THE UNIVERSITY OF MELBOURNE

FACULTY OF VETERINARY & AGRICULTURAL SCIENCES

Prevalence of hyperketonemia in periparturient dairy goats

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Supervisors: Brian Leury and Kristy DiGiacomo

Background

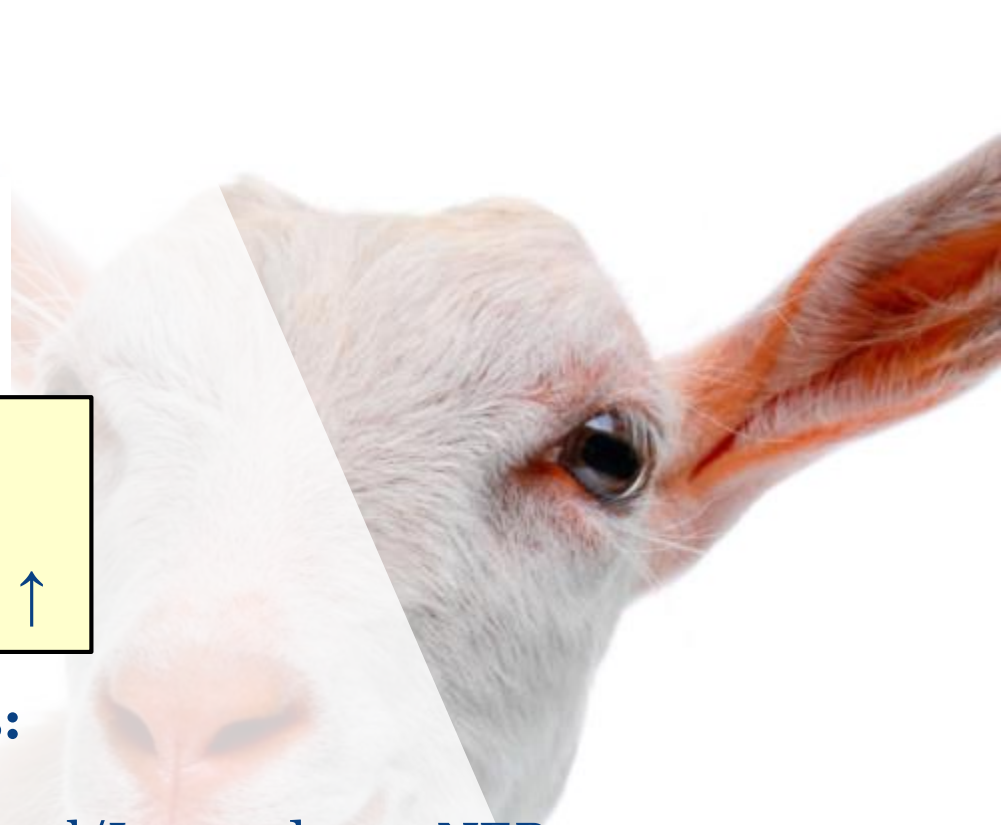
- Milk Production
- Fetal growth (litter size)
- M. Gland development

- Rumen compression
- Degree of fatness
- Sex hormones

Cause:

↑ Energy demands + ↓ Feed intake = **NEB**

↑ lipomobilization = ↑↑↑ FFA → liver → **BHB** ↑



Predisposing factors:

- ↑ Litter size
- ↑ Milk yield
- ↑ Parity number
- ↑ Weight/BCS
- Low-quality diet

Negative outcomes:

- ↓ Feed intake
- ↓ Milk yield
- ↓ Body weight
- ↓ Fertility
- ↑ Culling rates

BHB in goats:

- ≥ 0.8-1.6 mmol/L = moderate NEB
  ↑ risk of gestational ketosis (pregnancy toxaemia)
- > 1.6 mmol/L = severe NEB
  Presentation of gestational ketosis

(González et al 2011; Albay et al., 2014; Marutsova and Binev, 2017)

Research Aims

- Characterize the distribution of BHB during the transition period in commercial dairy goats

- And determine the prevalence of goats at or above BHB values suggested as indicators of NEB in dairy goats

Methodology

Where: Meredith, VIC – Australia

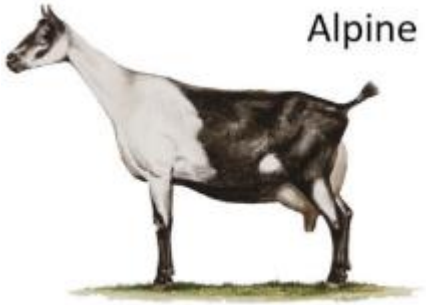
Methodology: Herd composition

~ 1600 goats in milk

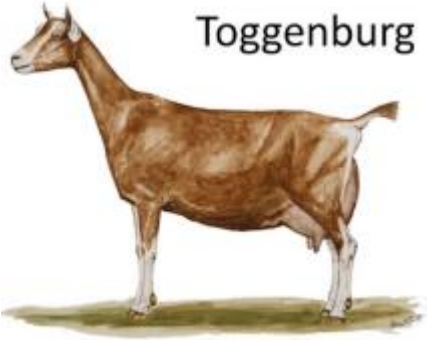
Breed

Saanen ➢ (60-70%)

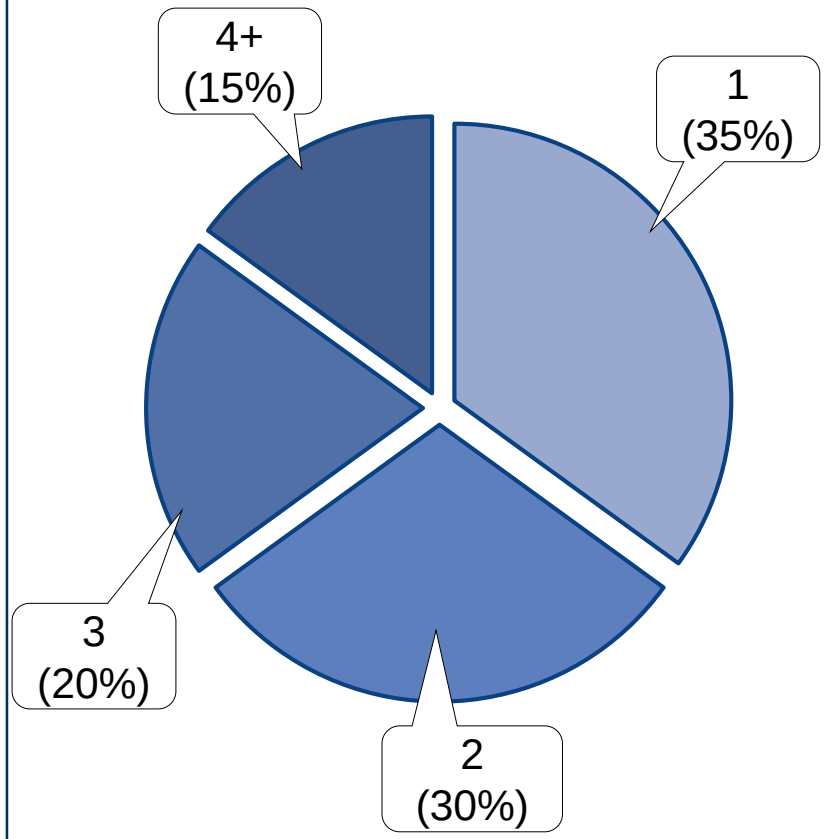
Alpine ➢ (15-20%)



Toggenburg ➢ (10-15%)

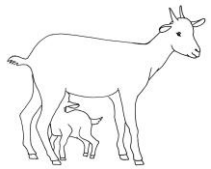


Parity number



Kidding Seasons

FRESH GOATS



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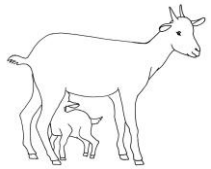

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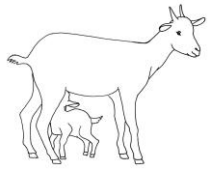

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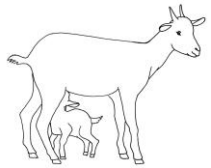

650

JAN
FEB
MAR
APR
MAY
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JUL
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SEP
OCT
NOV
DEC

Methodology

Animals: ~ 1000 Saanen-cross goats

- Age: 1-7 years
- Live weight: 70±17.0 kg
- BCS: 2.6 ± 0.3

Housing:

- one-sided shed (naturally ventilated)

Dried-off:

- 2 Months before exp. kidding date

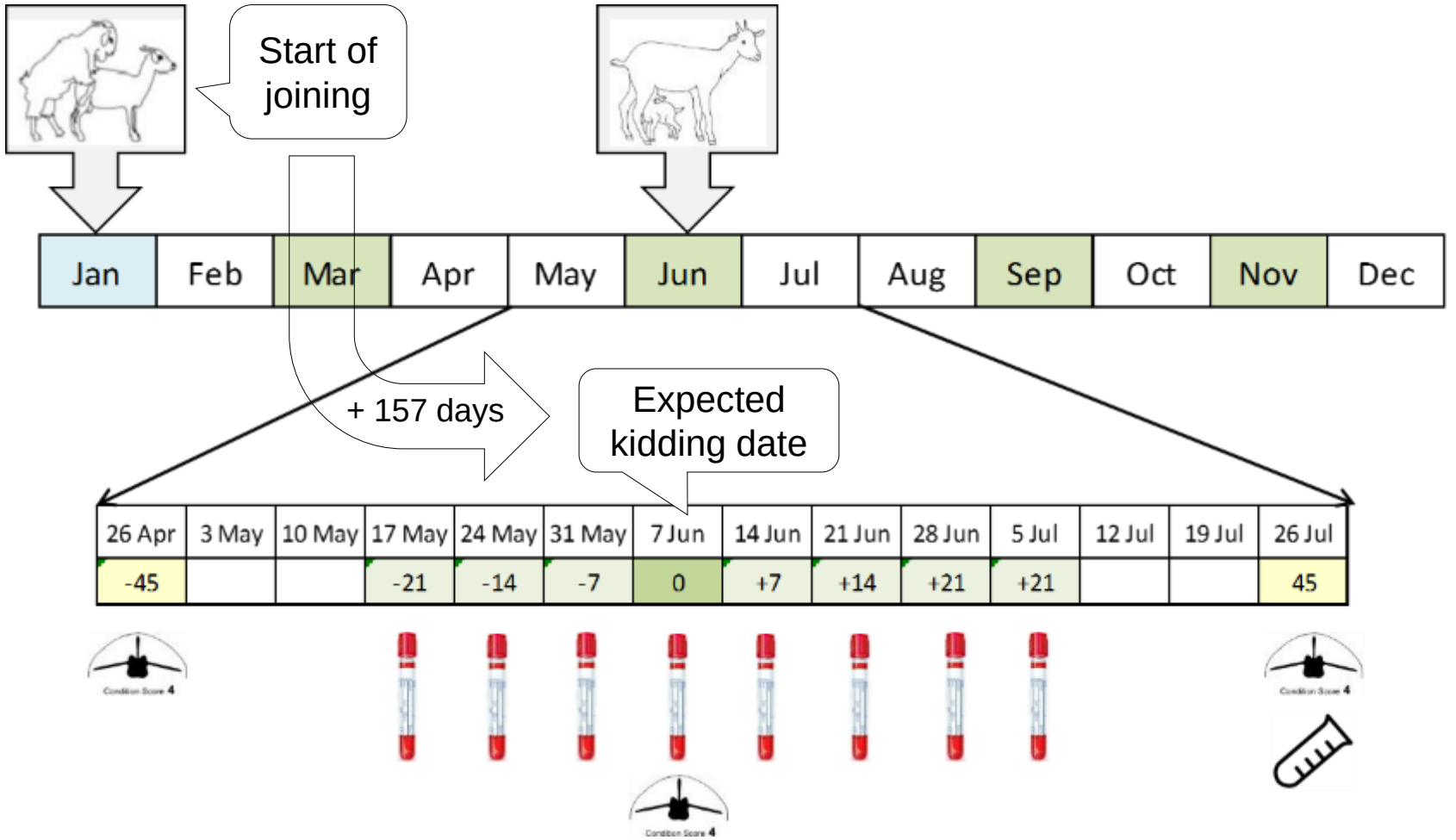
Fresh-goat diet:

- TMR (CP: 16%; 10 ME: 10 MJ/kg)
- 1 month before exp. kidding date

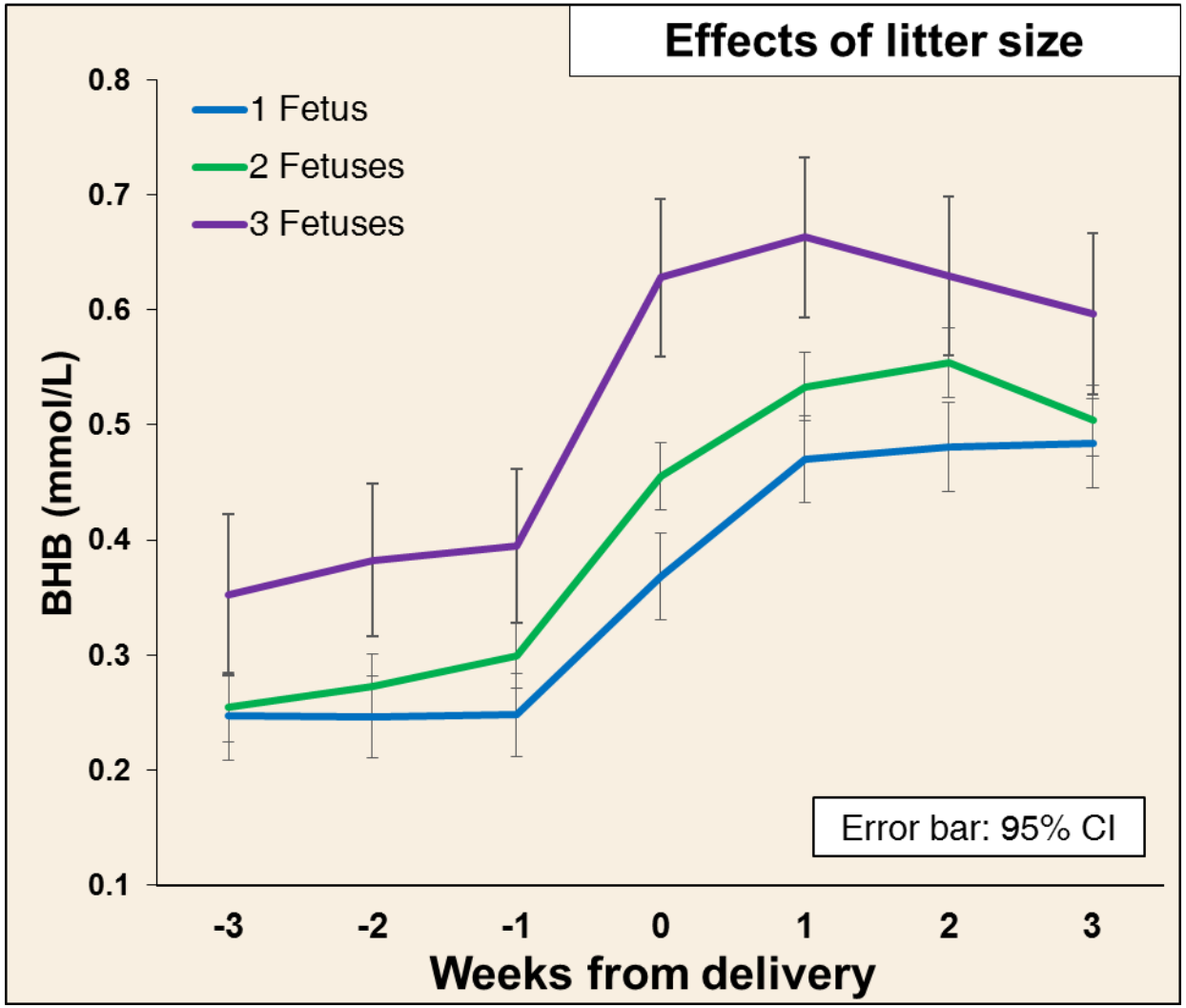
Milking: twice-daily

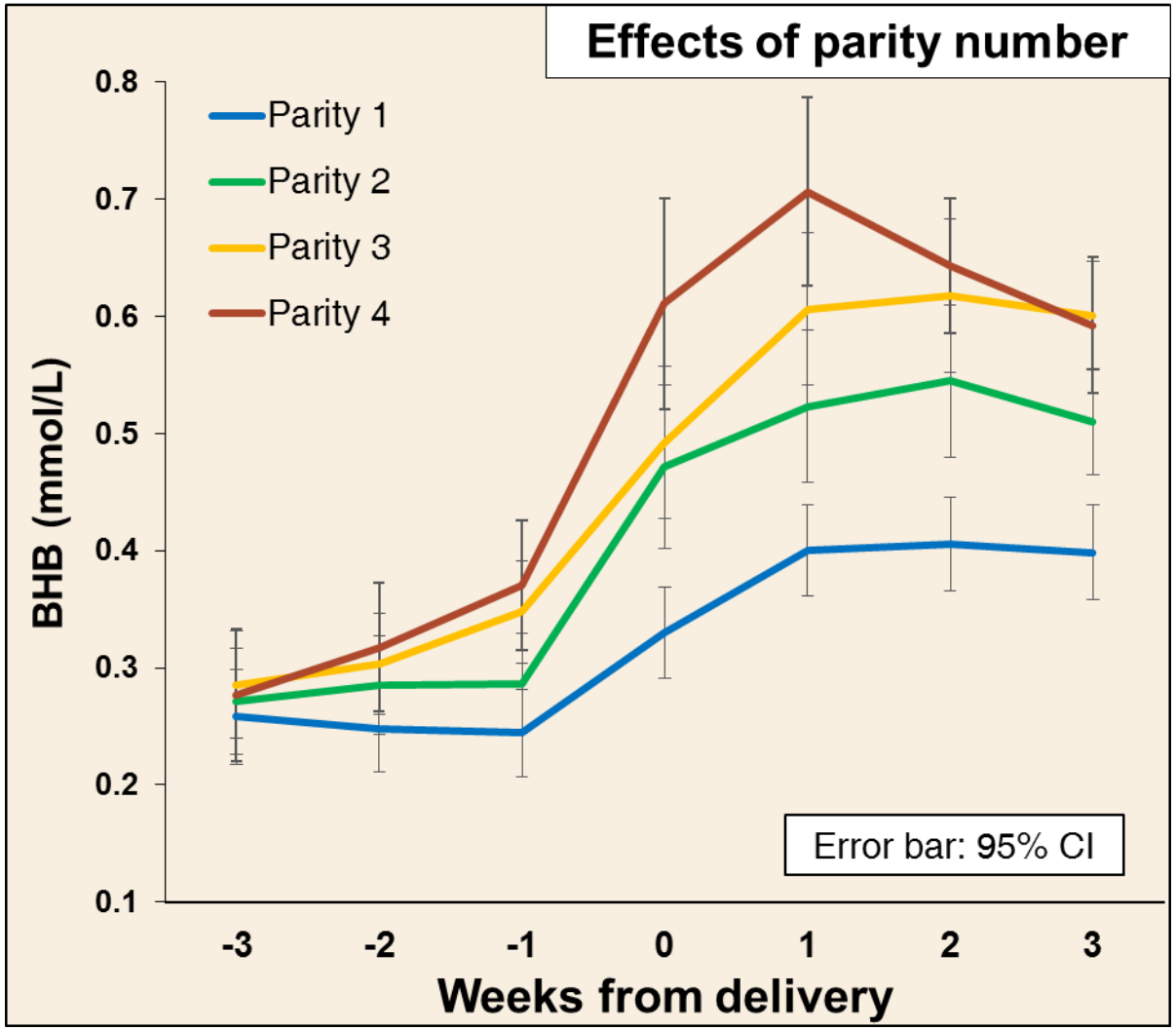
- ~ 6 am & 3 pm

Methodology: Bleedings



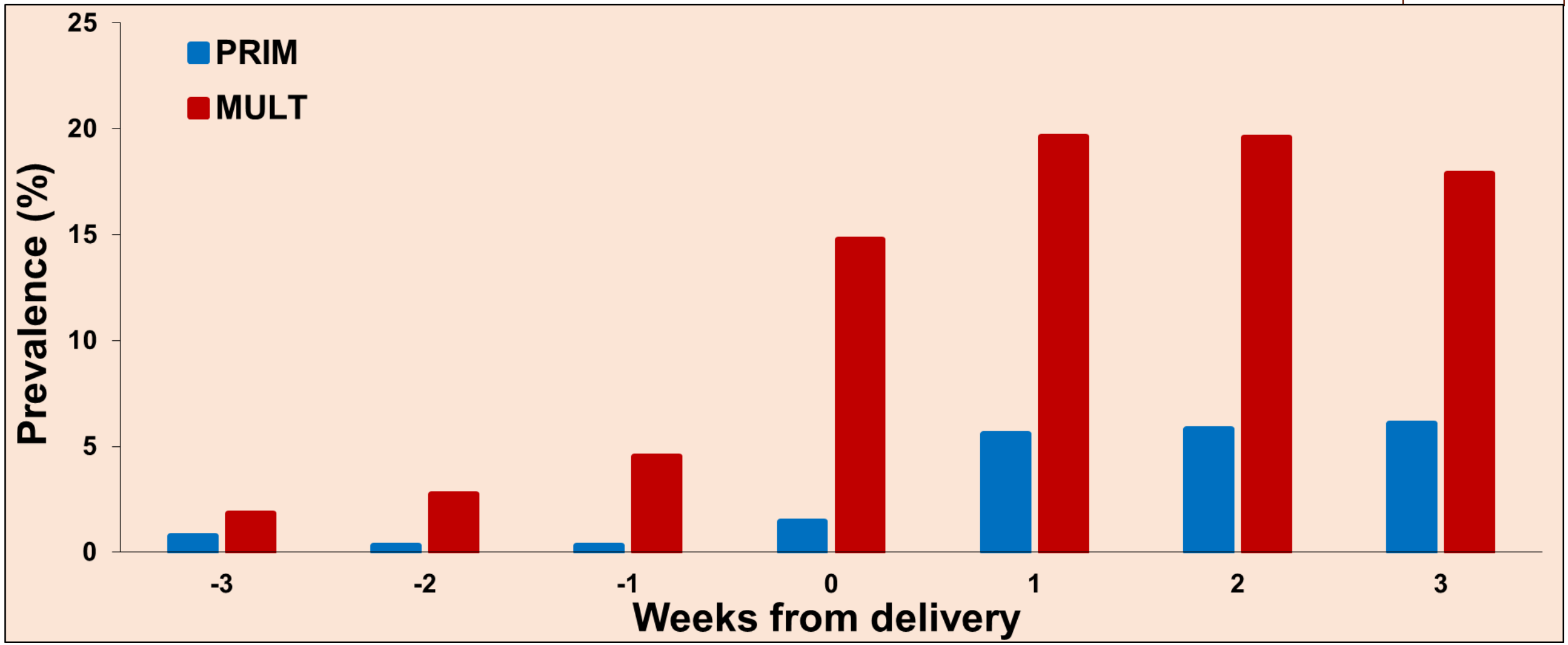
Weekly variations of mean BHB concentration





Prevalence of BHB ≥ 0.8 mmol/L

N = 960
MULT = 638
PRIM = 322



Elevated BHB & culling rates

Culled ≤ 30 DIM: 4.5%

Risk of being culled ≤ 30 DIM associated with positive events at or above thresholds

Period (BHB threshold)	Odds	95% CI	P-value
Antepartum (0.8-1.6)	3.4	2.1 - 5.5	0.003
Antepartum (> 1.6)	15.1	5.5 - 41.4	< 0.001
Postpartum (0.8-1.6)	0.7	0.3 - 1.8	0.481
Postpartum (>1.6)	3.7	1.8 - 7.6	0.003

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Conclusions

- **BHB concentrations are influenced by:**
  - Ante vs postpartum
  - Parity
  - Litter size
- **Prevalence of elevated BHB was 4x greater in MULT goats**
- **Antepartum**
  - **BHB ≥ 0.8 = ↑ risk of early removal (culling)**
- **Postpartum**
  - **BHB > 1.6 = ↑ risk of early removal**

Acknowledgements:

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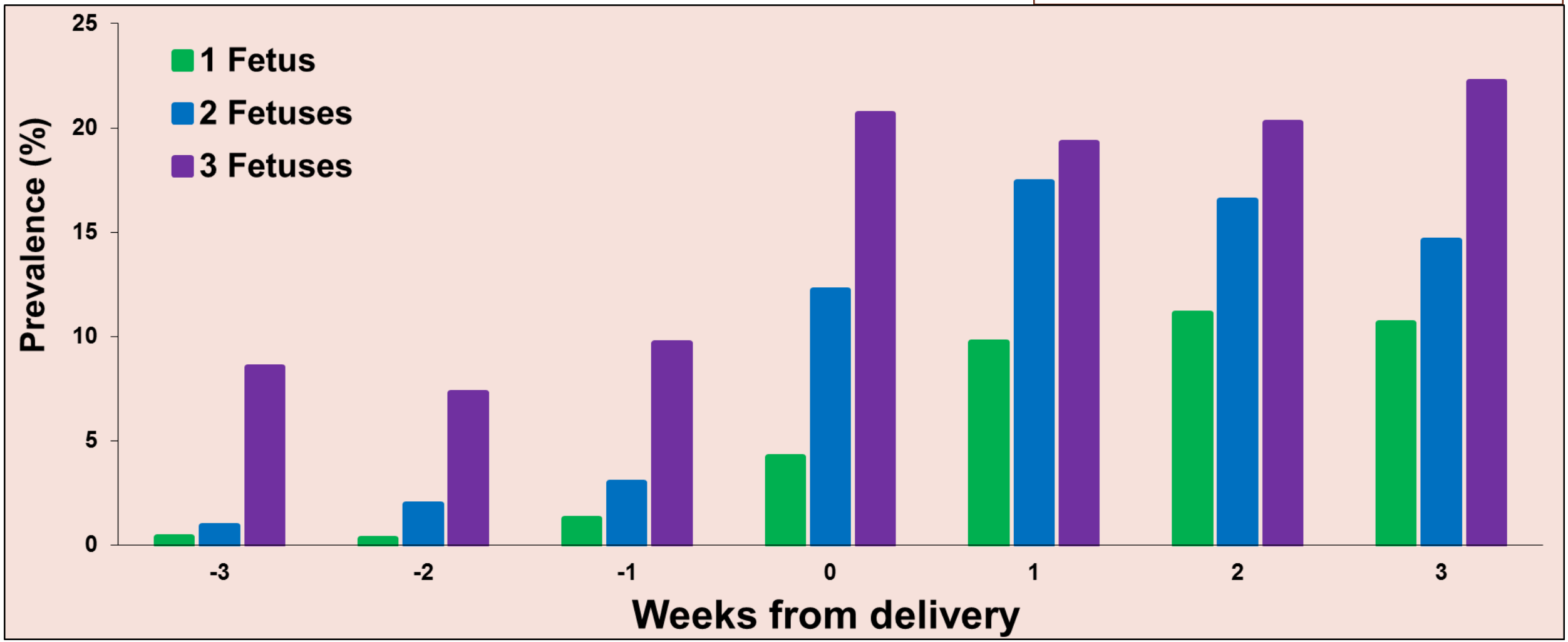
Prevalence of BHB ≥ 0.8 mmol/L

N = 960 (35% = 1F, 55% = 2F, 10% = 3F)



Elevated BHB & milk production

Effects of elevated BHB concentration on average milk yield

Weeks in milk	Milk yield (L/day)			SED	P-value
	BHB < 0.8 (86%)	BHB 0.8-1.6 (13%)	BHB > 1.6 (2%)		
1	2.0^{b}	2.6^{a}	2.4^{ab}	0.07	< 0.001
2	2.3^{b}	3.0^{a}	2.6^{ab}	0.06	< 0.001
3	2.5^{b}	3.2^{a}	2.9^{a}	0.02	< 0.001
4	2.5^{b}	2.9^{a}	2.9^{ab}	0.06	< 0.001