RED MEAT UPDATES

TASMANIA

27 July 2018

Dark cutting beef
Latest research for pasture-fed cattle

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Scibus

mla MEAT & LIVESTOCK AUSTRALIA

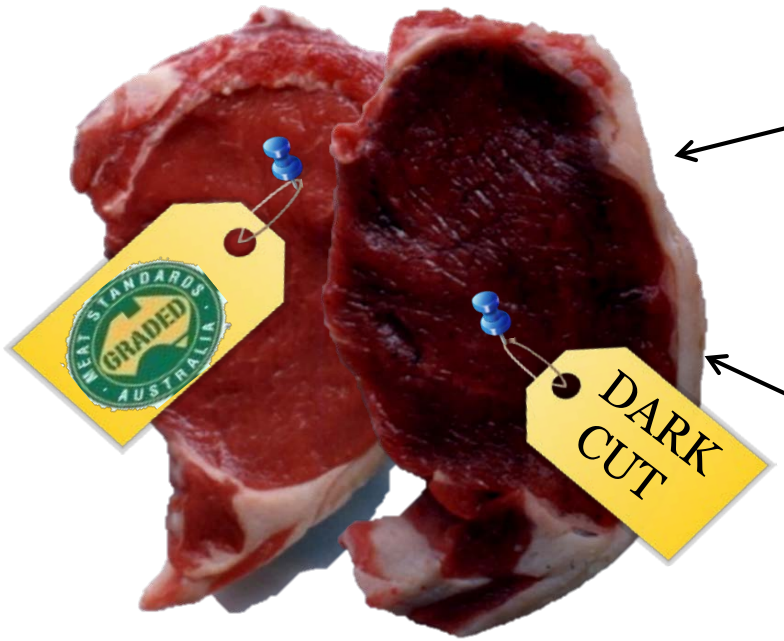
JBS

Outline

- Dark cutting re-cap

- King Island experiment
  - Mycotoxins
  - Minerals

What's wrong with high pH meat?



Ultimate pH >5.7
Meat colour >3

$$$ IMPACT ON INDUSTRY

Producer penalty:

avg $0.59/kg HSCW

= ↓ **$17m per annum**

Australian beef industry

= ↓ **$55m per annum**

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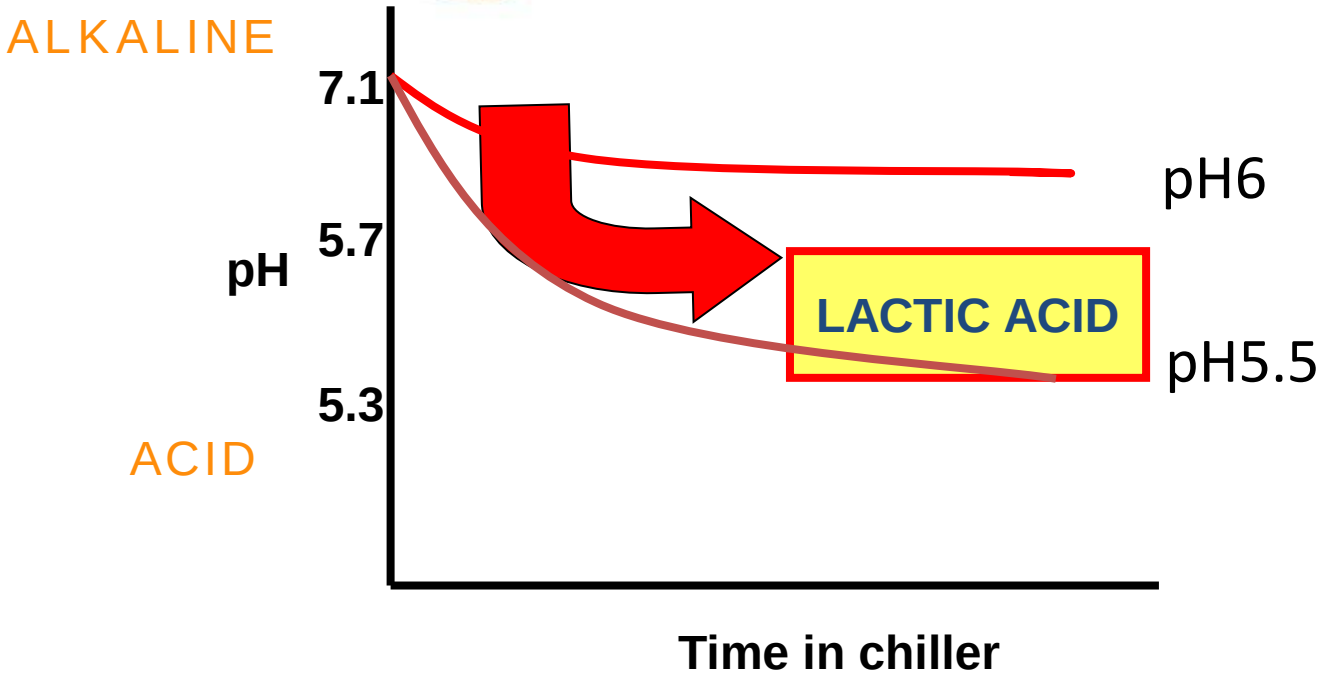
Low muscle glycogen (energy) at slaughter

Lactic acid

pH



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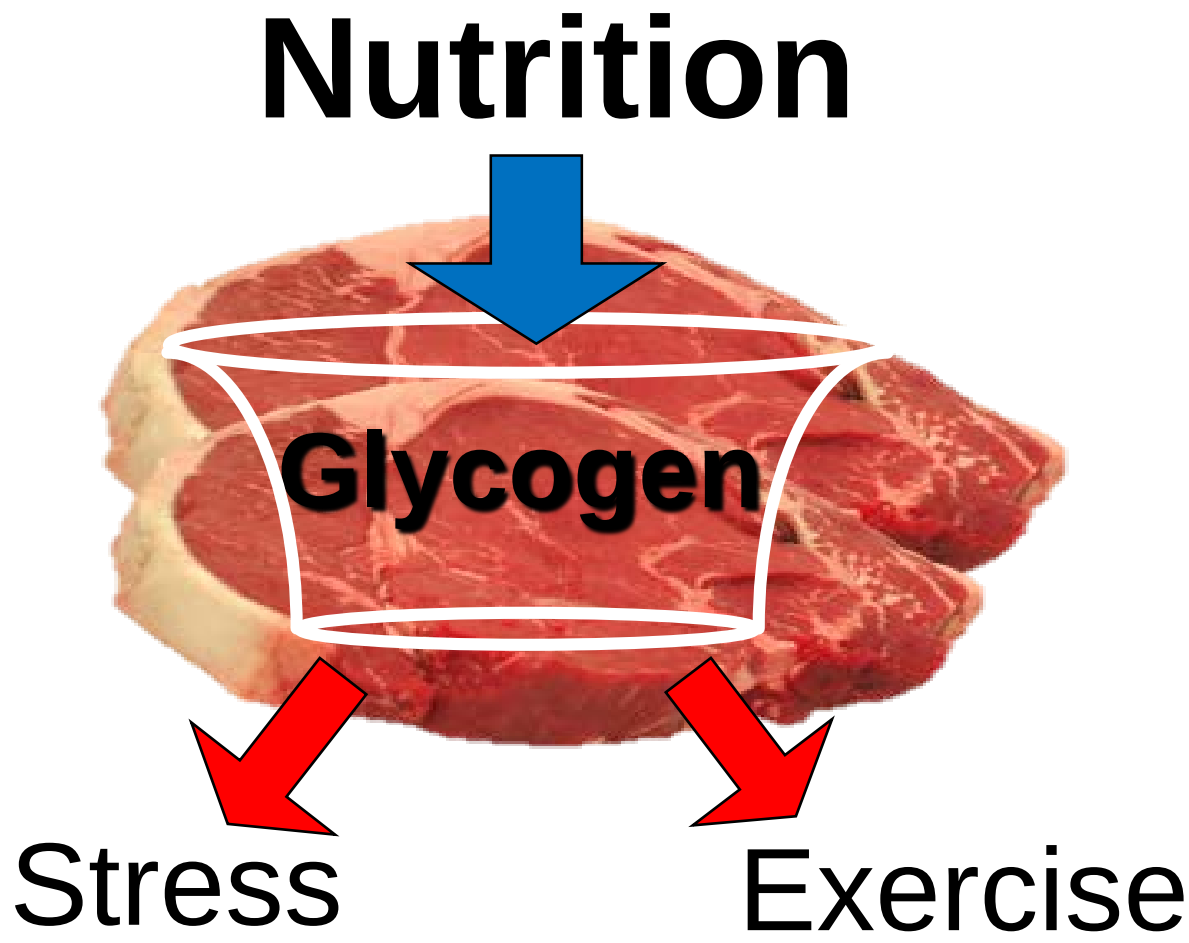
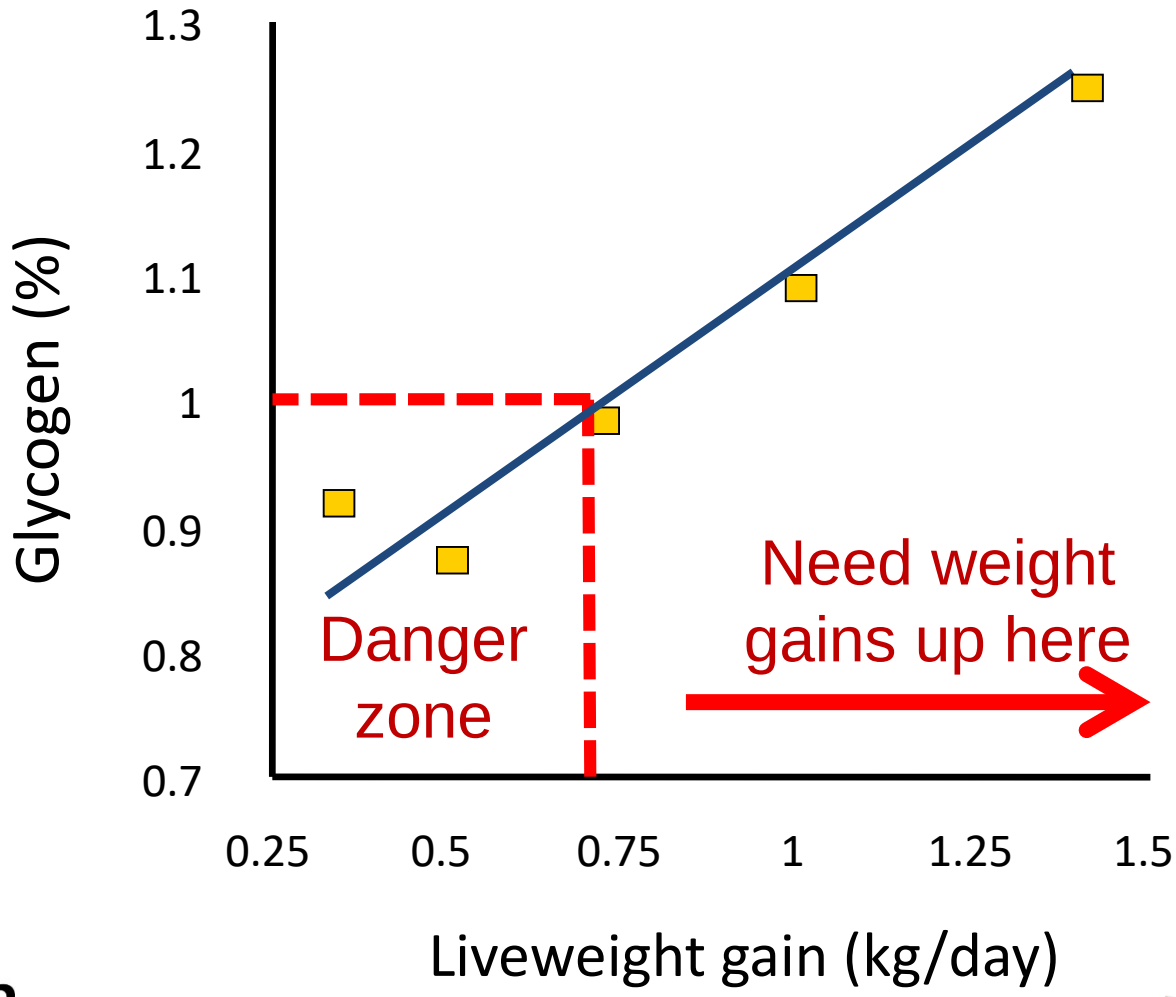
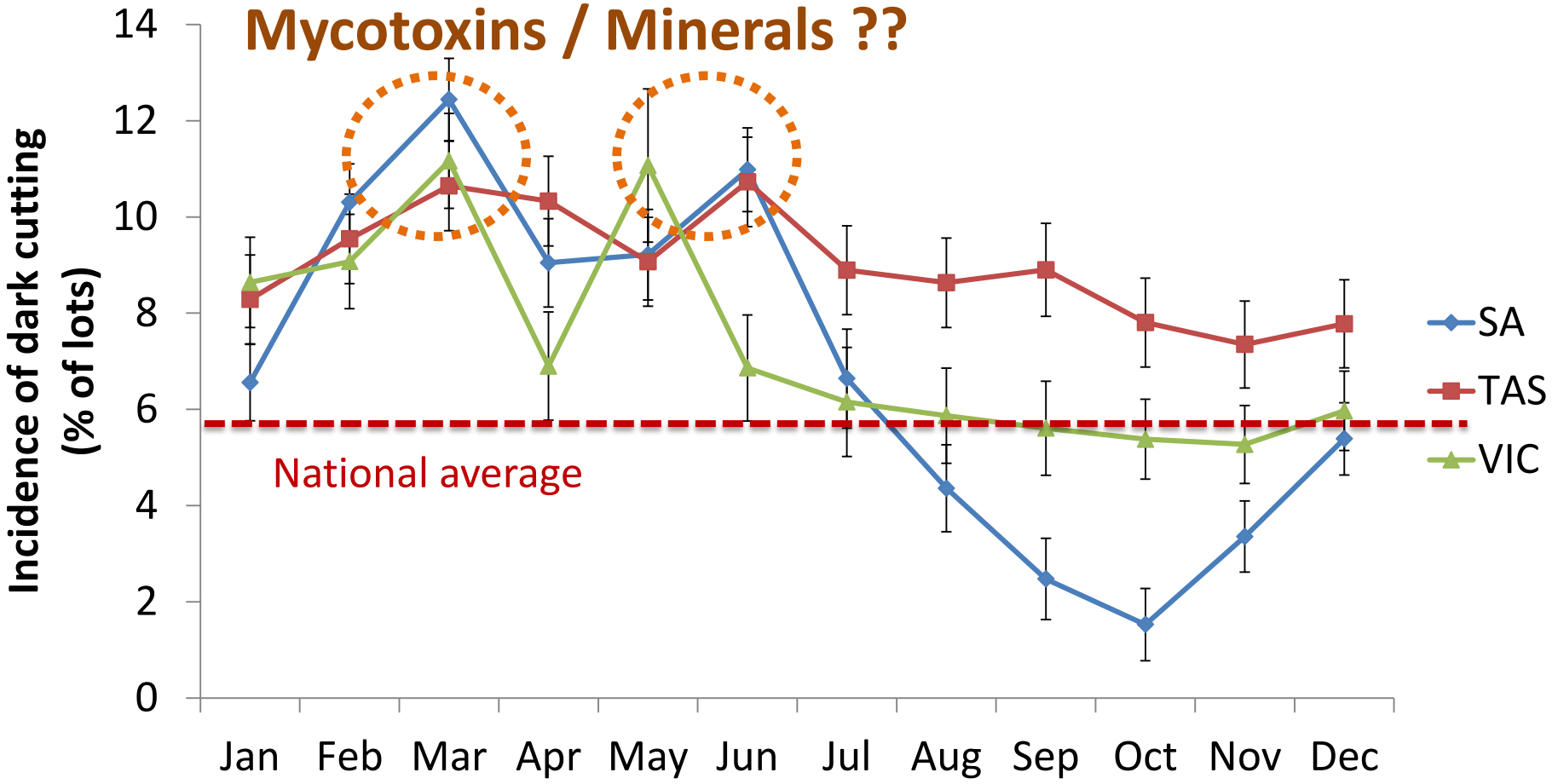
What dictates muscle glycogen?



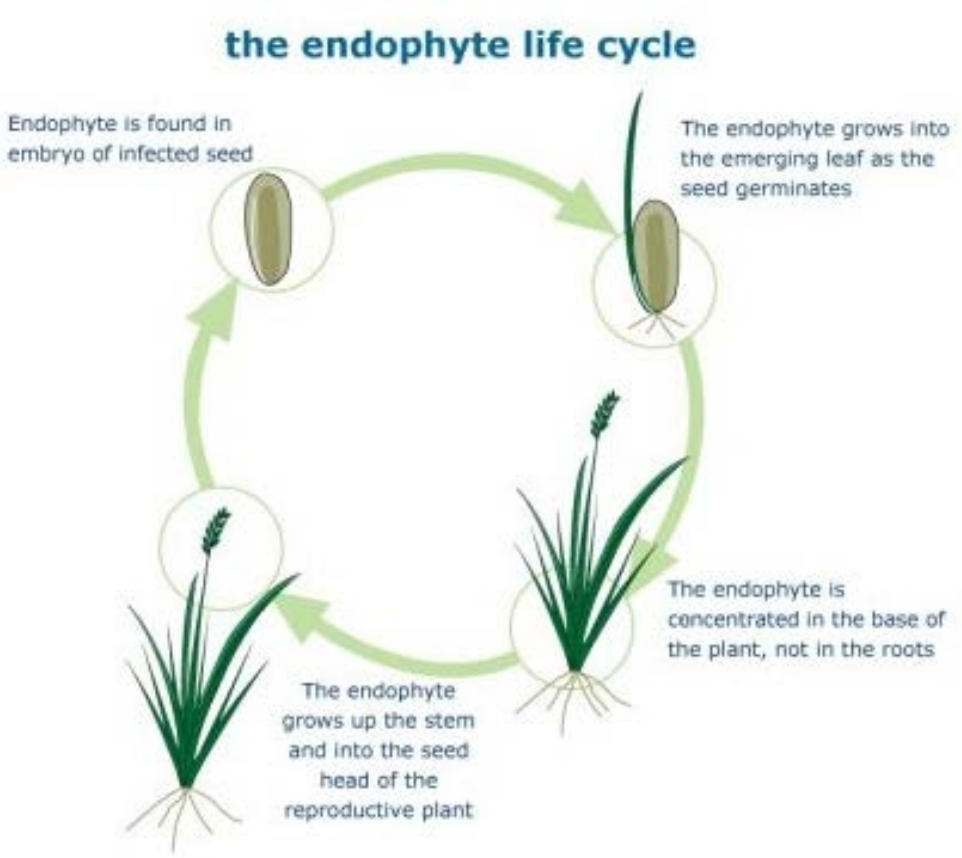
Predicting muscle glycogen



Incidence of dark cutting



Endophytes



- Pest resistance
- Disease resistance
- Drought tolerance

- Can produce **<u>mycotoxins –</u>** deleterious health effects

- Many classes of mycotoxins:
  - Lolitrem B
  - Ergovaline
  - Ochratoxins
  - Trichothecenes
  - Aflatoxins
  - Fumonsins
  - Zearaleones
  - Ergot Alkaloids

GASTROINTESTINAL

- Impaired rumen function
- Gastroenteritis
- Diarrhoea

THERMOREGULATION

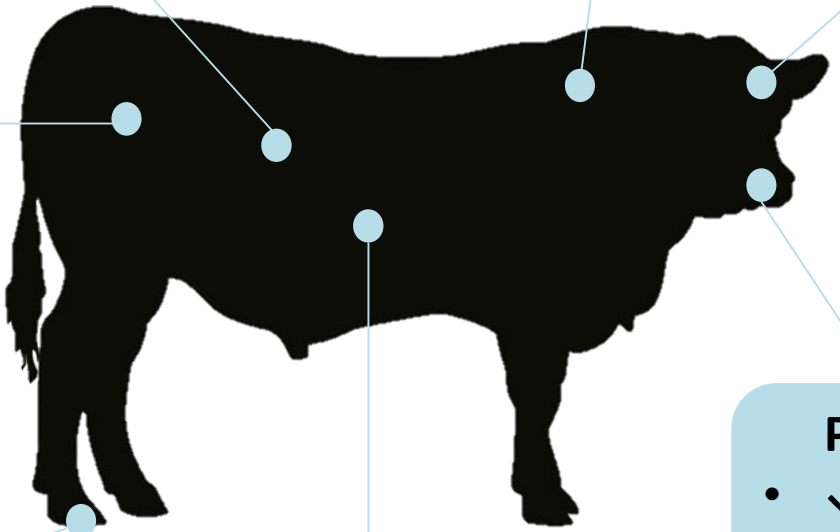
- Heat stress

NEUROTOXIC

- Convulsions

REPRODUCTIVE

- ↓ conception rate
- Embryonic loss
- Abortions
- ↓ testicular development
- ↓ sperm production



PERFORMANCE

- ↓ feed intake
- ↓ feed efficiency
- ↓ ADG

DERMAL

- Vasoconstriction
- Lameness (Laminitis)

IMMUNOSUPPRESSION
LIVER DAMAGE

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Adapted from Biomin effects of Mycotoxins on Ruminants. www.biomin.net

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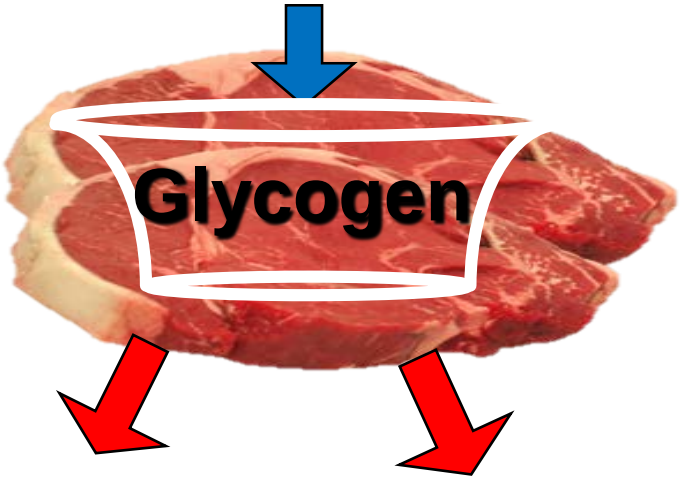
Magnesium – what is it all about?

- Plays a key role in many systems

Magnesium – what is it all about?

↓ FEED INTAKE

Nutrition



↓ MAGNESIUM (HYPOMAGNESAEMIA)

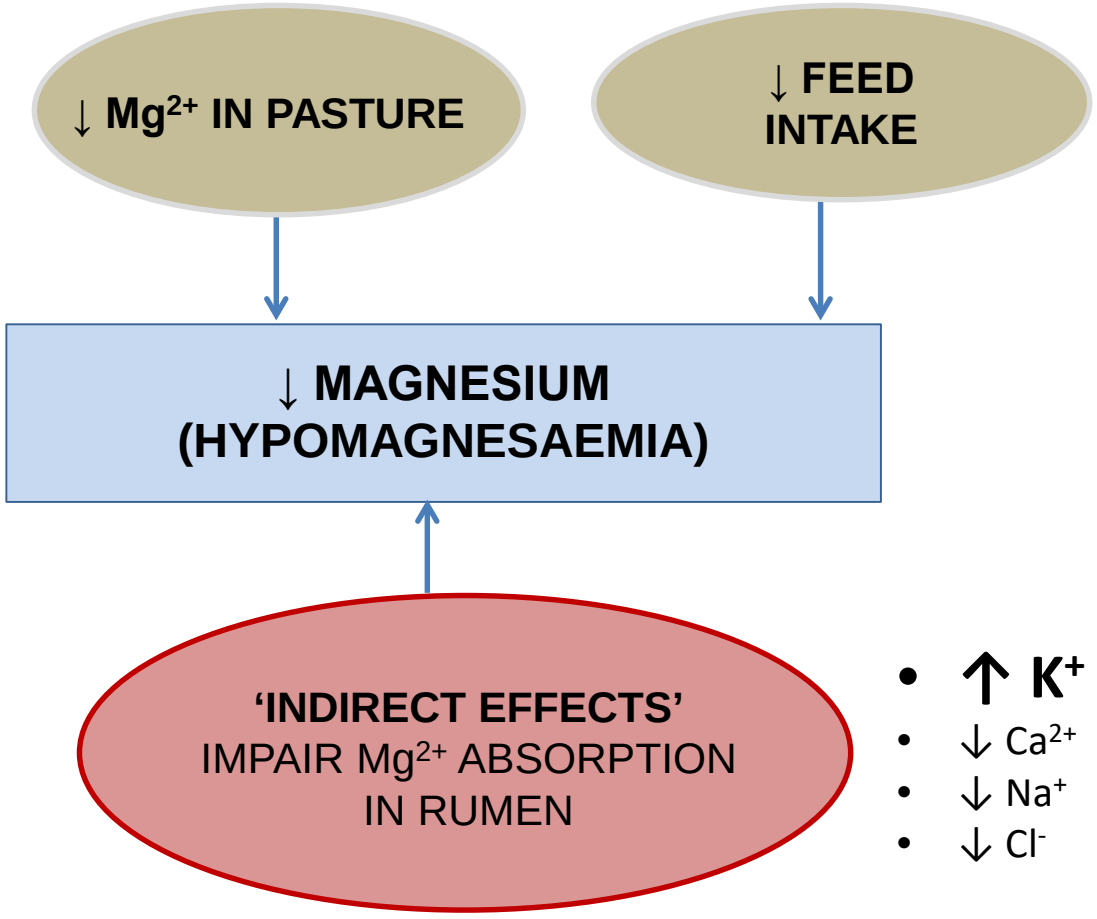
↑ ADRENALINE RELEASE

Stress

Exercise

↑ MUSCLE TWITCHING

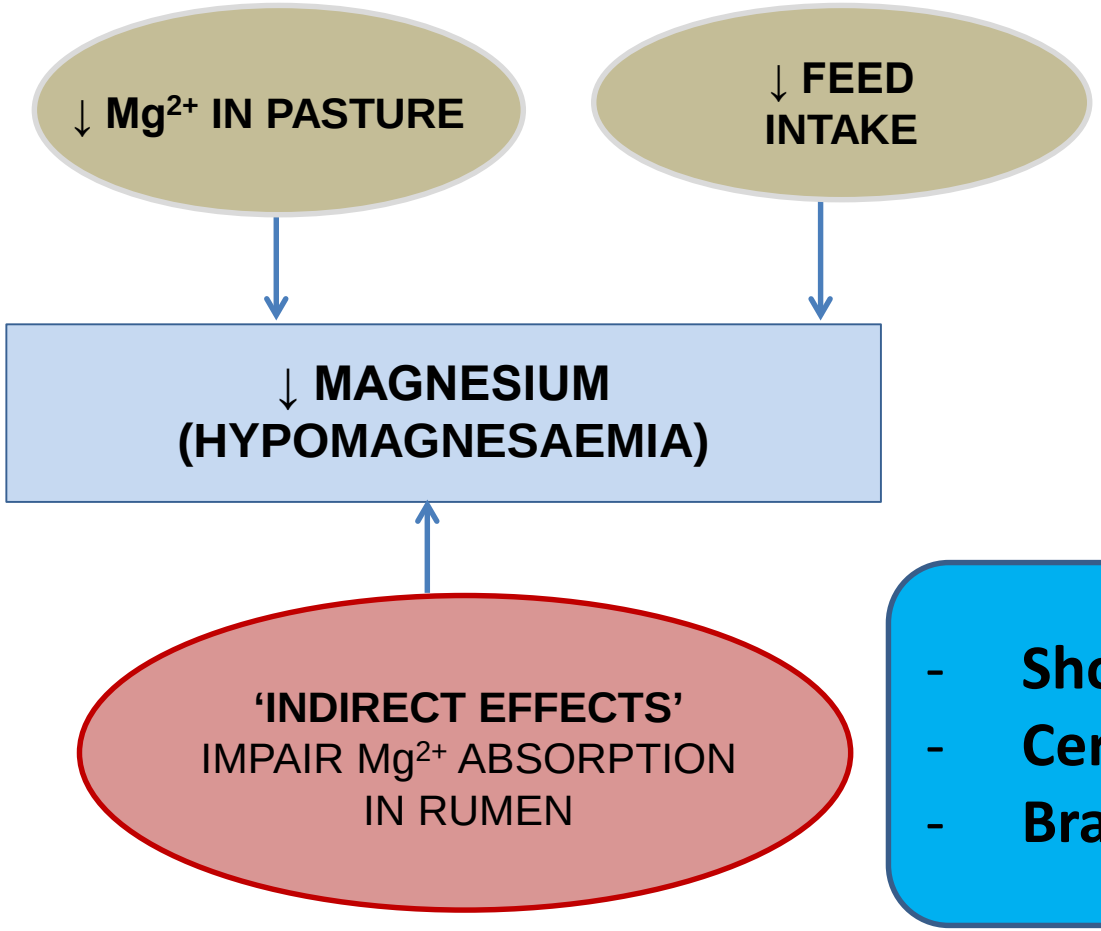
What causes low magnesium?



- ↑ K^+
- ↓ Ca^{2+}
- ↓ Na^+
- ↓ Cl^-

- ↑ protein ↓ energy
- ↑ moisture diet
- ↓ effective fibre
- ↑ fertiliser K and N

What causes low magnesium?

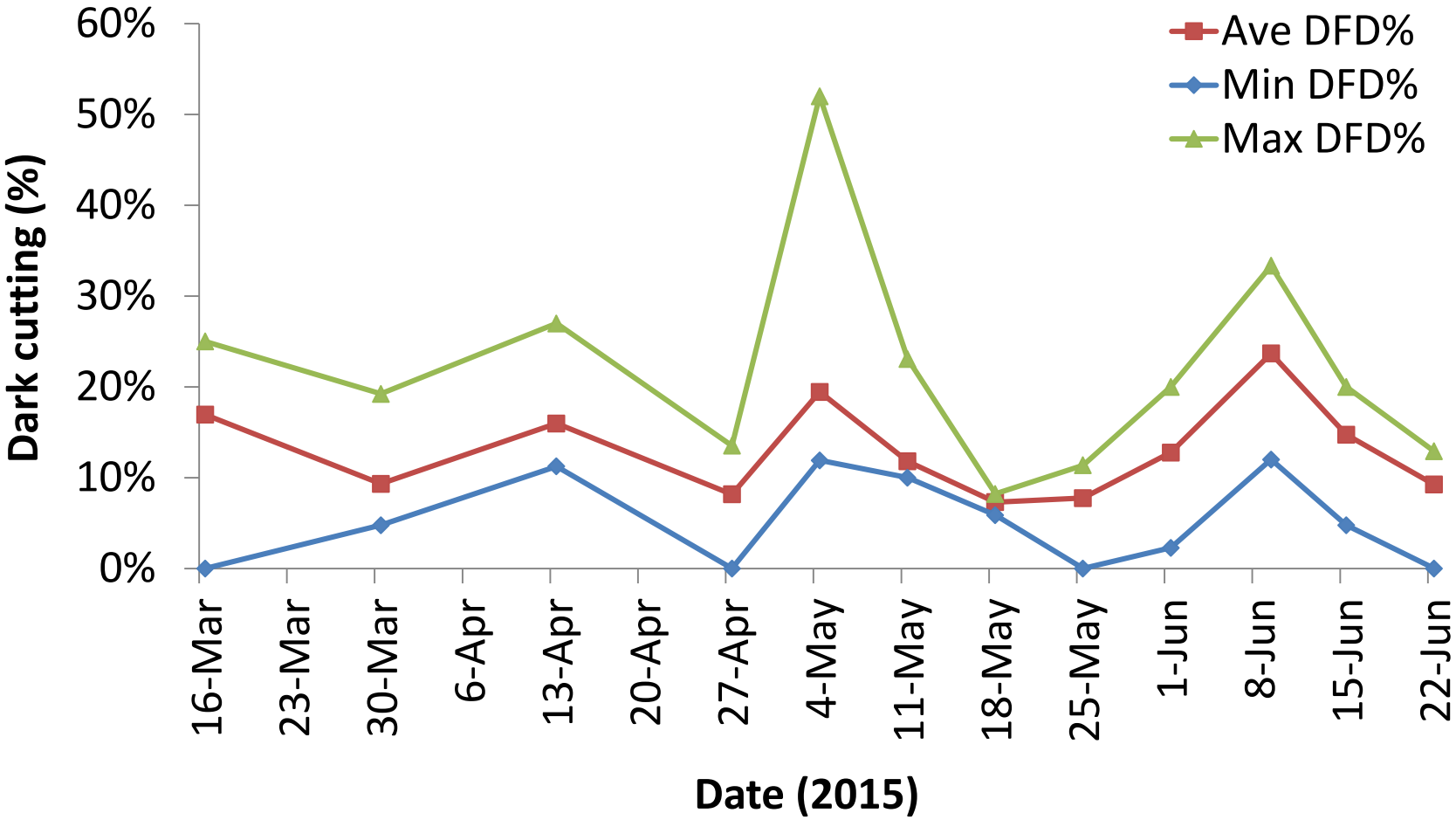


- **Short grass-dominant pasture**
- **Cereal forages**
- **Brassicas**

King Island experiment

- 3185 cattle in 66 groups
- Animal / management / environmental factors

Average dark cutting rate



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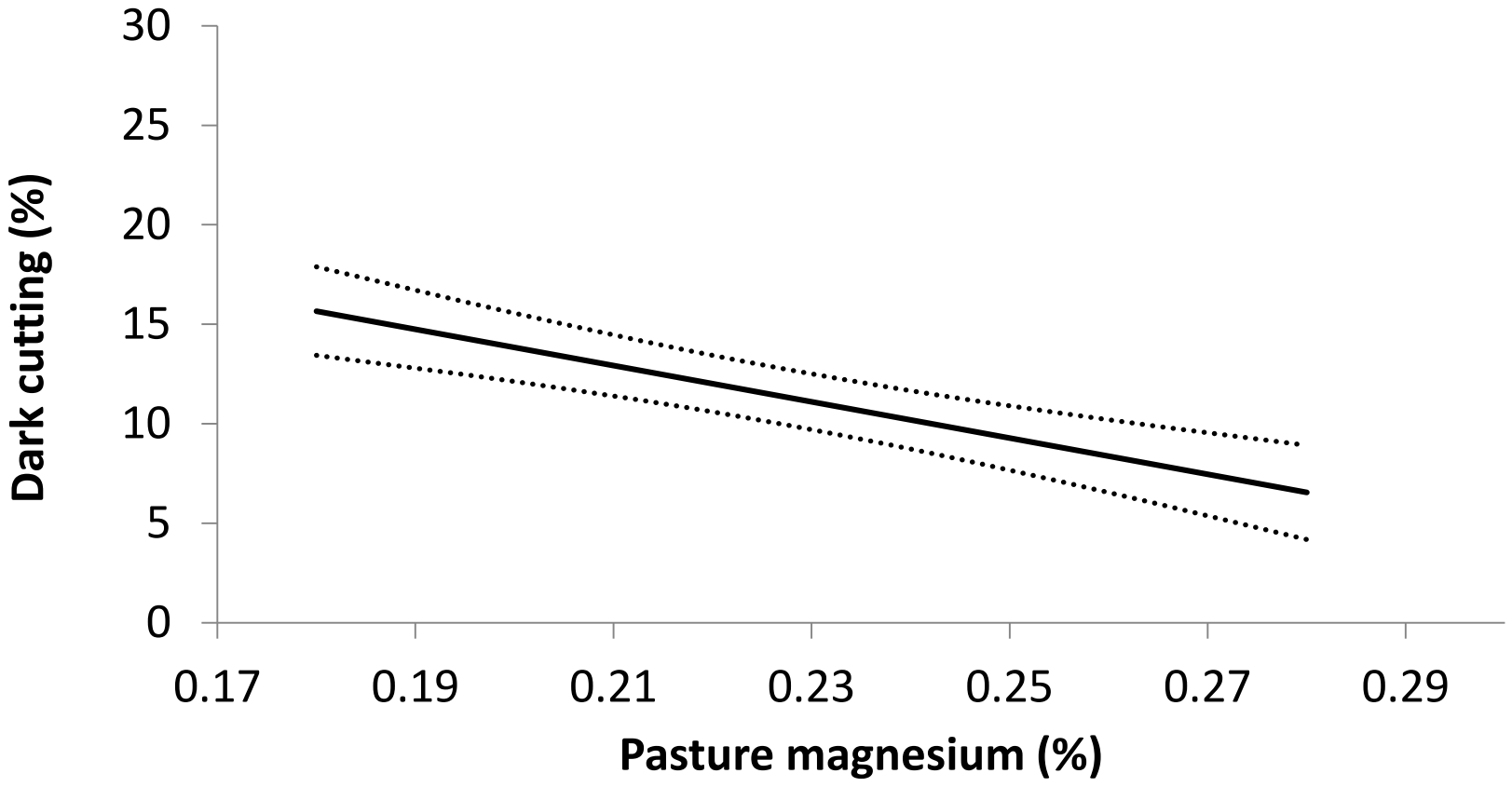
Results #1 Pasture magnesium



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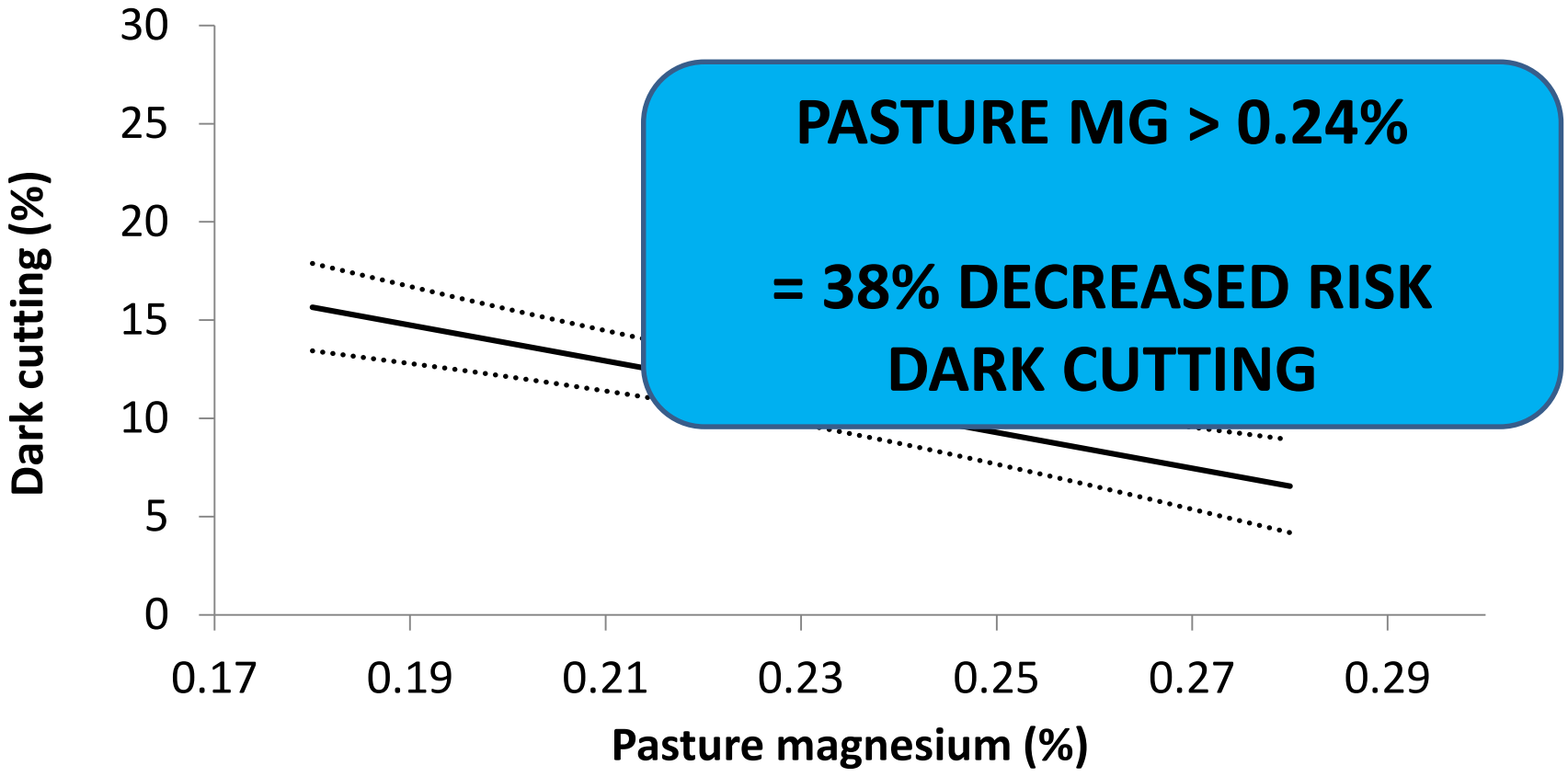
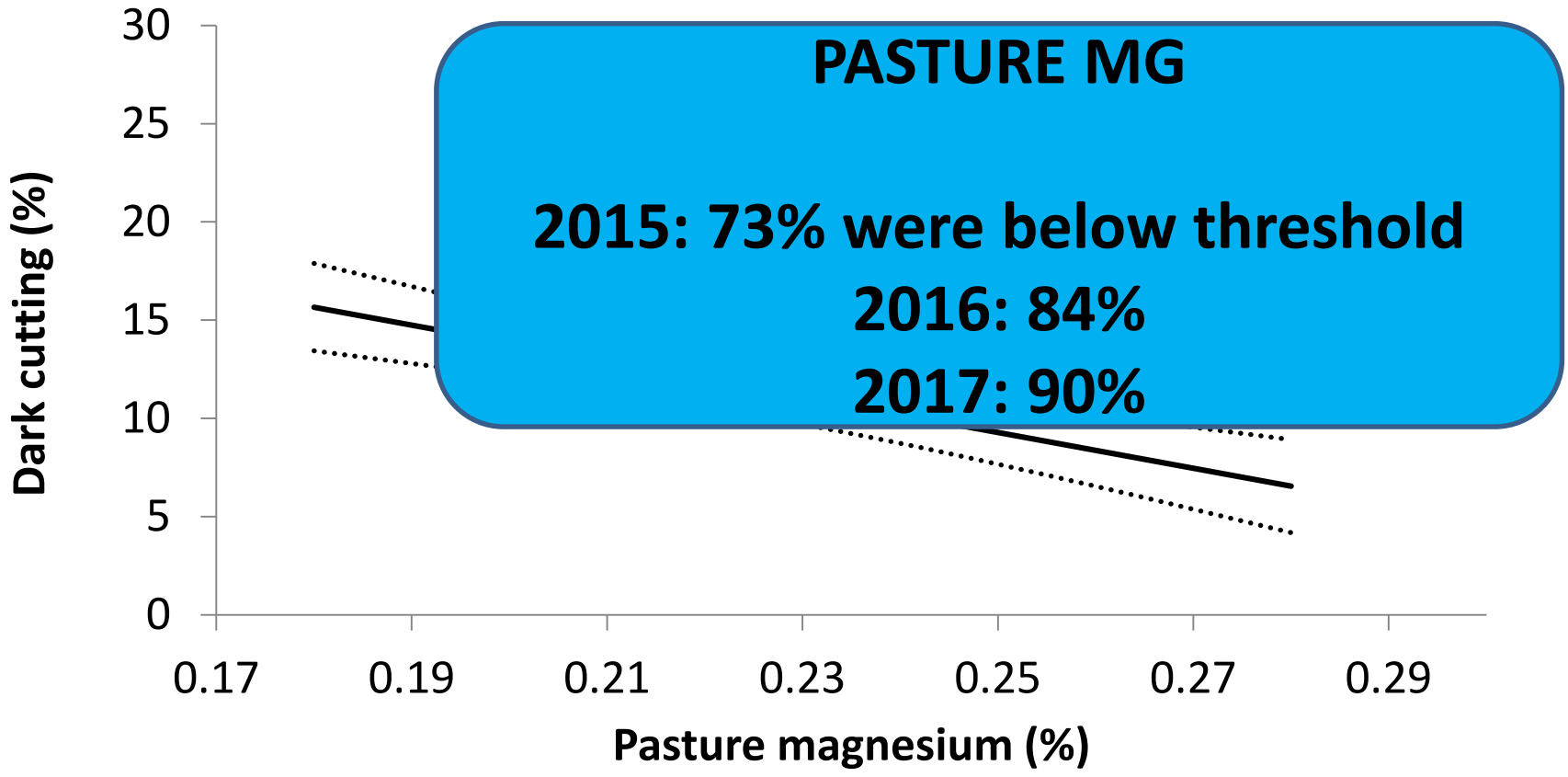
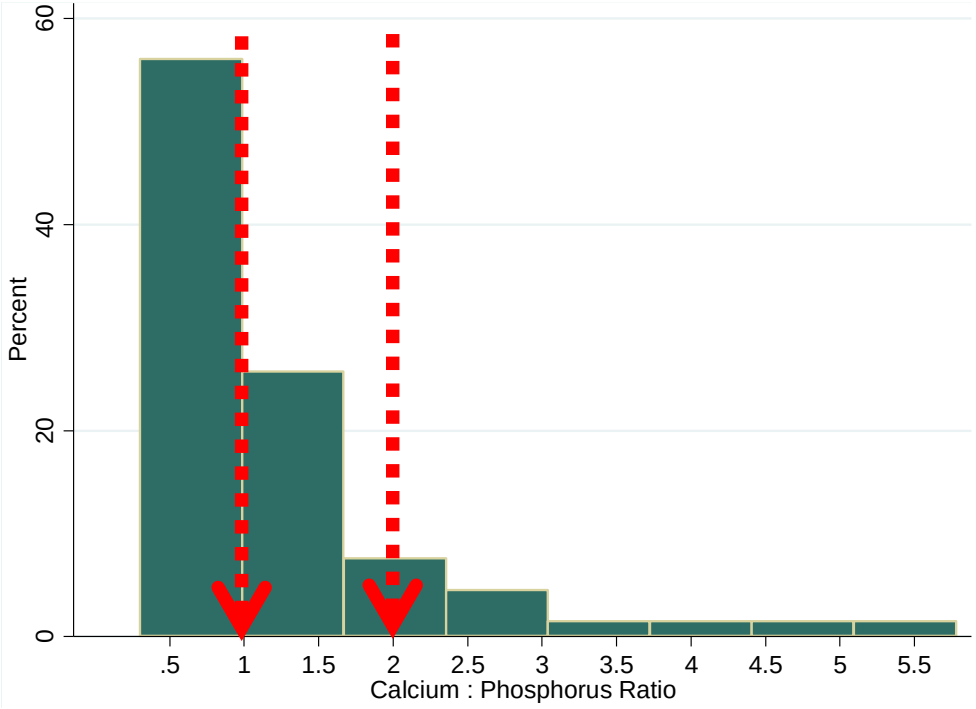
Results #1: Pasture magnesium



Results #1: Pasture magnesium



Pasture calcium



Bone, muscle function, immunity, energy

**Ca:P ratio CRITICAL

Ideal 2:1

Minimum > 1:1

Calcium deficiency compounded by low magnesium!!

2015: 50% <1:1 (Autumn – Winter)

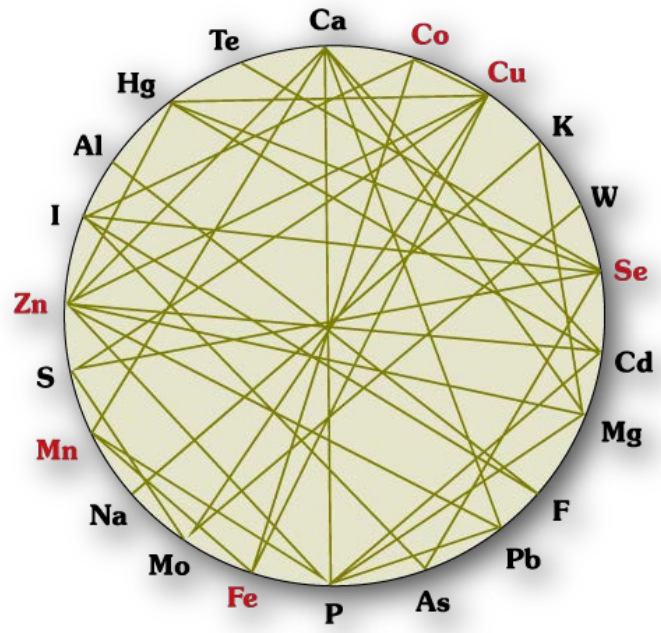
2016 and 2017: 100% < 1:1 (Winter)

What about the other minerals?

- King Island
  - Copper 10% deficient
  - Selenium 13% deficient
  - Zinc 54% deficient

- Copper and zinc: impact on MSA marble score and rib fat depth

- High energy = greater fat deposition



Result #2: Water

- 50% ↑ risk dark cutting in mobs drinking **dam water**

- ↑ water palatability
  - = ↑ water intake
  - = ↑ feed intake
  - = ↑ glycogen storage

Result #2: Water

- 50% ↑ risk dark cutting in mobs drinking **dam water**

- Dam pumped straight into trough:
  - 10-16% ↑ **growth rate**

- Spring-fed / filtered into trough:
  - 20% ↑ **growth rate**

Result #3: Supplementary feed

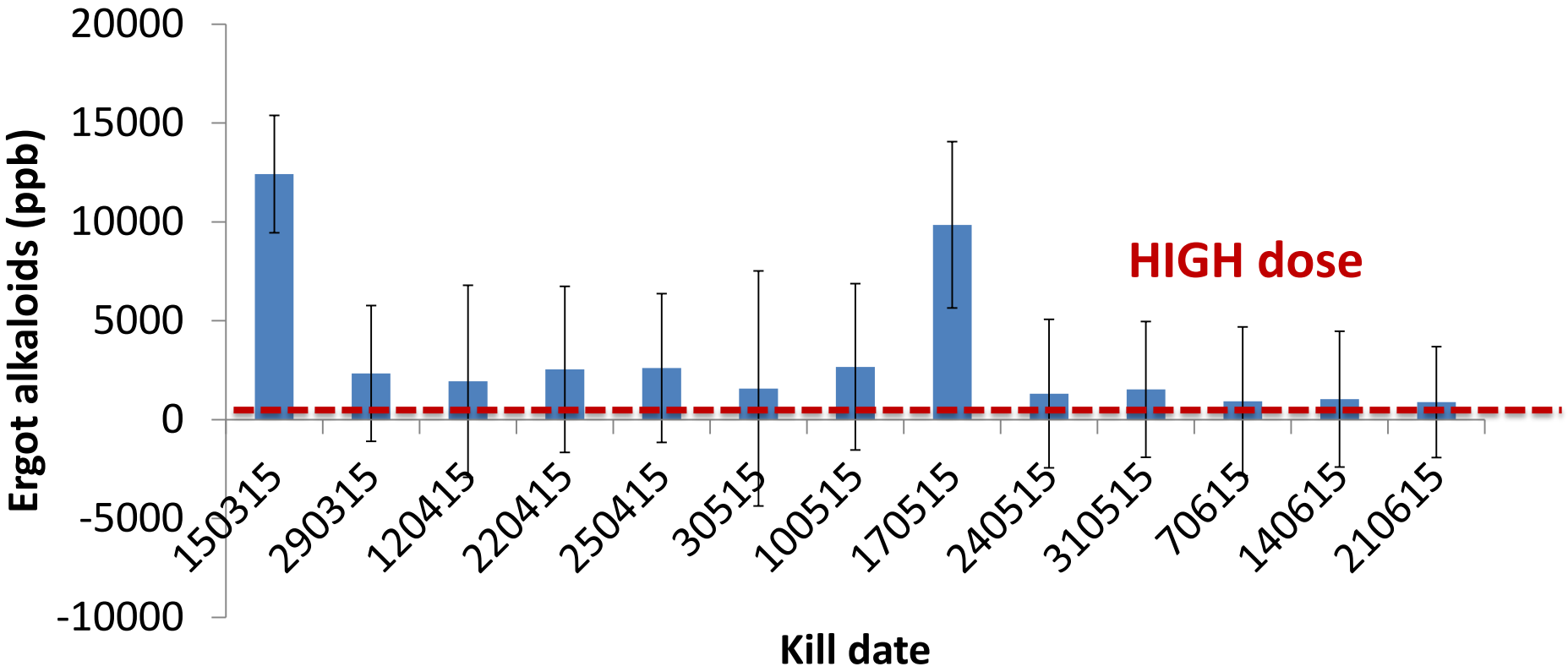
- 30% ↓ risk dark cutting in mobs fed supplementary feed in the last week before slaughter

- ↑ Metabolisable energy
- ↑ Human habituation
- ↑ Effective fibre = slower rumen transit rate?
- Dilution of mycotoxins?

Result #4: Mycotoxins

- Are out there!
  - 66 pasture tested
    - 100% had >3 major families
    - 20% had all 6 major families
- My animals don't have staggers…
  - 64% Tasmanian beef farmers reported staggers
- **SUBCLINICAL EFFECT IS THE GREATEST RISK**

Result #4: Mycotoxins



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What do we do with these results?

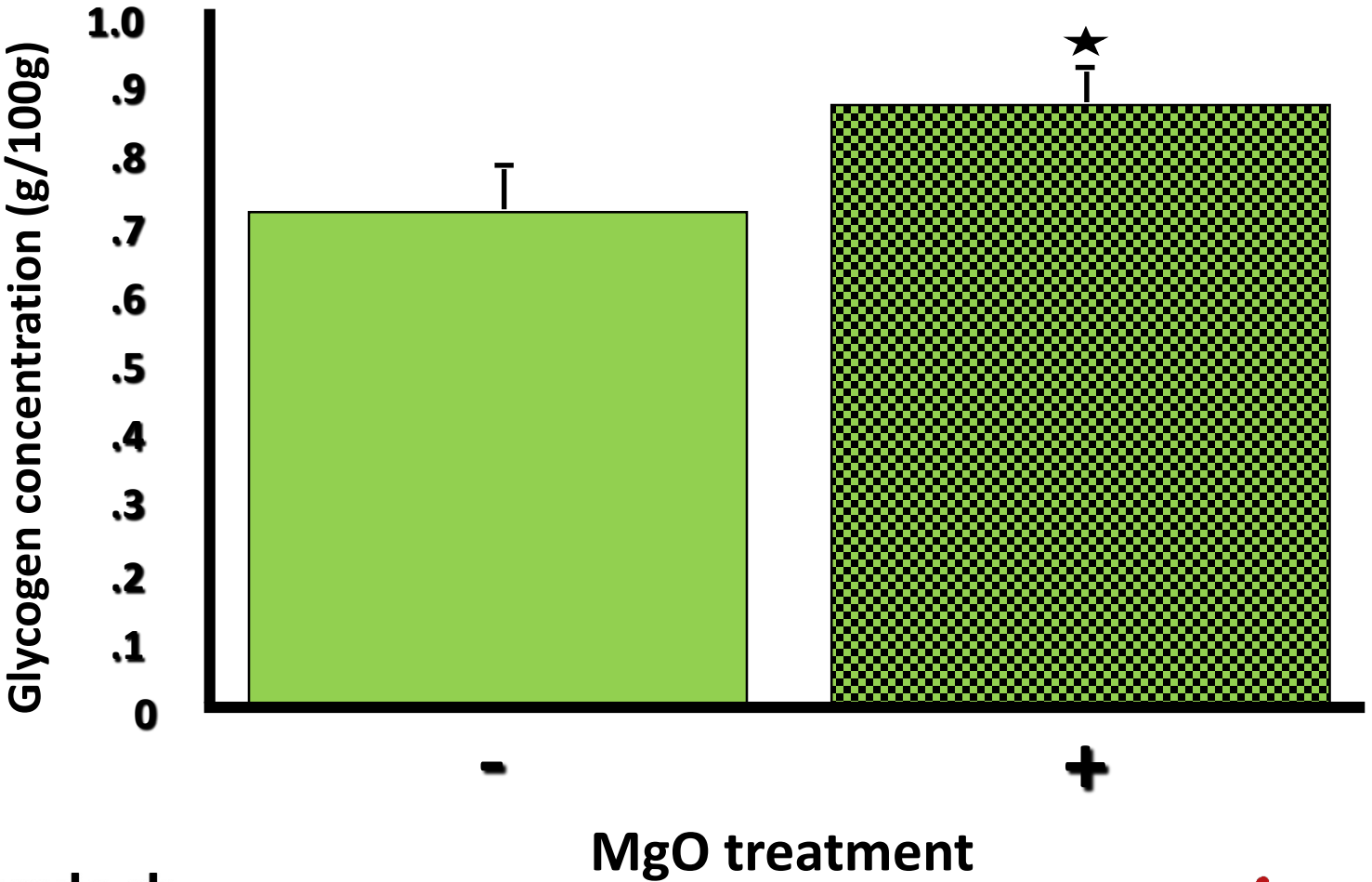
1. Magnesium

1. Mycotoxins

Pre-slaughter magnesium supplementation SHEEP

- Sheep: Graham Gardner Murdoch University
  - Short-term supplementation of MgO at 1.0% of the ration
  - Exercise trial
  - Slaughter muscle glycogen measurement

Pre-slaughter magnesium supplementation SHEEP



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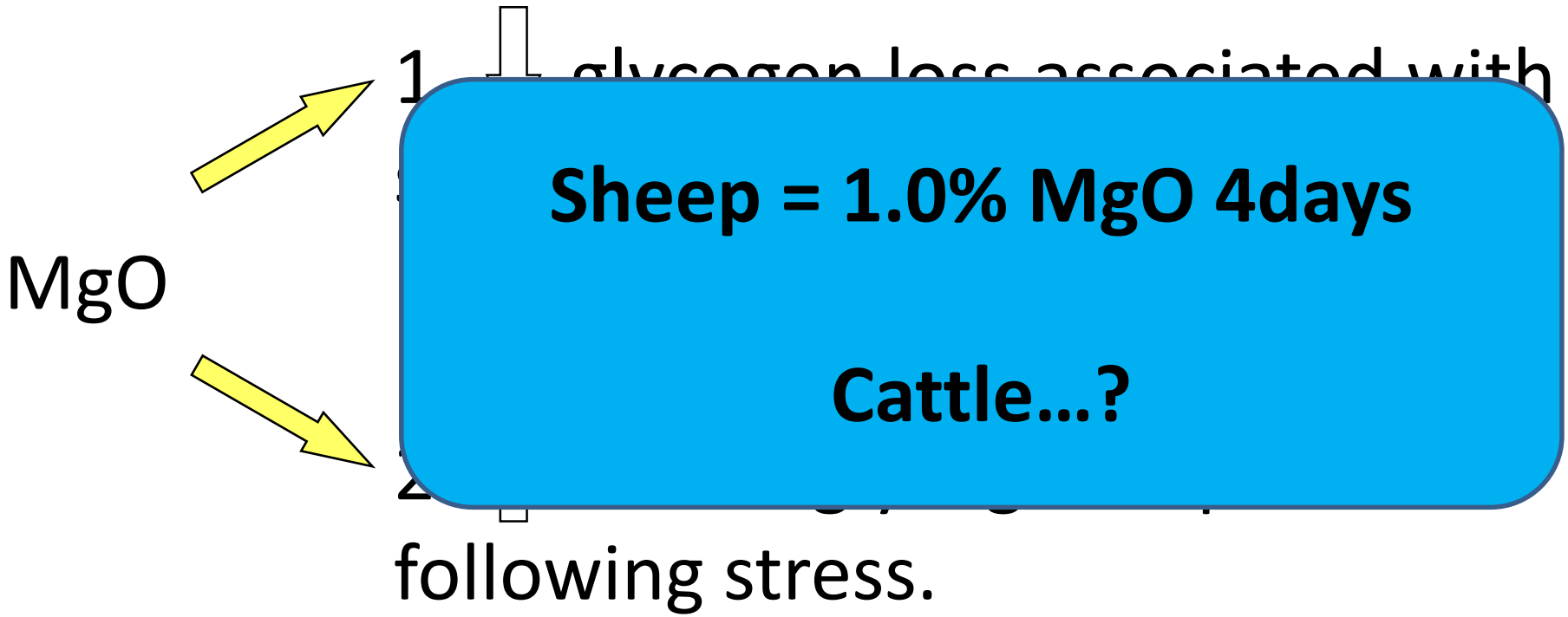
Pre-slaughter magnesium supplementation CATTLE

- King Island 2016 – 17
  - GM-free canola meal-based pellet
  - 46g $MgSO_4$ + 9.5gm MgO / day

…no difference in muscle glycogen

Pre-slaughter magnesium supplementation



Mycotoxins

- Pasture renovation with novel endophyte cultivars

- Mycotoxin binders
  - Adsorbents bind mycotoxins
  - Enzyme inactivation and conversion to non-toxic metabolites

Take home messages

- Pasture magnesium %
- Water source
- Supplementary feed (seven days before slaughter)
- Mycotoxins

Tools, resources & training

- Pasture mineral testing: $80-100
  - Magnesium, calcium, sodium, potassium DM%
  - Grass tetany index: K / (Mg + Ca) >2.2 = high risk hypomagnesaemia
- Animal (liver) mineral testing: $15 – $20 / head at slaughter

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Latest research for pasture-fed cattle

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