AGVANCE
Success. Together.

WEBINAR:

Using milk data to drive production & reproduction

PART 1

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OVERVIEW

DISCLAIMER: This is general information and only intended to create discussion and further investigation.

1. What does fat%, protein%, protein:fat ratio & MU tells us about the cow and the diet.

2. How do we interpret this data in context with other farm and cow data?

OVERVIEW OF MILK COMPONENTS

Kg/MS per cow is critical when reading milk component percentages, higher production = lower components

FAT% gives us an indication of rumen stability/performance

PROTEIN% gives us an indication of energy, AA supply and appetite

LACTOSE% gives us an indication of milk production potential

MILK UREA gives us an indication of protein supply, rumen protein utilisation and efficiency

<u>Strong genetic influences however:</u>
JERSEY = Higher fat%, lower protein% & lactose%
HOLSTEIN = Lower fat%, higher protein% & lactose%

OVERVIEW OF THE DATA

Milk processor data

Daily data
Consistent pickup time
Broad data measurements
Potential to expand

Milk meter data

Great resolution
Accuracy, 7-day averages
Great genetic potential

Herd test data

Good for cow/group comparisons
Low frequency
High resolution
Potential for genetic gain

MILK PROCESSOR DATA

FONTERRA

Kg milk solids
% milk solids
Fat %
Protein %
Protein:fat ratio
Milk urea
SCC

OPEN COUNTRY

Kg milk solids
% milk solids
Fat%
Protein%
Lactose%
Protein:fat ratio
Milk urea
SCC

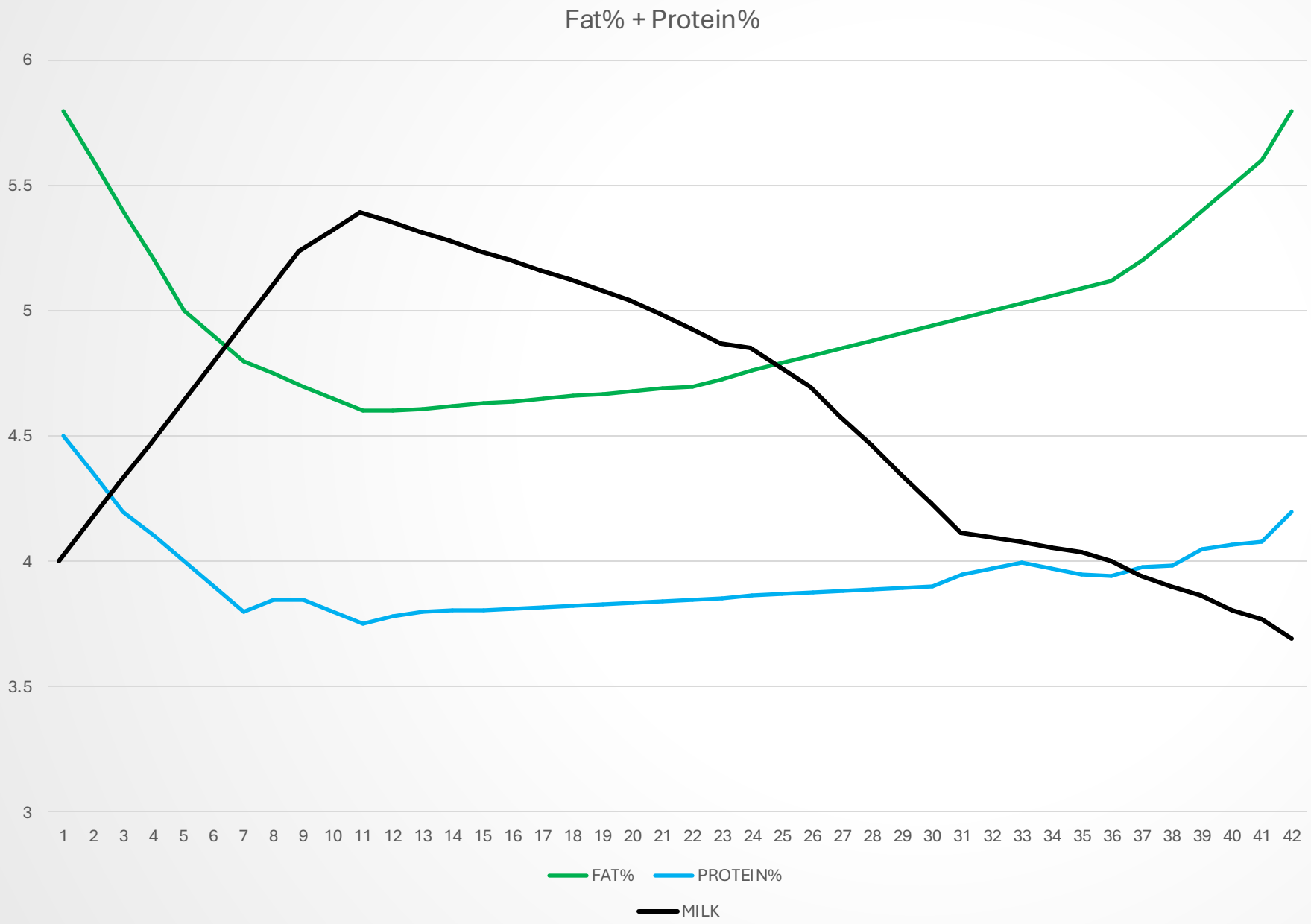
SYNLAIT

MATAURA VALLEY

TATUA

OCEANIA

FAT% & PROTEIN%


Fat% + Protein%
6
5.5
5
4.5
4
3.5
3
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42
FAT%
PROTEIN%
MILK

RUMEN PERFORMANCE

- The rumen likes pH between 5.8 – 6.4
- When pH shifts, so does the rumen microbial population
- First thing to shift is fat% in the milk

PROBLEMS: Stress, low fibre, high sugar, high starch and high fat

FATTY ACIDS

- VFAs (acetate, propionate and butyrate) are produced from the digestion of forage in the rumen
- Good rumen performance = strong fat% and protein%
- 50% De Novo (synthesised in the udder using acetate and butyrate)
- 50% C4-C18 fatty acids from the rumen
- This why diet + rumen dynamics affect milk fat%
- Milk-fat depression is likely due to increased ***trans-10*** and decreased ***trans-11*** C18:1 fat inhibits genes responsible for uptake and transport of preformed fatty acids into the udder, triggered by pH drop.

COMPARISON IS KEY

- Per cow milk production
- Protein% and lactose%
- Rumination and eating mins
- Higher fat% is often associated with lower milk production
- BUT it is the balance that is key and knowing what is the cause of the effect!

TOOLS TO INCREASE FAT%

- STABILISE THE RUMEN ENVIRONMENT!
- Increase EffNDF/fibre
- Pre-grazing residual
- Manage rumen flow rate
- Look at DM% in the pasture
- Rumen buffer/live yeast
- Balance acetate, butyrate, propionate

Made up of casein + alpha/beta lactoglobulin

ENERGY DENSITY + AA SUPPLY

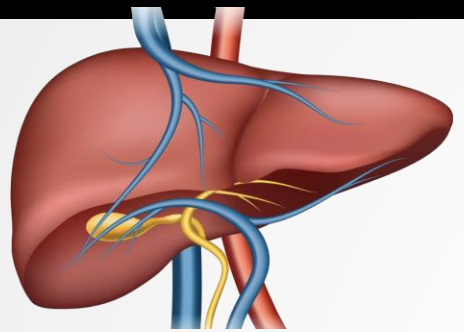
- Strong indicator of energy supply
- Also an indicator of energy metabolism
- Made up of AAs and glucose
- The liver delivers AAs & glucose to the udder, the epithelial cells in the udder then create milk proteins
- Lack of energy supply, lack of diet balance, cow impairment

APPETITE

- Increasing protein% helps to drive appetite
- Amino acids + propionate drive glucogenesis
- Glucogenesis drives insulin production which drives milk production
- Milk production drives appetite
- Increasing energy density or rumen performance that lifts protein% will help stimulate appetite
- Efficient liver supply of fatty acids and amino acids essential for protein supply to the udder

TOOLS TO INCREASE PROTEIN%

- Drive the rumen and liver engines harder!
- Increase rumen grunt/microbial population intensity
- This is done by feeding a better balanced, punchier feed
- Increase energy density
- Focus on protein balance: NPN/RDP/UDP/AAs
- PROTEIN% runs closely alongside LACTOSE%
- Look at rumen flow rates also, is the digesta in the rumen long enough for efficiency microbial digestion?
- Live Yeasts? Methionine? Betaine?



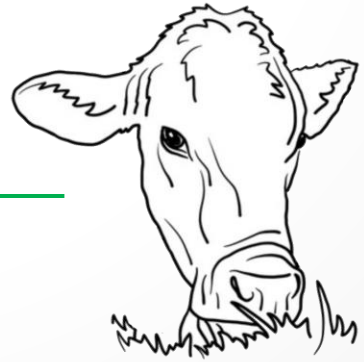
Stimulates release of **opioids**

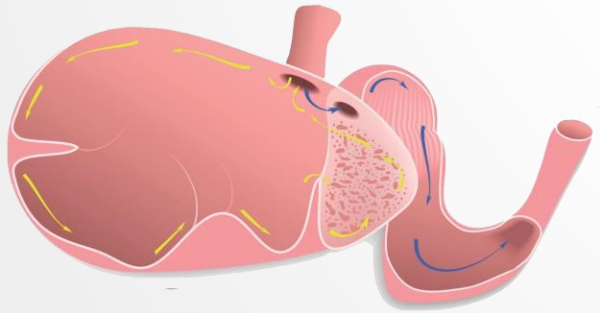
Opioids stimulate more production, through oxytocin & glucocorticoids

Produces **insulin** which stimulates increased **glucogenesis**

Heaps of food available - eat more/stop mobilising condition

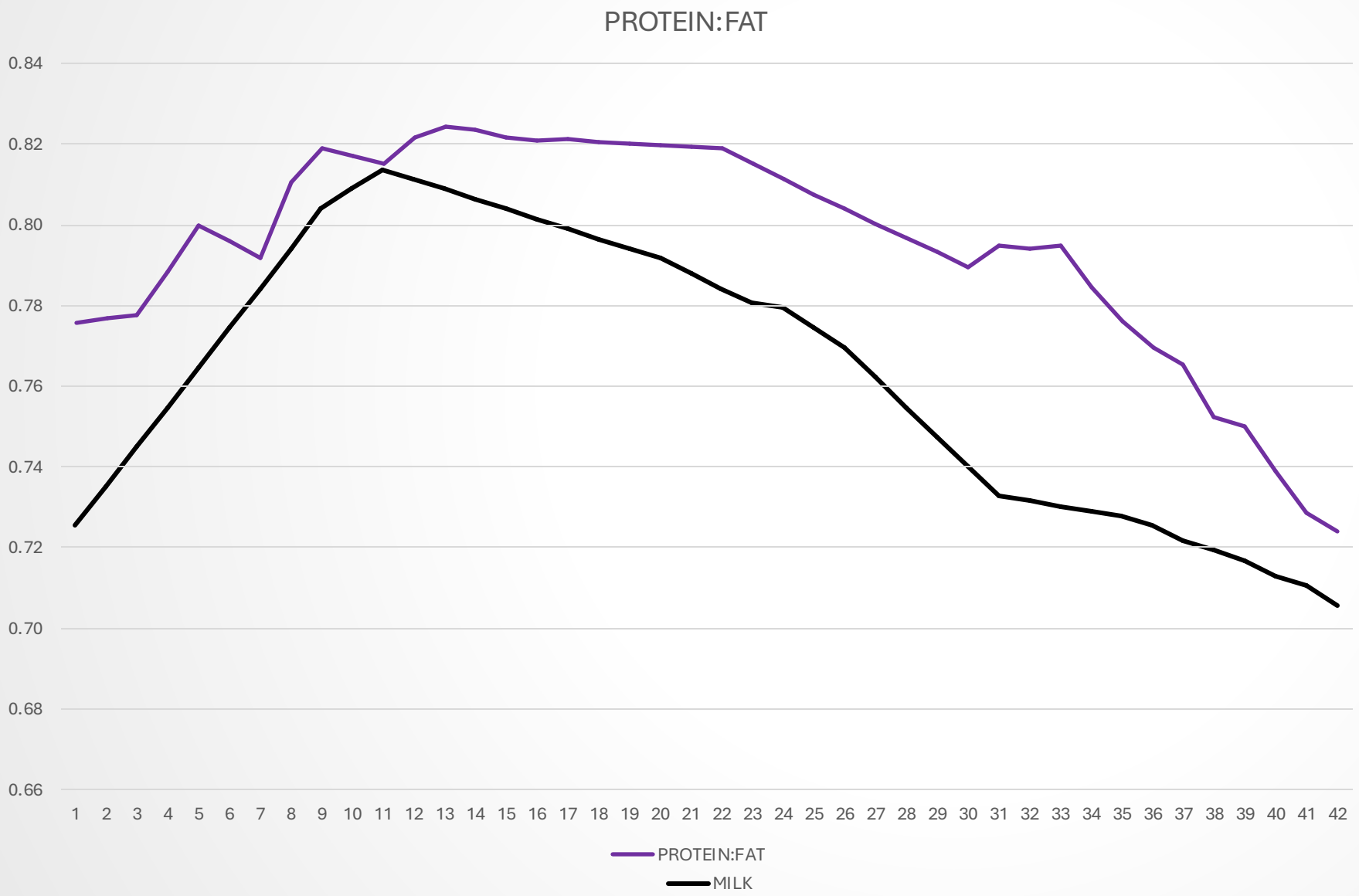
Sends digested amino acids, VFAs, lactate etc via PDV





Eats until she feels full, sits down and ruminates

PROTEIN:FAT RATIO



PROTEIN:FAT

The proportion of protein:fat as a ratio gives us an easier to read indication of balance in terms of diet

However, its easy to mis-read protein:fat ratio

Ratios are breed specific – lower LWT = lower ratio

Too low (<0.78) – energy potentially lacking

Too high (>0.85) – rumen instability/hot diet

As per-cow production increases, so should protein: fat ratio

TOOLS TO INCREASE PROTEIN:FAT

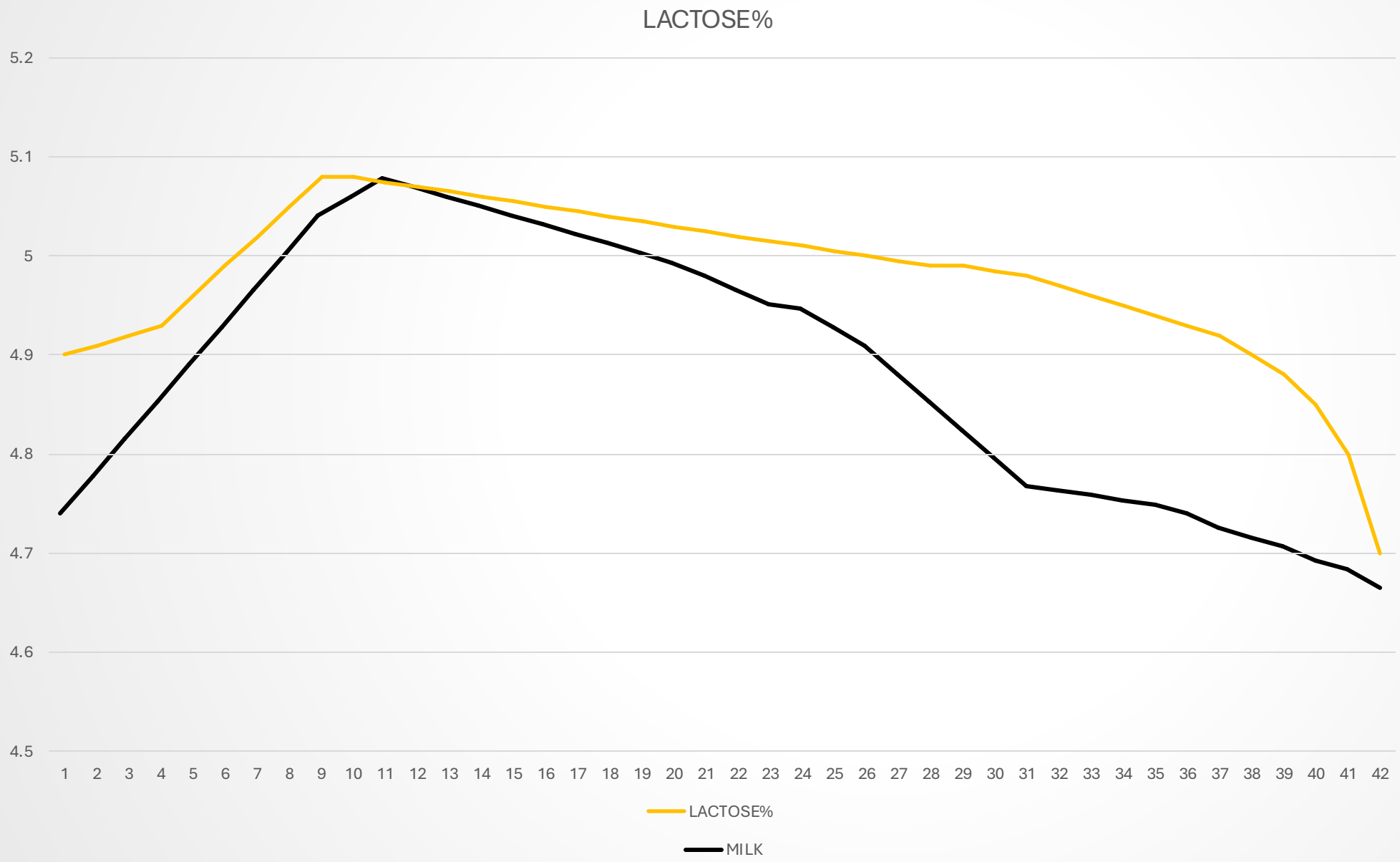
- Increase feed quality/energy density
- Increase amino acid supply
- Increase appetite/intakes

To increase protein:fat ratio we need to increase protein☺

Increasing non-soluble carbohydrates, starches and sugars alongside reducing effNDF

BUT, ensure rumen degradable protein (RDP) is sufficient, otherwise energy will leak out of the protein hole in the bucket!

LACTOSE%


LACTOSE%
5.2
5.1
5
4.9
4.8
4.7
4.6
4.5
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42
LACTOSE%
MILK

LACTOSE%

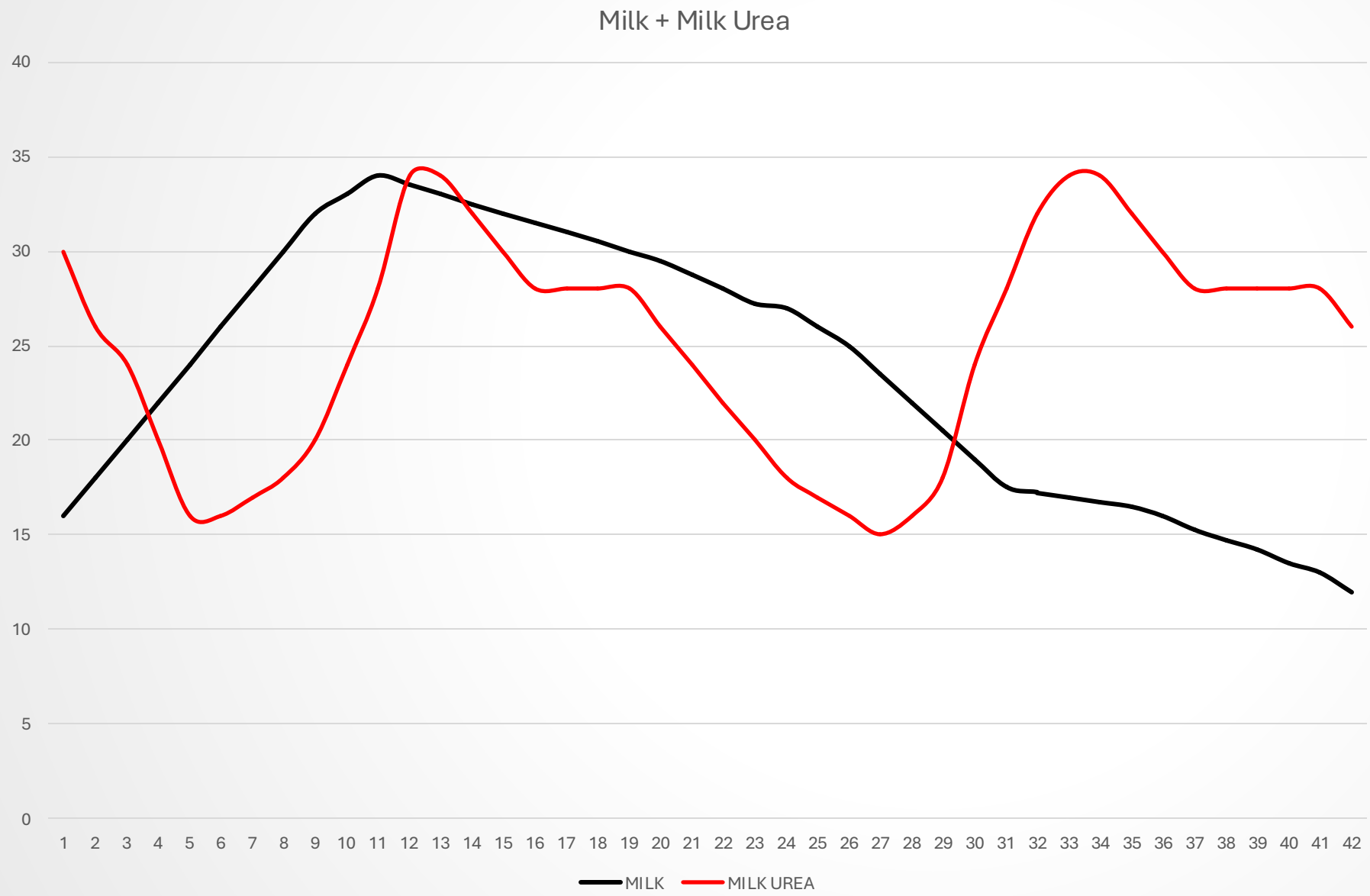
INDICATES

- How hot the fire is! High lactose% = greater milk vol
- Feed conversion efficiency (FCE) & diet consistency
- Animal health issues: Udder inflammation, metabolic disorder/ketosis
- Higher lactose% is correlated to reproductive success

Lactose% is driven by energy, particularly glucose supply

Therefore, like protein%, lactose% is linked to feed quality and appetite

MILK UREA


Milk + Milk Urea
40
35
30
25
20
15
10
5
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42
MILK
MILK UREA

MILK UREA

- Milk urea is the overflow of nitrogen/ammonia that the rumen has been unable to utilise to grow microbial protein
- It does not automatically indicate low or high protein level
- Always look at milk urea in context alongside other milk indicators
- Milk urea also needs to be accessed in conjunction with per cow milk production. Higher production warrants higher milk urea within reason.

TOOL TO MANAGE MILK UREA

KNOW YOUR ENEMY!

- Herbage testing the feed to establish crude protein (CP) and non-protein nitrogen (NPN) levels
- Are we dealing with excess or lack of nitrogen/rumen degradable protein (RDP) or a lack of energy/starch/soluble sugar?
- RDP = Ammonia, peptides and amino acids, are we dealing with an imbalance?
- Metabolic shifts/subclinical ketosis will also drive up milk urea for a short period

COW GENETIC INFLUENCES

Cow Breed (Live-Weight)	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+??

Combination of published & collected NZ Data, verified independently

QUESTIONS & NEXT WEBINAR

In PART 2, we are going to look at on-farm examples of how I use milk and cow sensor data to help farmers make decisions that drive production, cow health, reproduction and profitability.

QUESTIONS?

THANK YOU FOR ATTENDING

For more information and previous webinars:

- Visit our website: www.agvance.co.nz
- Talk to your local Agvance Consultant
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- Call me on: 021644035