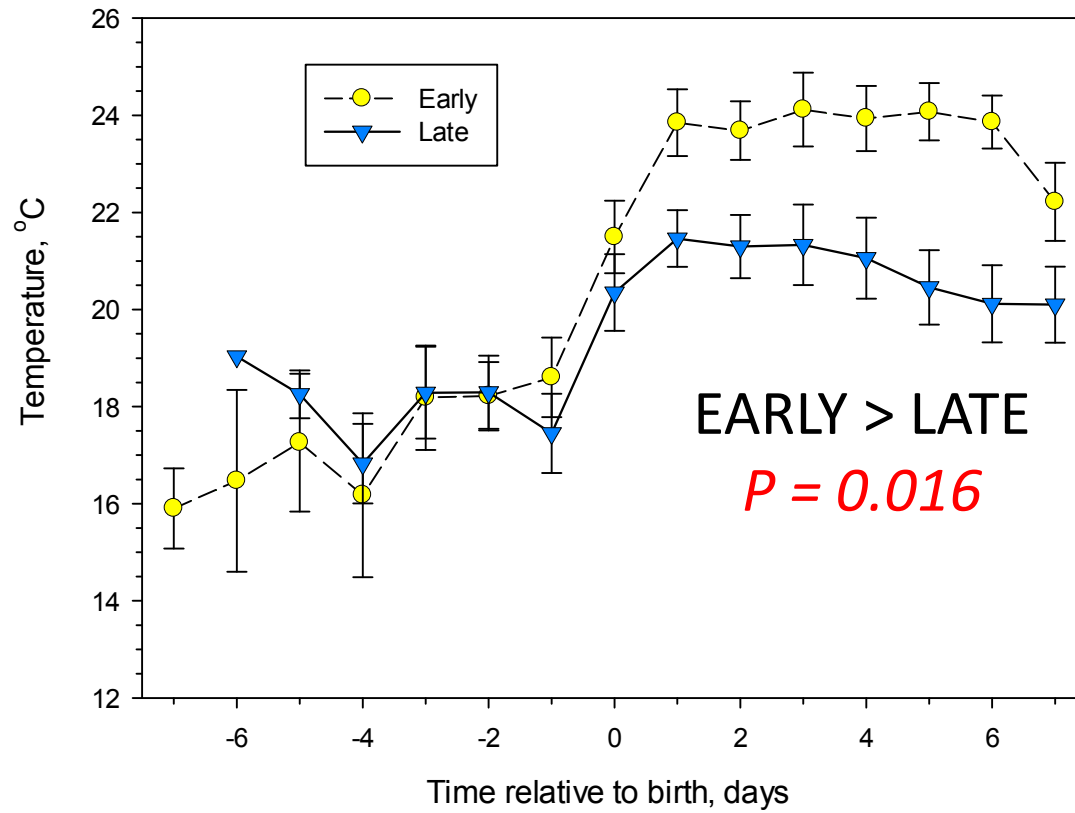
- weekly from mating to day 2 postpartum

Nest score



In-nest climate

-Temperature



Nest building

Pregnant females

- Nest-build 1 month prior to delivery when given the opportunity
- Can relative quickly (< 1 day) build a full nest

In EARLY transferred females (vs. LATE)

- Warmer nests postpartum
offspring better protected against hypothermia
during the early period critical for survival



Young survival

Among litters affected by kit mortality (N=92)

Live-born kits dying day 0-7 postpartum

EARLY: 28.9 %

INTERMEDIATE: 28.5 %

LATE: 42.7 % $P = 0.085$

Maternal care



Highly motivated behaviour

Kit-retrieval test day 5 -an indicator of maternal care



Malmkvist & Houbak, *Scientifur* 2000

Malmkvist & Palme, *Appl. Anim. Behav. Sci.* 2008

Role of kit vocalisation

Clausen et al., *Appl. Anim. Behav. Sci.* 2008

Brandt et al., *J. Exp. Biol.* 2013

Kit vocalisation

$P = 0.015$

EARLY:

16.7 % **a**

INTERMEDIATE:

41.2 % **b**

LATE:

40.0 % **b**



Timing of transfer

➤ **EARLY** *Day -36*

Warmer nests than group LATE

Fewer kits vocalising = fewer kits in need

➤ **INTERMEDIATE** *Day -18*

Different cortisol profile over time

Increased dam cortisol during weeks prior to delivery

➤ **LATE** *Day -3*

Colder nests than group EARLY

Increased kit mortality (tendency)

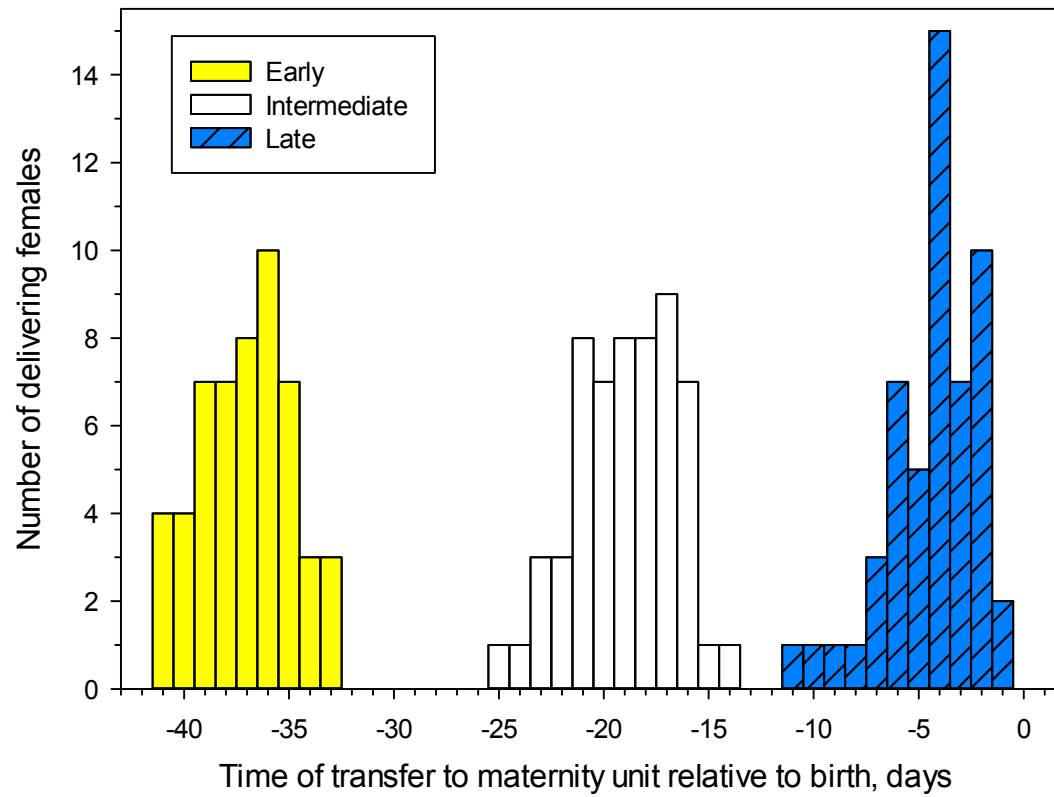
Conclusion

Transfer to the maternity unit immediately after mating (around day -36), rather than later during the pregnancy period (day -18/day -3), reduce pre-delivery stress and increase maternal care in farmed mink dams

This study received funding from

- Danish Fur Animal levy foundation
- Copenhagen Fur

Treatment groups



In-nest climate

-Relative humidity, %

