RED MEAT UPDATES

TASMANIA

23 July 2021

Where do trace elements fit into beef production systems?

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Agenda

- What are the key trace element deficiencies?
- Understanding key risk factors and diagnosis
- Cost effective supplementation

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Important interactions

- Intensification of system often induces more severe deficiency
  - Fertiliser
  - Pasture species
  - Pasture growth (dilution)
- Seasonal interactions
  - Winter - spring - summer
- Complicated interaction with other minerals

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What are the key trace elements?

- Copper
- Selenium
- Cobalt
- Iodine

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Trace element deficiency diagnosis

- Blood and liver analysis
- Iodine thyroid weight in relation to birth weight
- Also consider pasture molybdenum (Mo), selenium (S), copper (Cu)
  - Herbage Cu > 7 mg/kg (stock), 3 mg/kg pasture clover (response trial)
  - For every 4 mg/kg Mo, Cu availability reduces by 50%
- Response trials
- Soil copper, cobalt, selenium, iodine – waste of time

Copper deficiency – Where?

- Coastal sandy soils
- Granite soils
- Peat soils
- Other soils (interactions with molybdenum, sulphur and iron)
- High lime application (increase available)

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Copper deficiency complicated

- Low pasture copper levels
  - Low levels in specific soils
  - Grass<clover
  - Green feed < dry feed

- Complicated interactions
  - Peat swamps excess molybdenum applied
  - Liming pasture
  - High sulphur +/- iron

- Cattle 10/30 trials showed growth response
  - High moly rest between May-October
  - Difference disappeared by summer
  - No deficiency no response

Copper deficiency signs

- Hair coat colour
  - Angus bronze tinged, Hereford sandy colour
  - Not diagnostic alone (sodium, winter, cobalt)
- Low growth (10-15% max)
  - Plasma copper must be low >1 month
  - Often Mo > 3 mg/kg DM or Cu:Mo ratio < 2
- Diarrhoea
- Infertility – over stated?
- Anaemia

Copper supplementation

- Care with too much copper – toxic to livestock especially on dry pasture
- Copper pellets or All-trace bolus
- Copper injection cheap every 3 months in at risk period
- Water dispenser – no good in winter!
- Pasture supplementation ~0.5-2 kg copper/ha (up to every 15 years)

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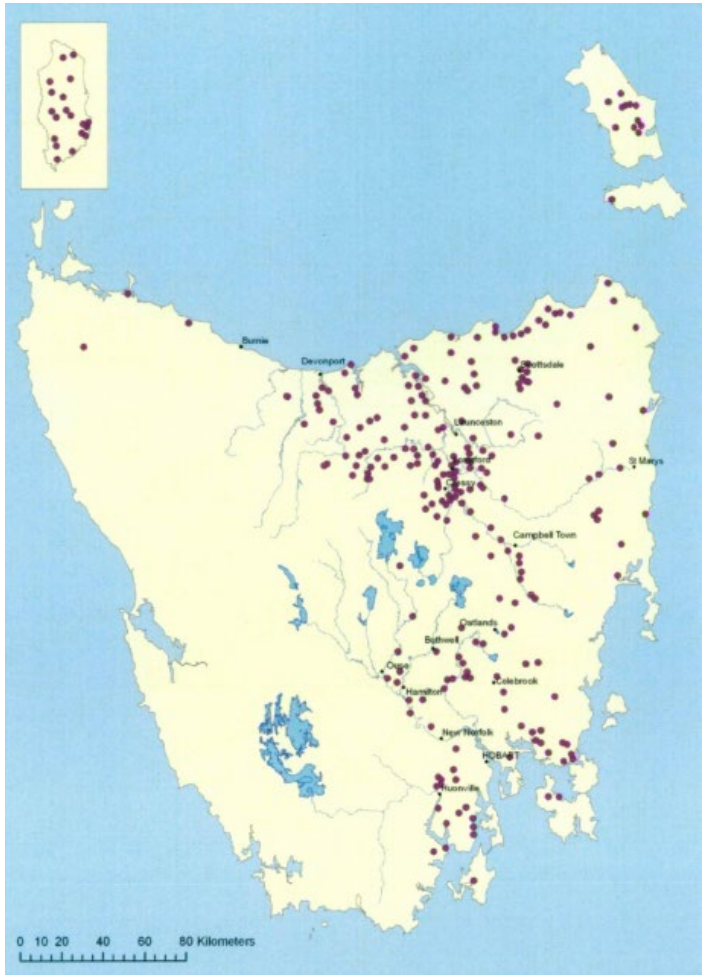
Selenium deficiency – where?



Mason 2007 selenium deficiency in sheep

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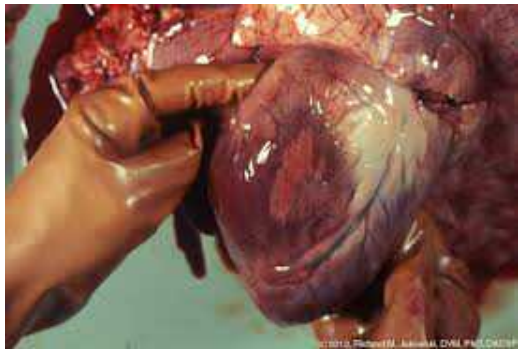
Selenium deficiency complicated

- Low pasture selenium levels
  - Lowest in winter and spring
  - Lowest in year with good autumn break with lush clover
- Complicated interactions
  - Dilution with extra pasture growth
  - Lower levels with high superphosphate application - due to Sulphur?
- Cattle trials
  - 1970's 1/30 trials showed growth response
  - 2010-11 4/4 trials substantial response

Selenium deficiency clinical signs

- White muscle disease
  - Calves weaners under stress – severe deficiency



- Poor growth - response to treatment 3-10 kg
- Poor fertility, susceptibility to disease retained membranes – hard to prove??

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Selenium trial response
Benefit cost ratio 6:1 to 20:1

	GPx (Selenium) levels (40-300)	Extra weight gain	Significance (P<0.05)
Mansfield (Mixed sex -Deposel)	18	**+ 3.2kg**	0.04
King Valley (Mixed sex -Deposel)	6	**+ 6.0kg**	0.02
Yarra Valley (Steers – Deposel)	7	**+ 6.0kg**	*0.29*
Yarra Valley (Heifers - Deposel)		**+ 11.1kg**	0.00
Seymour (Mixed sex - Deposel)	11	**+ 5.3kg**	*0.08*
Seymour (Mixed sex - Permatrace)		**+ 10.5kg**	0.00

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Selenium supplementation cattle

- Selovin LA injection protect young cattle 12 months
- Selenium pellets, Alltrace bolus
- Selpor pour-on (3 months)
- Water dispenser (no good in winter)
- Selenium in fertiliser (lasts 2 years)

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Cobalt deficiency

- Cobalt converted to Vitamin B_{12} in rumen

- Soil types
  - Coastal calcareous soils
  - Mountain Kraznosems (bound up Co)
  - Granite soils
  - Liming and high fertiliser can compound deficiency

- Clinical signs
  - Non specific Ill-thrift
  - Ketosis in cows, photosensitisation
  - Phalaris staggers cobalt protective but may not be deficient

Cobalt supplementation

- Vitamin B12 injection lasts for 10-12 weeks and is useful for short term protection
- Cobalt pellets, Alltrace bolus protection for 12 months
- Oral supplementation and licks are not recommended
- Water dispensers – not good in winter
- Pasture application variable response

Iodine deficiency - goitre

- Very wet years with >100mm/month for last 3 months pregnancy
- More common in sheep but a risk in spring calving herds – especially heifers in years with early autumn break
  - Poor calf survival
  - Enlarge thyroids – 0.4 g/kg birthweight lambs
- Iodized salt lick (potassium iodate)

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Top three take home messages

1. Substantial economic responses to trace element supplementation can be achieved only if deficiency occurs
2. Assess your herd's status before spending money
3. Intensification can induce more deficiencies so keep monitoring

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Tools, resources & training

- http://vro.agriculture.vic.gov.au/dpi/vro/vrosite.nsf/pages/trace_elements_pastures
- Trace elements for pastures and animals in Victoria
- This reference provides a comprehensive guide of all important trace elements including their impact, diagnosis and management.

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