AGVANCE
Success. Together.

Nutritional tools for reproduction: Part 2

Practical diagnosis and tools

Overview

- Mating checklist – identifying the gaps
- How does nutrition influence reproduction?
- Are the cows in ‘the zone’ for reproduction - using milk, wearable, and farm data?
- Tools for bringing cows into ‘the zone’

Mating checklist – identifying the gaps

- Energy balance – are the cows in PEB?
  Visual observation, BHBA in blood, and appetite vs production
- Are milk components in balance?
  Look at fat %, protein %, protein:fat ratio, and MUN
- Does the cow wearable data back up the milk data?
  Look at repro info, rumination, activity, and maybe pH/water intakes etc. if available
- Are Ca, Mg, P in the right balance in the feed backed up by blood?
- Do I have a robust trace mineral supplementation plan covering Cu, Zn, Co, I, Se, B, and Cr? Have I looked for suspected vitamin D and E, along with biotin deficiency?
- Are there any red flags in cow behaviour in the paddock or the shed, along with animal health dysfunction, that need attention?

How does nutrition influence reproduction?

1. Appetite/DM intake

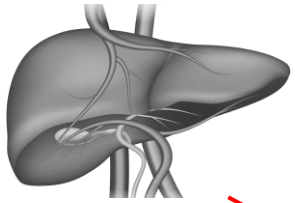
Greater appetite / DM intake = Increased energy and protein supply = Efficient liver Hormone production = **Strong heats and early conception**

Increase feed density → PHYSICAL CONTROLS

Increase feed quality → HORMONAL CONTROLS

Physical and hormonal controls

LIVER



Stimulates release of opioids

VAGUS NERVE FIRING

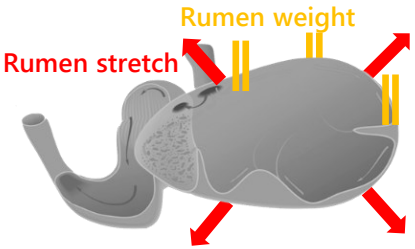
Stimulates release of **insulin** which stimulates *increased* glucogenesis/appetite

Opioids stimulate more production by releasing oxytocin and glucocorticoids

Nutrient from rumen digestion

Heaps of food available = EAT MORE!

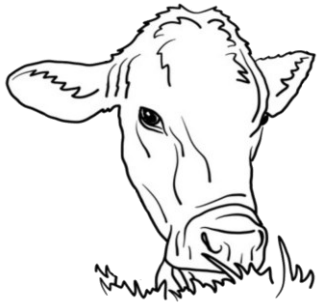
MILK PRODUCTION



RUMEN & LIVER Signals give 'full' feeling

Cow starts eating, 'hungry' feeling

RUMEN

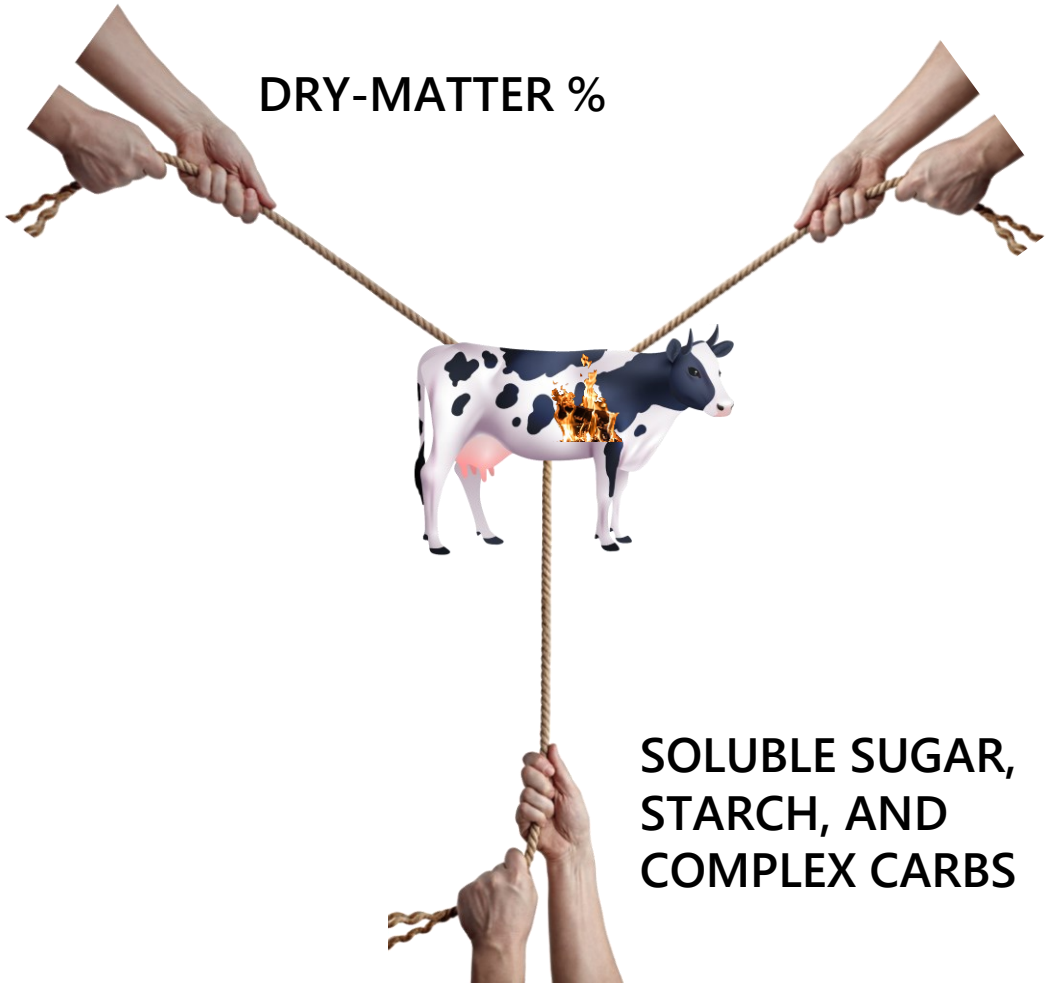


DESIRE TO EAT

How does nutrition influence reproduction?

1. Appetite/DM intake
2. Feed energy density

Drives glucose production and appetite
= Effective hormone function
= Effective immune function



How does nutrition influence reproduction?

1. Appetite/DM intake
2. Feed energy density
3. Protein quality and quantity

- Protein drives liver gluconeogenesis
- MUN levels should be carefully considered
- Non-protein nitrogen vs complex protein
- Protein status in the animal from dry off to mating

Drives gluconeogenesis and appetite
= Effective hormone function
= Effective immune function

GLUCOGENESIS
Carbohydrate-produced GLUCOSE

GLUCONEOGENESIS
Protein and fat-produced GLUCOSE

How does nutrition influence reproduction?

1. Appetite/DM intake
2. Feed energy density
3. Protein quality and quantity
4. **Mineral and vitamin nutrition**

- Balanced mineral supplementation is important: Calcium, magnesium, phosphorus, salt, copper, zinc, iodine, cobalt, selenium, boron, chromium, biotin, vitamin D, and vitamin E.
- Blood test for status: Ca, Mg, and P… Se, Zn, B12, and pooled I
- Herbage test for full diet analysis
- Use blood and feed data to rebalance supplementation

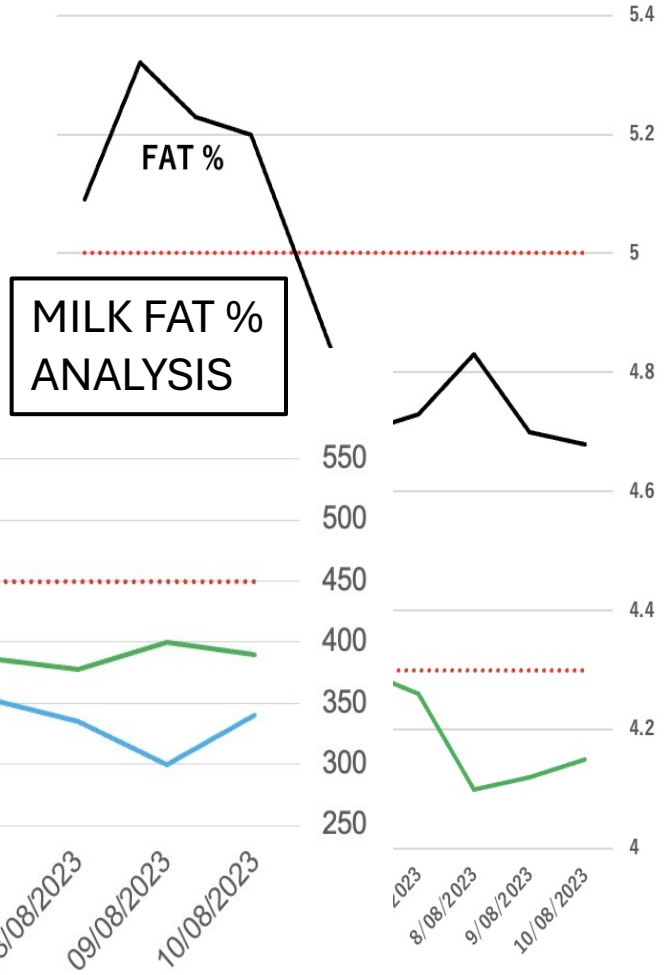
Energy metabolism and osmotic balance protects and fuels liver function
= Effective hormone function
= Effective immune function

How does nutrition influence reproduction?

1. Appetite/DM intake
2. Feed energy density
3. Protein quality and quantity
4. Mineral and vitamin nutrition
5. Rumen performance

Maximum fuel to liver
Minimise oxidative pressure on liver
= Effective hormone function
= Effective immune function

MANURE ANALYSIS

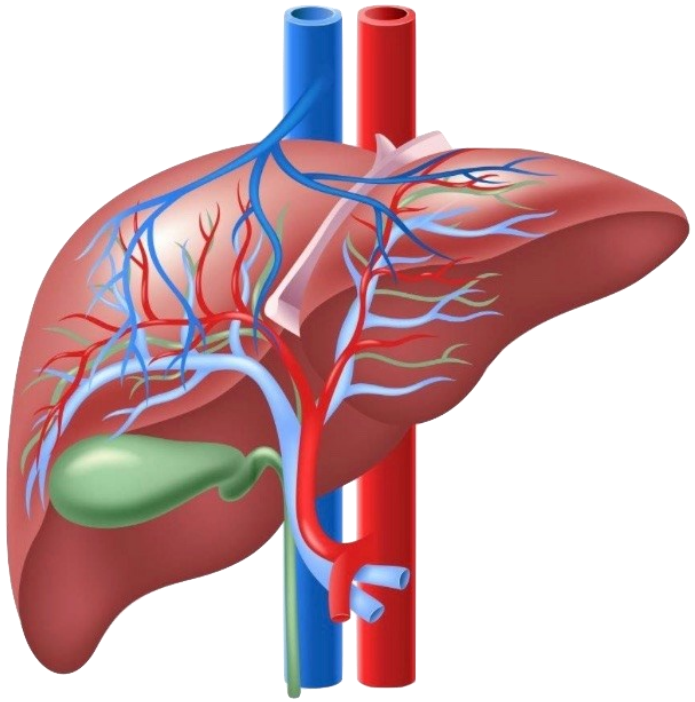


MILK FAT % ANALYSIS

RUMINATION ANALYSIS

How does nutrition influence reproduction?

1. Appetite/DM intake
2. Feed energy density
3. Protein quality and quantity
4. Mineral and vitamin nutrition
5. Rumen performance
6. Liver performance



All lead to = optimum liver performance

- Positive energy balance
- Sufficient feed metabolites
- Sufficient AA metabolites
- Sufficient mineral metabolites
- Sufficient vitamin metabolites
- Minimise rumen/diet stress
- Minimise cow stress

Are the cows in ‘the zone’?

It is key to NOT look at any one milk component in isolation – together they tell a story…

- **Production** per cow, kg DM/kg MS are important measurements
- **Fat %** gives us an indication of rumen stability and performance
- **Protein %** gives us an indication of energy being released from the diet
- **Protein:fat ratio** is a calculation giving us as indication of comparative balance only
- **Milk urea nitrogen** is a measurement of the amount of ammonia escaping the rumen not being utilised by rumen microbes
- **Rumination minutes** measurement of the amount of time cow ruminating
- **Activity minutes** measurement of the amount of time the cow is moving and head-down eating

Are the cows in ‘the zone’?

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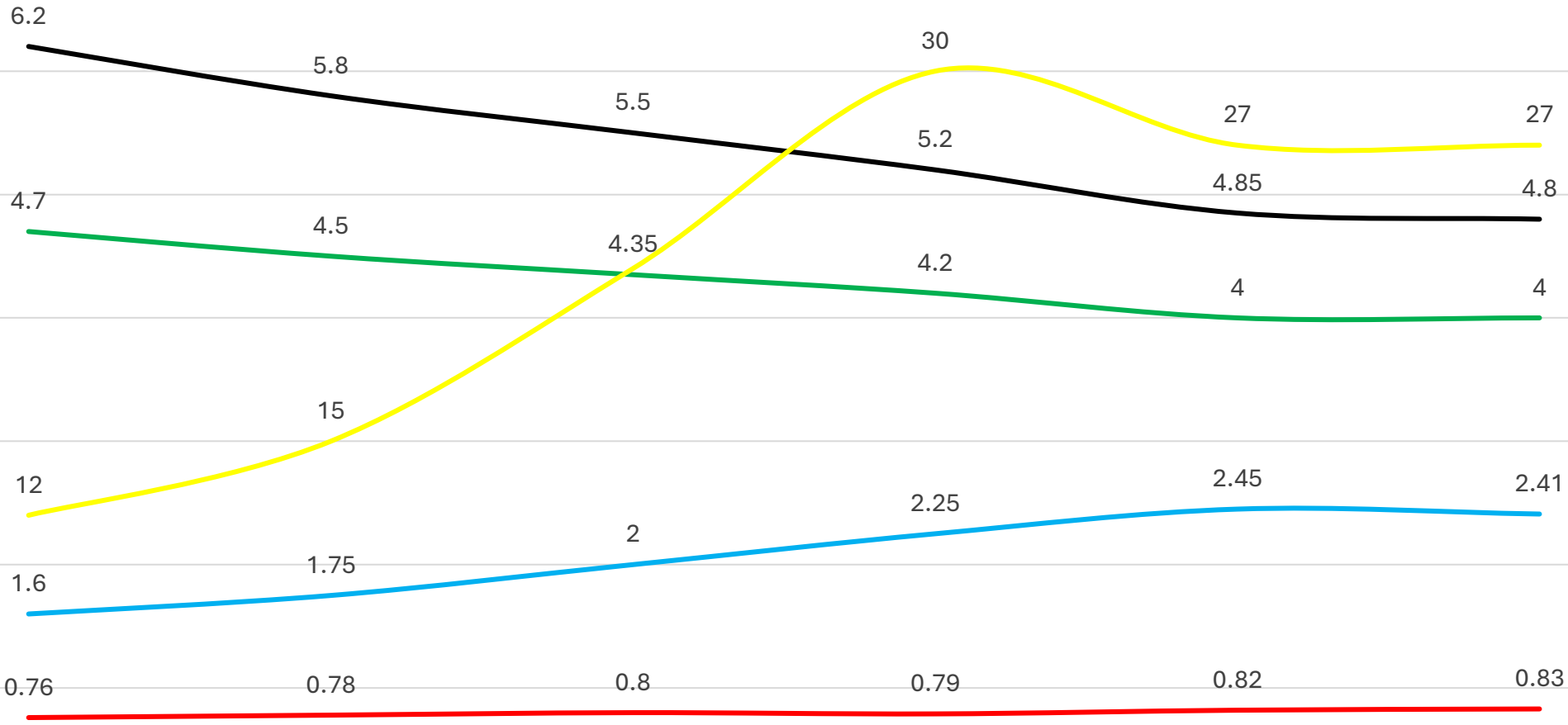
HIGH

Example – 470kg Kiwi-Cross herd



LOW

TRANSITION | CALVING | COLOSTRUM/RECOVERY | PEAK MILK | MATING

kg MS/Cow | Protein:Fat Ratio | Fat% | Protein% | MUN

My ideals at peak milk based on cow breed/liveweight

Cow breed (Liveweight)	Jersey (400kg)	Kiwi-Cross (450kg)	Friesian (500kg)	Holstein (550kg+)
Peak milk (MS/cow)	2.1kg	2.2kg	2.4kg	2.6kg
Fat %	5.6%	5%	4.7%	4.4%
Protein %	4.4%	4%	3.9%	3.7%
Protein:fat ratio	0.79 (0.78-0.82)	0.8 (0.79-0.83)	0.83 (0.80-0.84)	0.84 (0.81-0.85)
Milk urea nitrogen	22-28	24-30	26-32	28-34
Rumination (mins) **???**	400+??	440+??	480+??	520+??
Activity (Eating mins) **???**	380+??	420+??	460+??	500+??

(Data sourced from DairyNZ and my NZ farm data, checked against other NZ ruminant nutritionists)

Are the cows in ‘the zone’?

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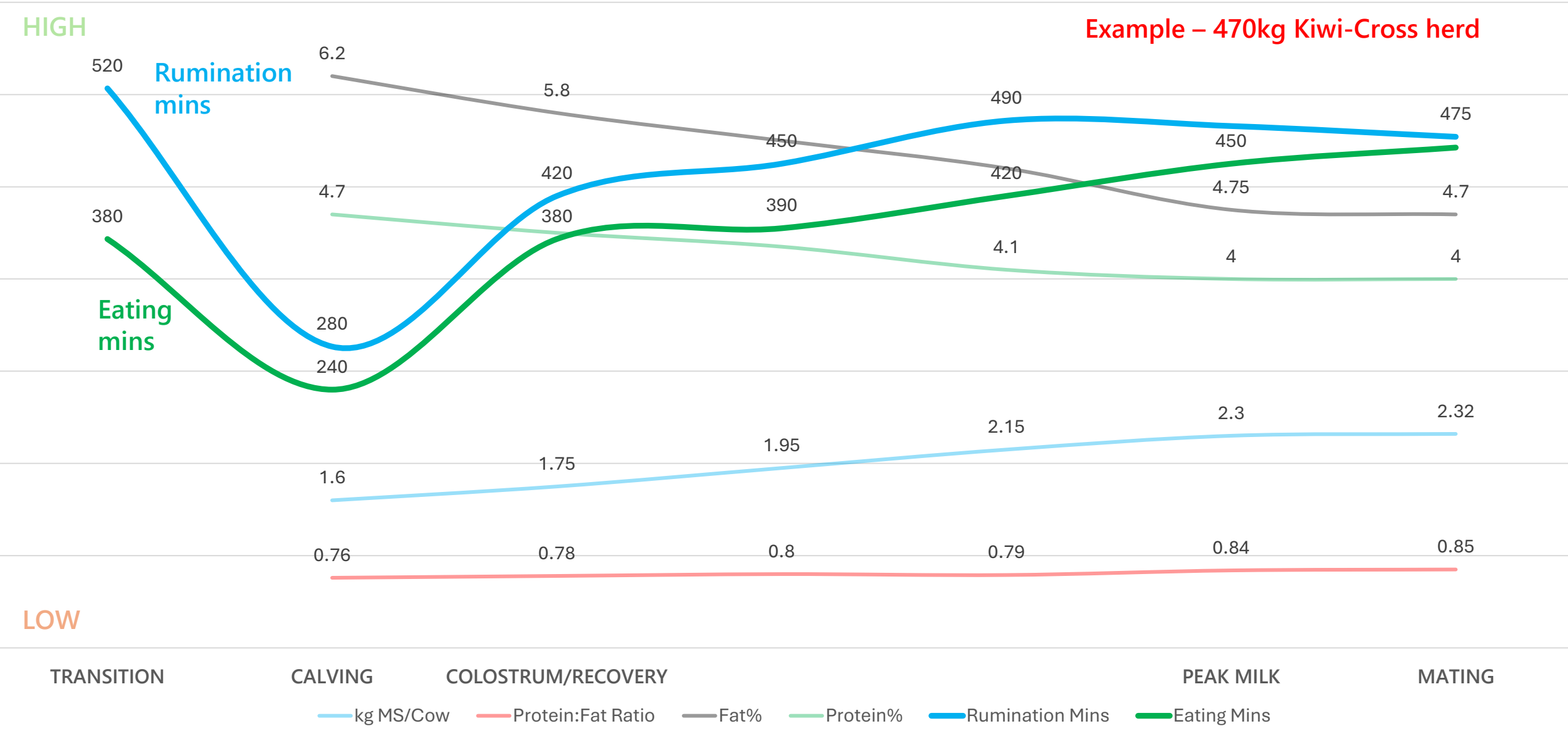
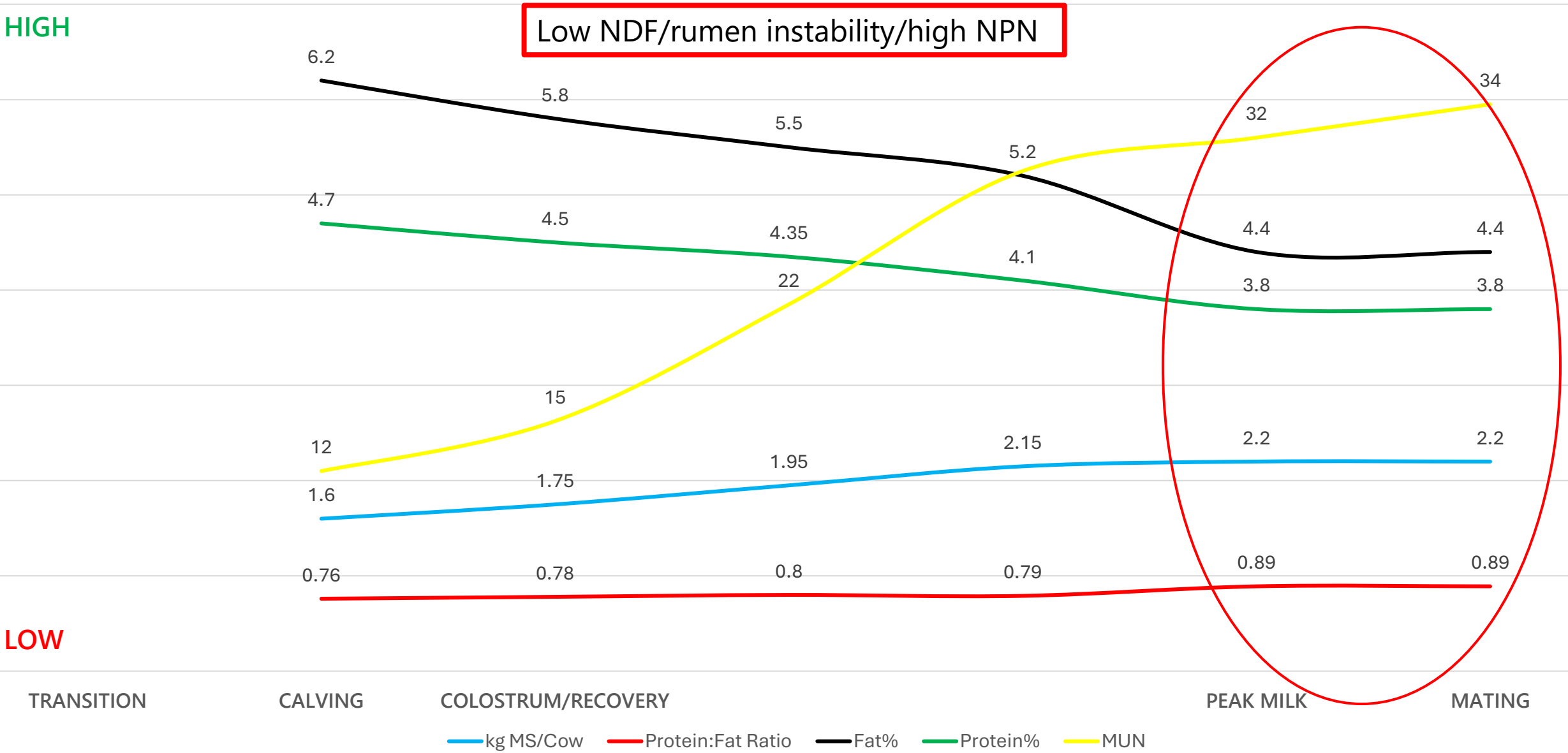


Are the cows in ‘the zone’?



Are the cows in ‘the zone’?

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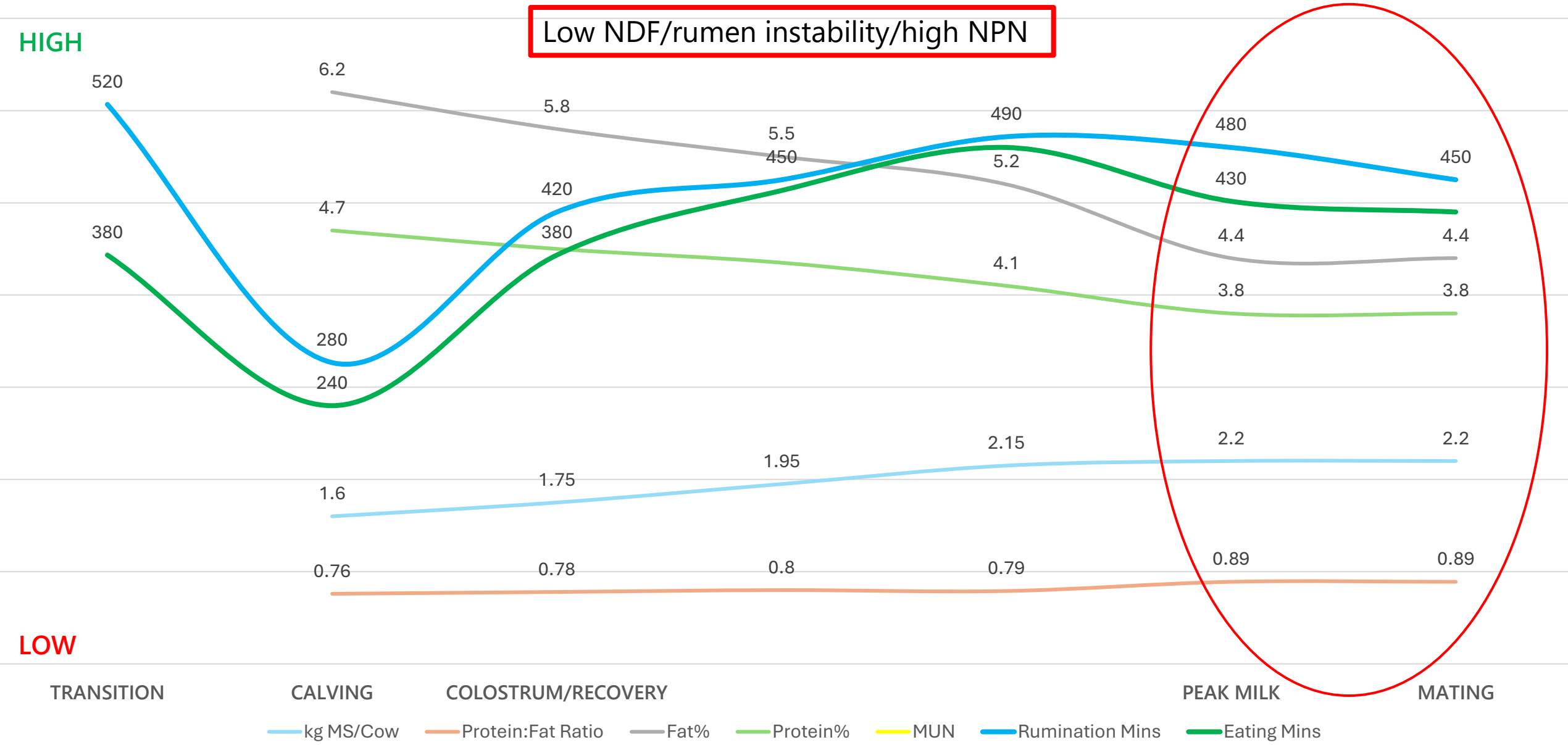

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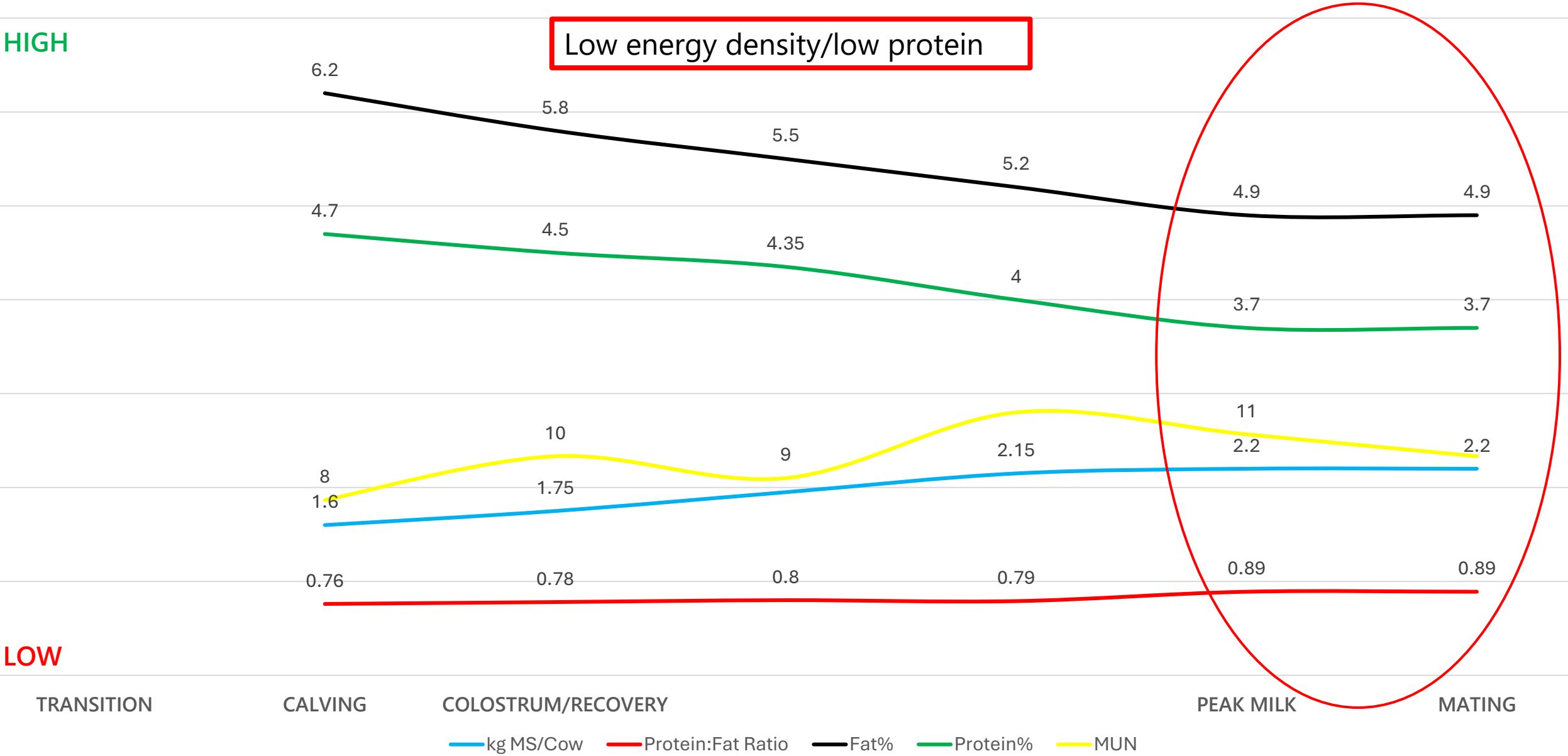

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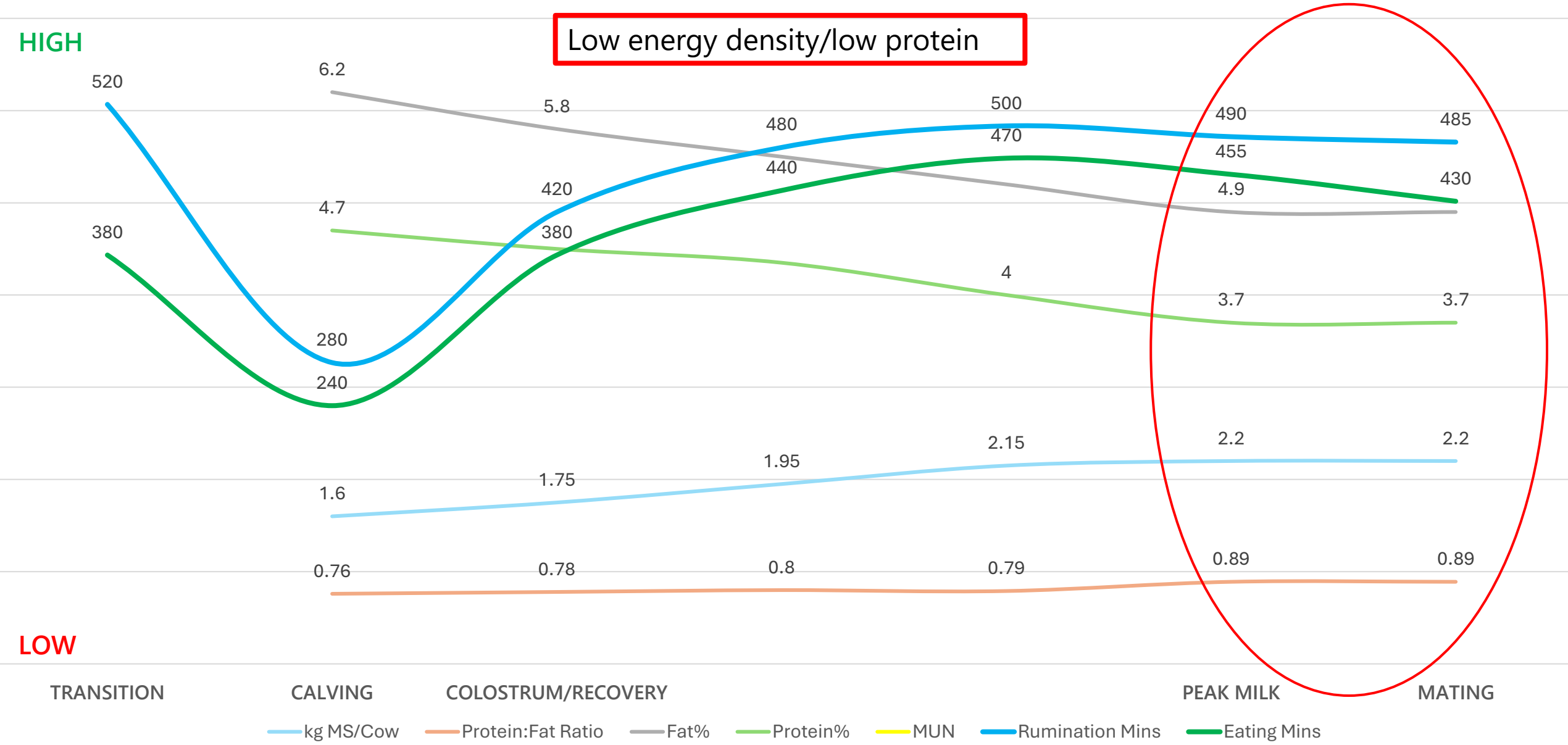
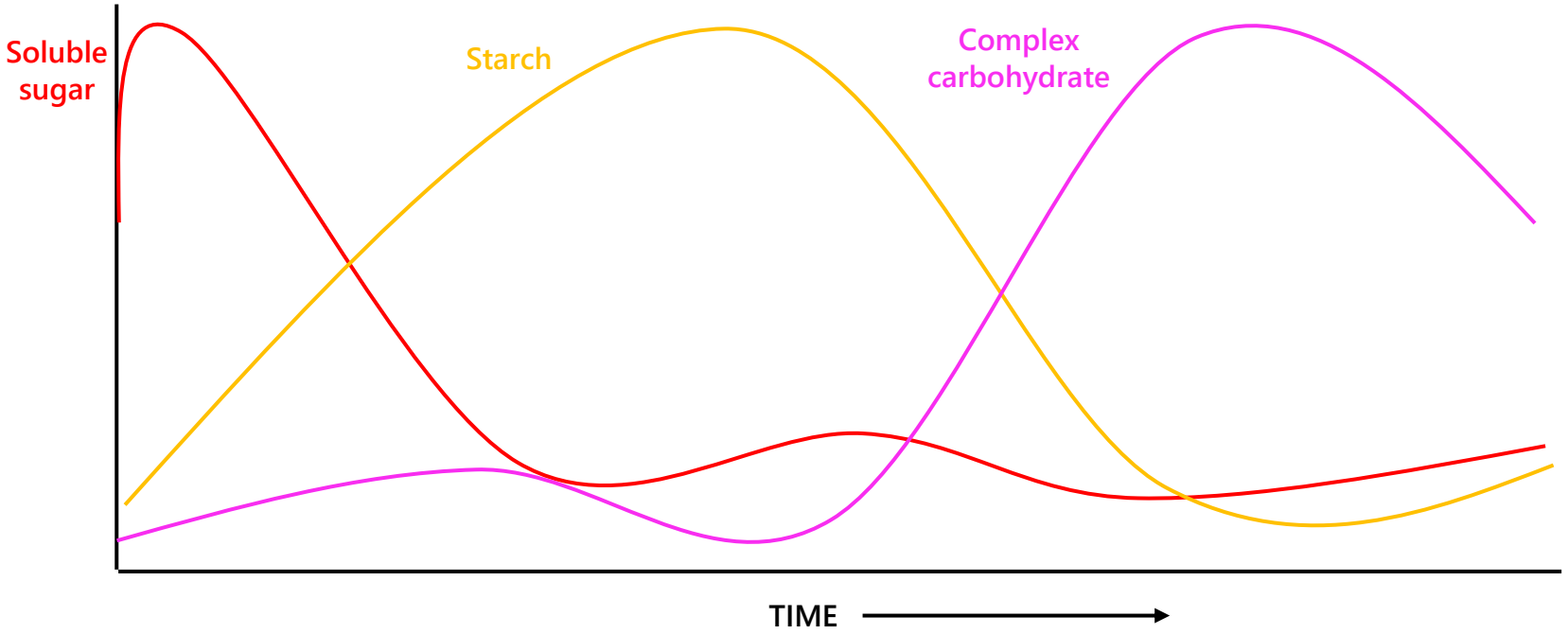


1. Feed management: Sugar and starch
2. Feed management: Protein
3. Calsea and Monensin/Bovatec
4. Calcium, phosphorus, magnesium, and salt
5. Copper, zinc, cobalt/B12, iodine, manganese, selenium, boron, chromium, vitamin E, and biotin

Feed management: Sugar and starch



PROBLEM: Good pasture growth, cloudy days, high input system, average production, low MUN.
Protein:fat ratio = 0.84
Fat % = 4.75
Protein % = 4.0
MUN = 20
Rum/act = 520/440

SOLUTION: Increase soluble sugar. Low WSC, need more grunt from rumen.

PROBLEM: Cloudy days, poor pasture growth, cows lacking energy.
Protein:fat ratio = 0.78
Fat % = 4.9
Protein % = 3.8
MUN = 28
Rum/act = 520/400

SOLUTION: Increase concentrated energy (sugar, starch, and CC), energy density too low!

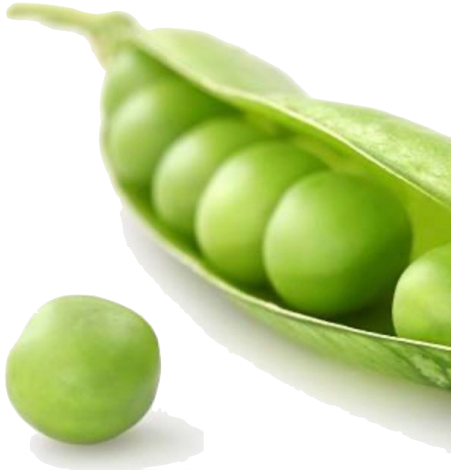
PROBLEM: Excellent pasture growth but average production, average appetite.
Protein:fat ratio = 0.83
Fat % = 4.6
Protein % = 3.8
MUN = 36
Rum/Act = 470/400

SOLUTION: Increase starch feeding carefully! WSC & NPN likely high.

Tools for bringing cows into ‘the zone’

1. Feed management: Sugar and starch

2. **Feed management: Protein**



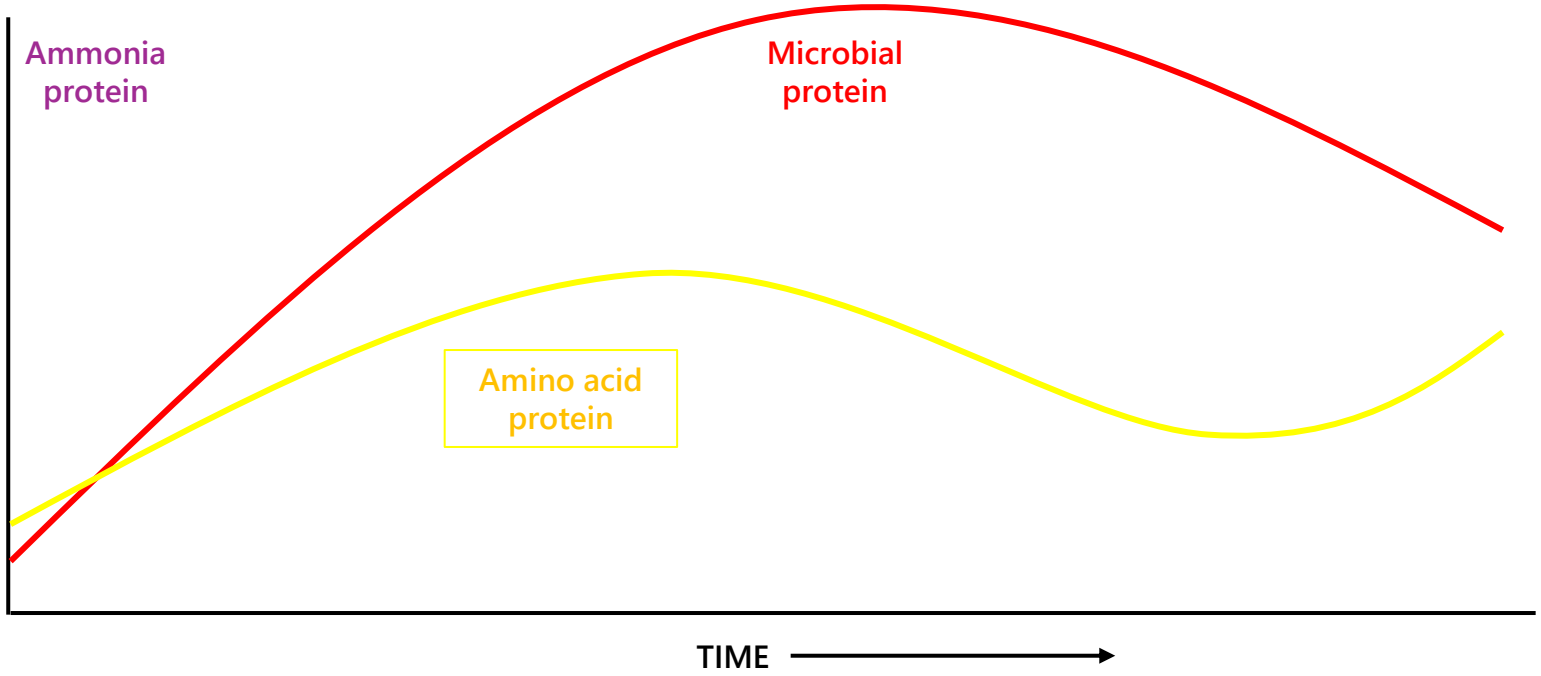
3. Calsea and Monensin/Bovatec

4. Calcium, phosphorus, magnesium, and salt

5. Copper, zinc, cobalt/B12, iodine, manganese, selenium, boron, chromium, vitamin E, and biotin

Tools for bringing cows into ‘the zone’

Feed management: Protein



Protein should be a large focus through the dry period, transition, and early lactation as this is where it pays great dividend at peak milk / mating time.

PROBLEM: Good pasture growth, cloudy days, high-input system, average production, low MUN, low appetite.
Protein:fat ratio = 0.80
Fat % = 4.8
Protein % = 3.8
MUN = 15
Rum/Act = 520/440

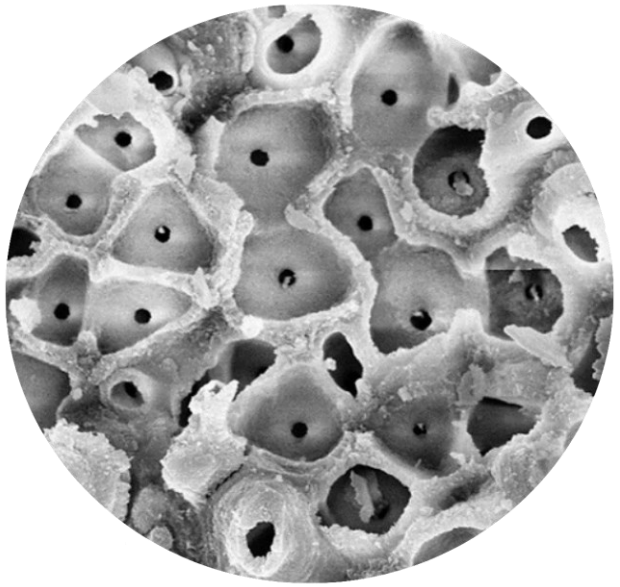
SOLUTION: Increase protein (watch MUN closely) - soya, canola, peas, cottonseed meal, and urea will all behave differently.

PROBLEM: Excellent pasture, medium MUN, high-input system, average production, average appetite, WSC optimal/high.
Protein:fat ratio = 0.80
Fat % = 4.8
Protein % = 3.8
MUN = 20
Rum/act = 520/440

SOLUTION: Increase bypass protein (watch NPN doesn’t increase), with starch alongside some rumen stabilisation.

Tools for bringing cows into ‘the zone’

1. Feed management: Sugar and starch
2. Feed management: Protein
3. Calsea and Monensin/Bovatec
4. Calcium, phosphorus, magnesium, and salt
5. Copper, zinc, cobalt/B12, iodine, manganese, selenium, boron, chromium, vitamin E, and biotin



Tools for bringing cows into ‘the zone’

Calsea and Monensin/Bovatec ionophore

PROBLEM: Excellent pasture growth but average production, average appetite.
Protein:fat ratio = 0.86
Fat % = 4.5
Protein % = 3.9
MUN = 34
Rum/act = 470/400
BHBA level >0.7, suspected cows losing some weight

SOLUTION: Help stabilise the rumen with Calsea at 50-80g/cow/day.

PROBLEM: Cloudy days, good pasture growth, higher residuals, cows lacking energy.
Protein:fat ratio = 0.78
Fat % = 4.9
Protein % = 3.8
MUN = 28
Rum/act = 520/400
BHBA level >0.7, suspected cows losing some weight

SOLUTION: Add Ionophore to help reduce BHBA levels, increasing energy levels.

Tools for bringing cows into ‘the zone’

1. Feed management: Sugar and starch
2. Feed management: Protein
3. Calsea and Monensin/Bovatec
4. Calcium, phosphorus, magnesium, and salt
5. Copper, zinc, cobalt/B12, iodine, manganese, selenium, boron, chromium, vitamin E, and biotin

Tools for bringing cows into ‘the zone’

Calcium, phosphorus, magnesium, and salt

PROBLEM: Poor immune system function
- Higher SCC levels
- Infection-related lameness
- Niggly health issues

SOLUTION: Ensure optimal calcium levels. Analyse using feed and blood data.

PROBLEM: Metabolic issues
- Odd high-producer or stressed cow going down
- Cows unsettled in shed or paddock

SOLUTION: Ensure optimal calcium, phosphorus, and magnesium levels

PROBLEM: Poor cow performance and low blood phosphorus
- The occasional crawler cow at some stage through the season

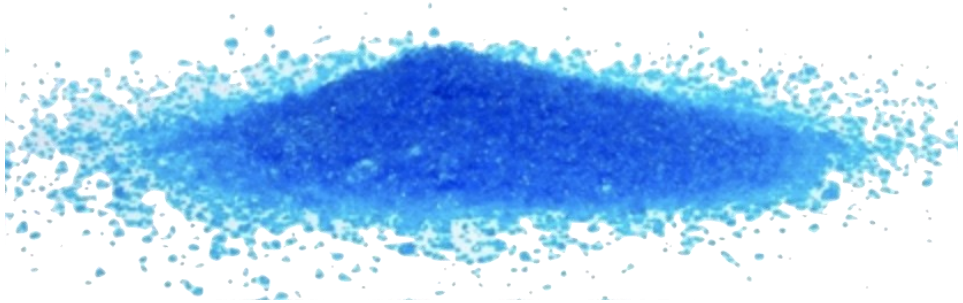
SOLUTION: Supplement mono-calcium phosphate at 25-40g/cow/day.

PROBLEM: High pasture potassium levels
- Niggly metabolic issues
- Blood showing variable Ca, P, and Mg levels

SOLUTION: Have free-choice salt available and supply 20-50g/cow/day via feed or water.

Tools for bringing cows into ‘the zone’

1. Feed management: Sugar and starch
2. Feed management: Protein
3. Calsea and Monensin/Bovatec
4. Calcium, phosphorus, magnesium, and salt
5. Copper, zinc, cobalt/B12, iodine, manganese, selenium, boron, chromium, vitamin E, and biotin



Tools for bringing cows into ‘the zone’

Copper, zinc, cobalt/B12, iodine, manganese, selenium, boron, chromium, vit E, and biotin

ESSENTIALS
COPPER, ZINC: Immune and reproductive system protection, liver health
B12: Energy metabolism and liver health
IODINE: Thyroid function
SELENIUM: Thyroid function, liver health, immune and reproductive system protection

MATING ESSENTIALS
MANGANESE: Progesterone production, energy metabolism, liver health, immune and reproductive system protection
BORON: Catalyst for calcium, phosphorus, and magnesium metabolism
CHROMIUM: Increases insulin sensitivity, important for energy balance
IODINE: Helps increase heat expression with short-term supplementation

ONLY IF GAPS FOUND
BIOTIN/VIT H: Deficiency often seen in increases in lameness issues, important for glucogenesis
VIT D: Important catalyst for calcium and phosphorus absorption and metabolism
VIT E: Protects immune and reproductive system, powerful antioxidant

Thank you for attending!

For more information or to ask any questions:

- Visit agvance.co.nz
- Talk to your local Agvance consultant
- Email me at shaunb@agvance.co.nz