Department of Primary Industries
and Regional Development

NSW GOVERNMENT

Pastures With Low Methane Potential

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EST. 1985 PASTURES & GRAZING NSW

NSW GOVERNMENT | Local Land Services Central Tablelands

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NSW Net Zero Plan Stage 1: 2020–2030

CN30

mla
MEAT & LIVESTOCK AUSTRALIA

CN30 is the Australian red meat industry's aspirational target to be carbon neutral by 2030.

MLA is supporting CN30 through investing in **research, development and adoption:**

EMISSIONS AVOIDANCE R&D	CARBON STORAGE R&D	INTEGRATED MANAGEMENT	LEADERSHIP BUILDING

Coles Finest Certified Carbon Neutral range

Denmark will introduce the world's first emissions tax for cows and pigs

The Danish government says it hopes it will inspire other countries to follow suit.

Category	Mt CO_2-e	Percentage		
Total net emissions	136.6	100%		
1. Energy	107.4	79%		
2. Industrial Processes	12.8	9%		
3. Agriculture	16.3	12%	Percentage	**GHG**
A. Enteric Fermentation	12.3	9%	76%	CH_4
B. Manure Management	1.2	1%	7%	
C. Rice Cultivation	0.0	0%	0%	
D. Agricultural Soils	2.2	2%	13%	N_2O

Source: State and Territory Greenhouse Gas Inventories 2019

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Feed additives and Tech to reduce methane

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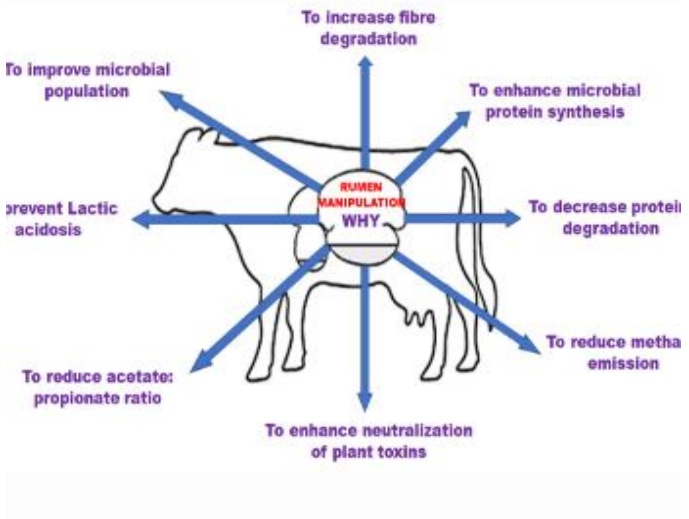
CH4 Inhibitors
- Bovaer® (3-nitrooxypropanol, 3-NOP)
- Asparagopsis (seaweed)

Rumen manipulation
- Vaccines
  - Development stage
- Early-life programming

Breeding
- Increase efficiency
- Lower CH4

Technologies
- Zelp collars



Pasture Management

- Options to improve pasture quality
  - PSC inhibit methanogenesis
    - Condensed Tannins
    - Saponins
    - Phenols
  - ↑ quality pasture = ↓ CH_4
  - Decrease EI

Functional grouping	Pasture Grp / Spp.	PSC	Change in CH4 %
Perennial legumes	Lotus – Big trefoil / birdsfoot trefoil	CT	**-38,** (- 64 to 0)
	Lucerne	Sap, Phe	**-3** (-27 to +20)
	Clovers- Red / White	T, Phe	**-2** (-31 to + 39)
	Sanfoin	CT, Phe	**-13** (-48 to +2)
	Sulla	T, Sap	**-32**
Annual Legumes	Clovers – arrowleaf / bladder / sub	T, Phe	**-1** (-28 to + 47)
	Biserrula	Phe	**- 77**
	Burr medic	Phe, Sap	+9
	Serradella – french / yellow	Phe	+5 (0 to + 11)
Perennial herbs	Chicory	CT, Phe, Sap	**-9** (-37 to +5)
	Plantain	CT, Sap	**-14**

Badgery et al. 2023

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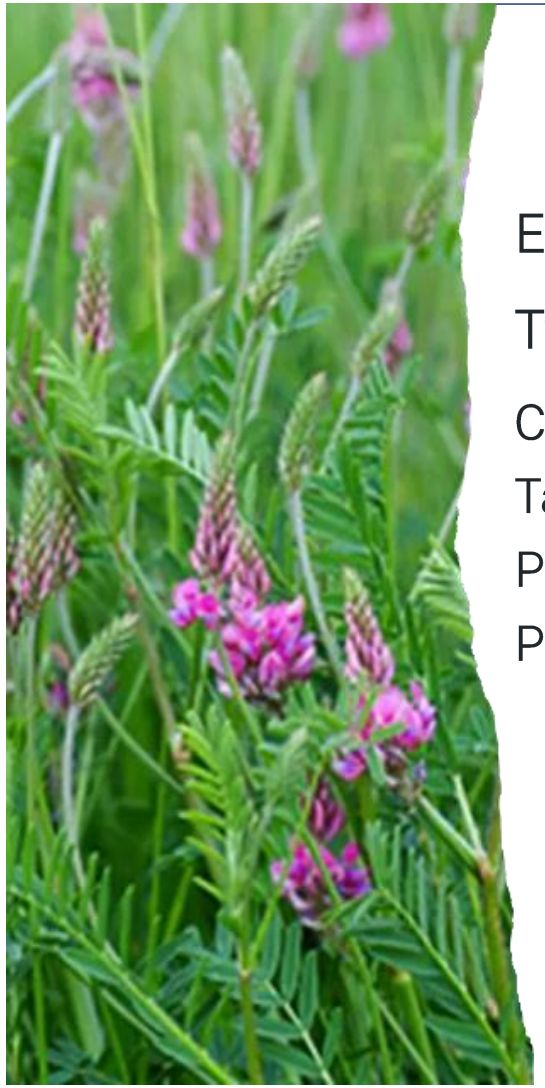
Cowra Trial



Established 2022

Two Trials

Chicory (Puna II)

Tall Fescue (Temora)

Phalaris (Holdfast)

Plantain (Lancelot)

Trial 1:
Balansa Clover (Bolta)
French Serradella (Margurita)
Yellow Serradella (Avila)
Biserulla (Casbah)
Sub Clover (Seaton Park)
Lucerne (Aurora)

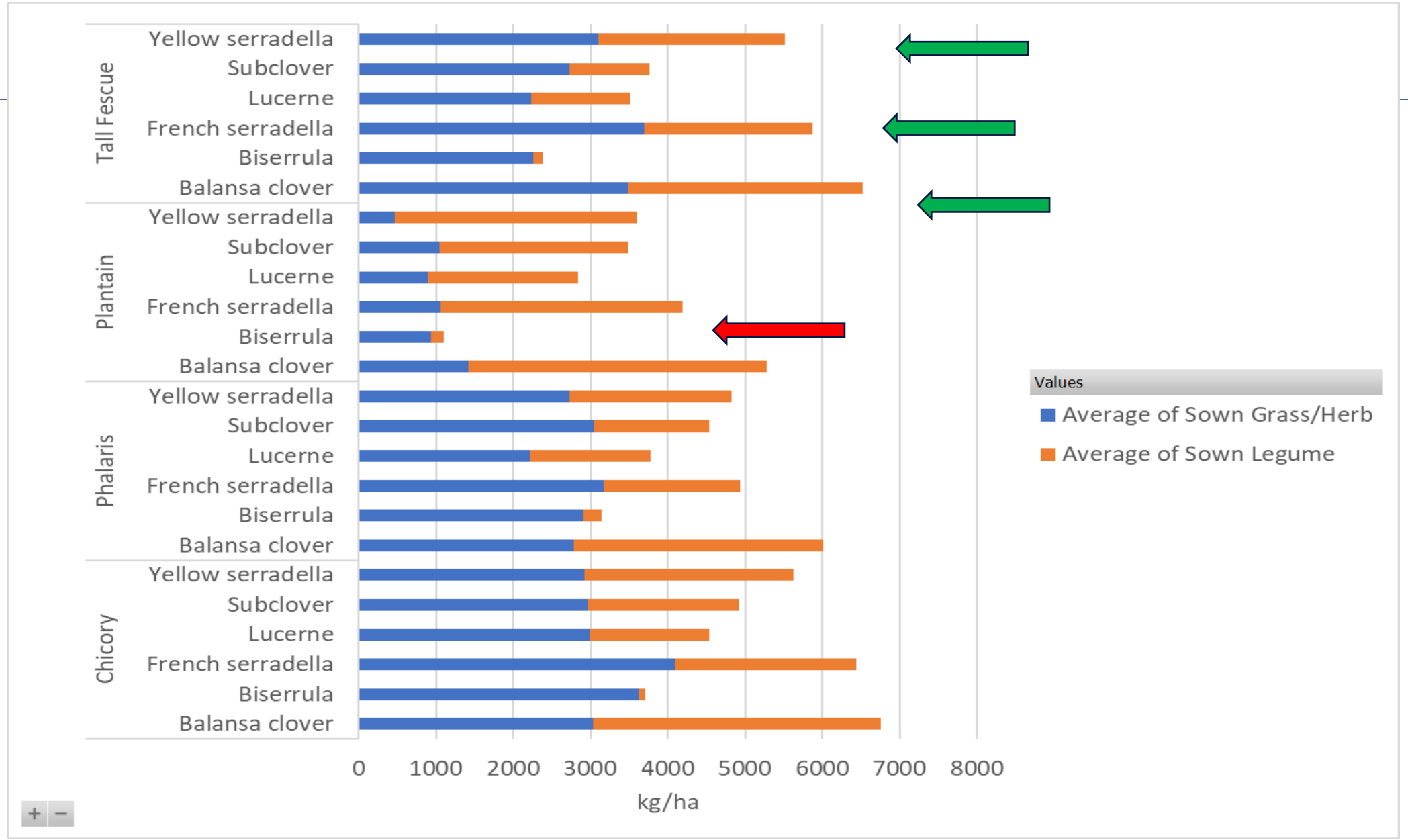
Trial 2: EST 2023
White Clover (Haifa)
Greater Lotus (Maku)
Sainfoin (Othello)
Sulla (Wilpena)
Lucerne (Aurora)

Average Biomass Production

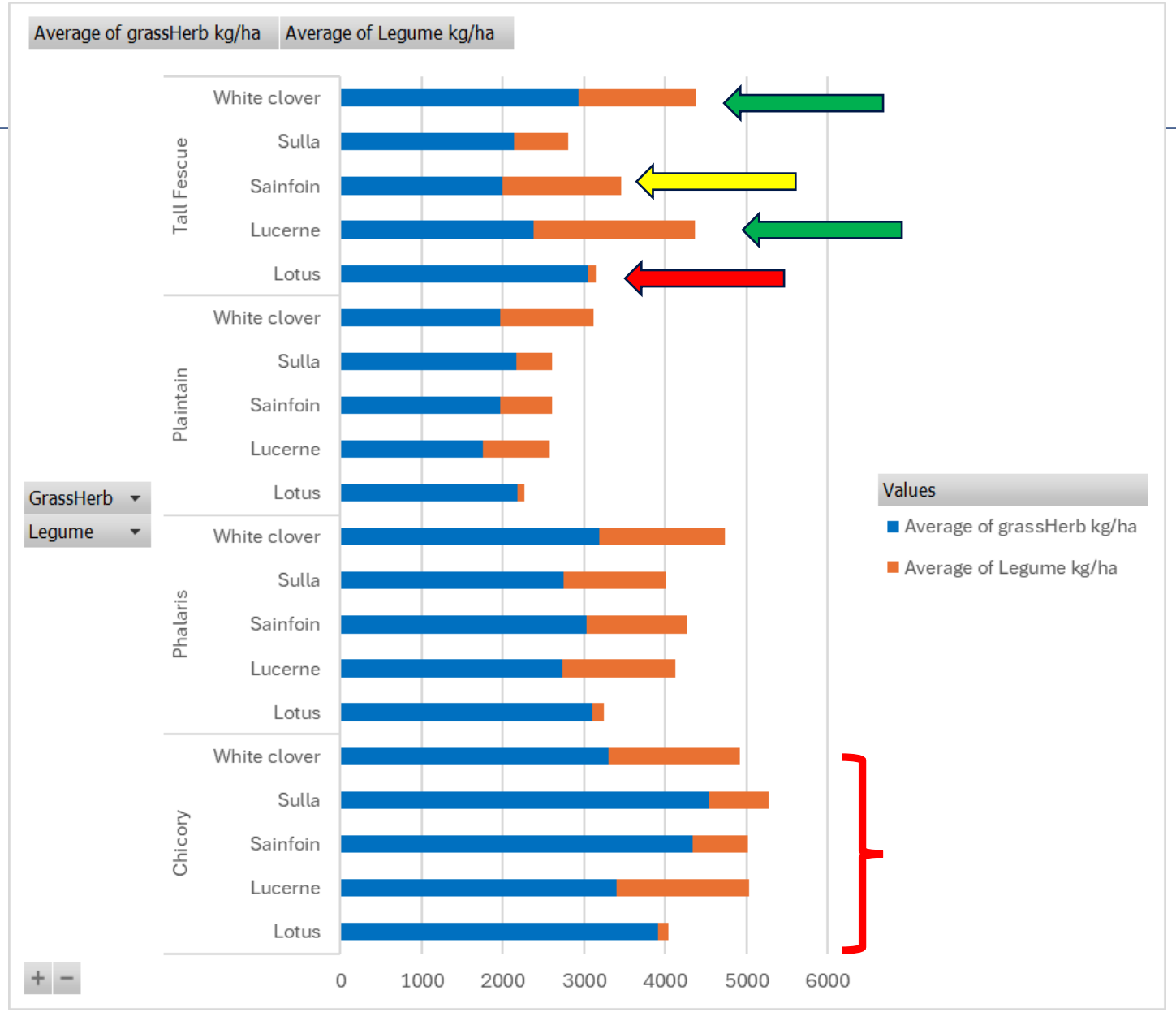
- Average dry matter measured seasona
  for 3 years
- Trend for higher DM from chicory and
  fescue
- Higher legume content in mixes with
  chicory
- Dry matter production was lowest for
  plantain, mainly due to declining plant
  population, particularly with the highe
  producing legumes.
- Seedling recruitment

Values
Average of Sown Grass/Herb
Average of Sown Legume

Average Biomass Production

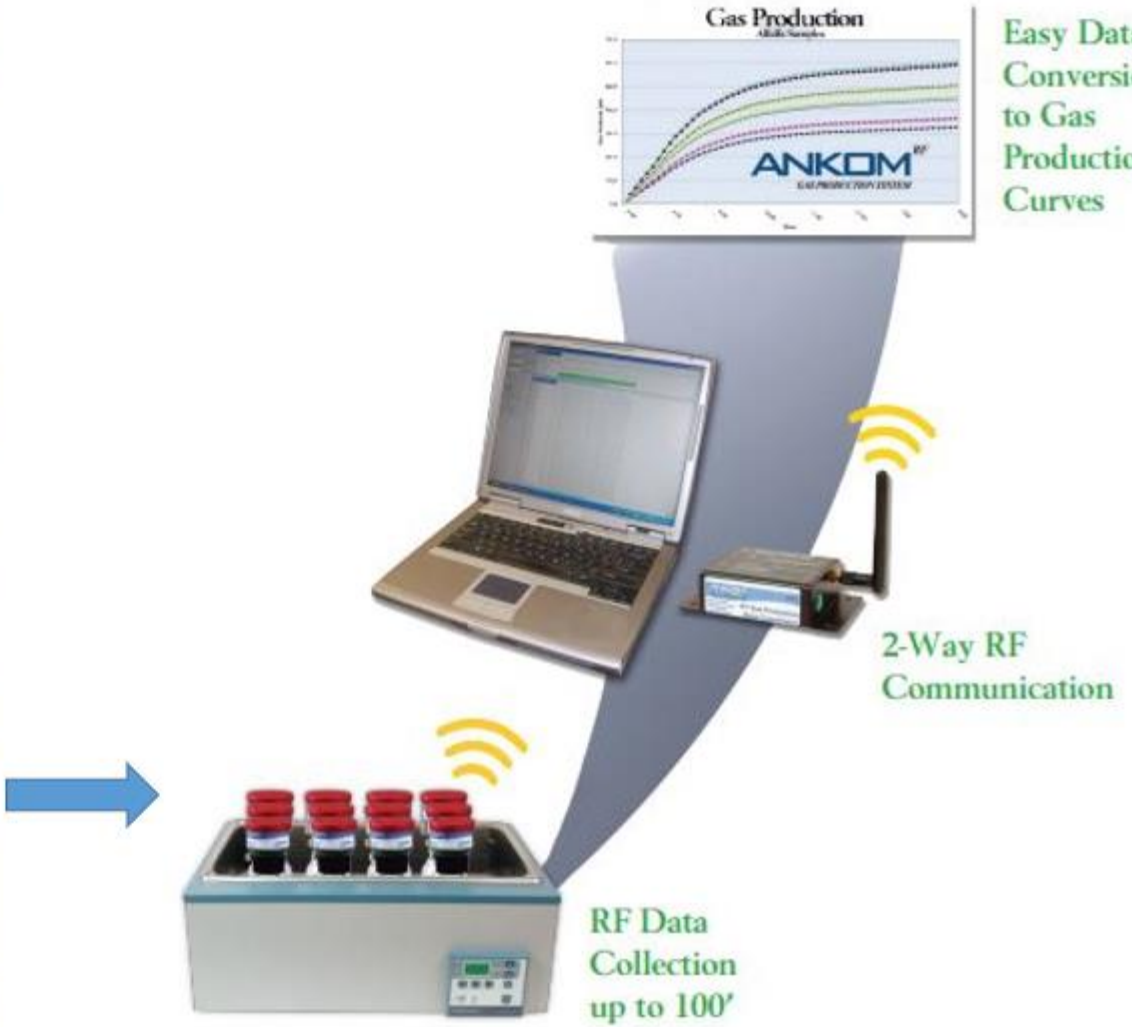


Average Biomass Production



Forage Quality

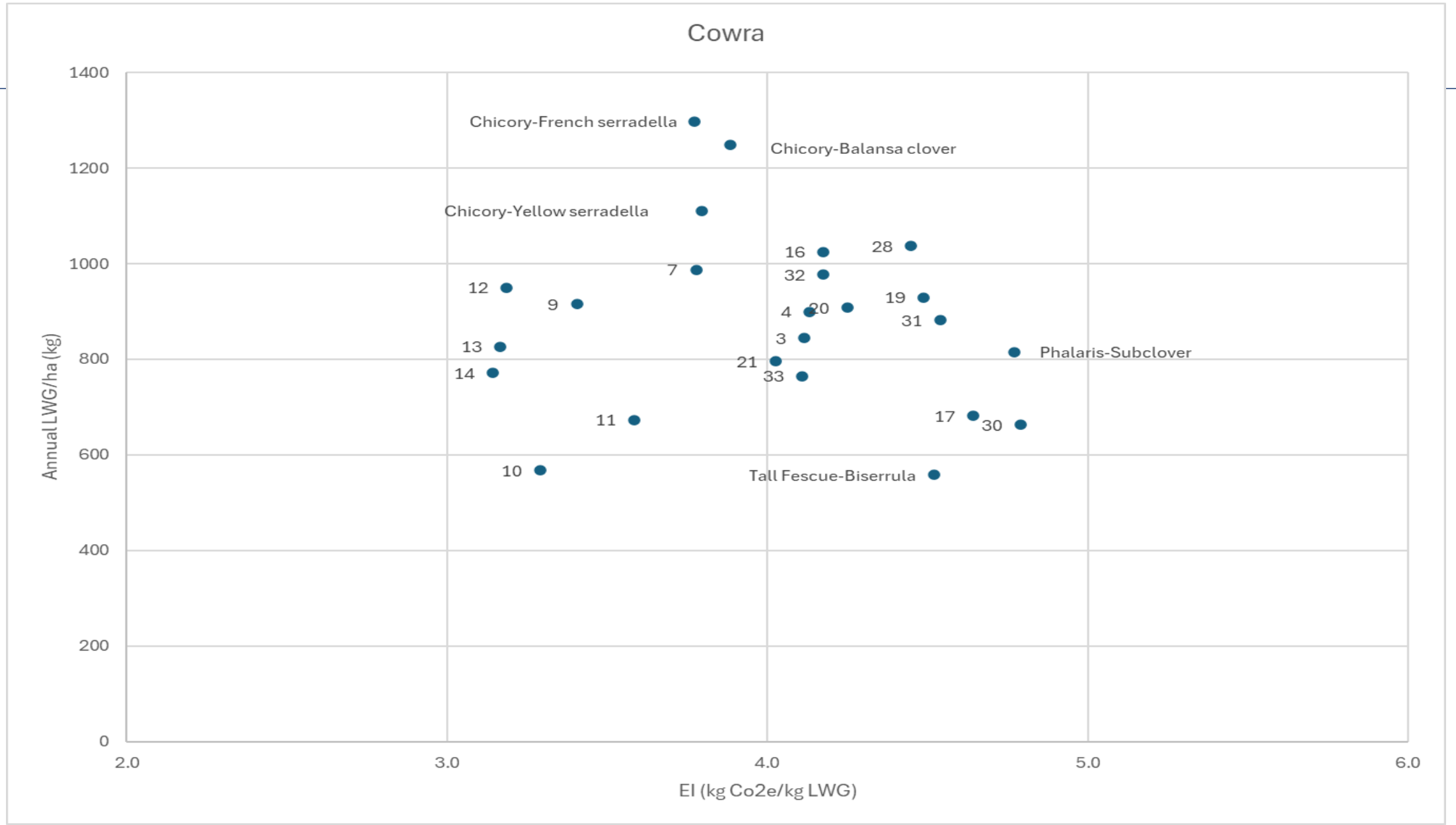
	NDF	Crude Protein	ME (Mj/kg)	WSC
Lucerne	34.3	20.6	10.6	8.2
Yellow serradella	35.6	20.5	10.5	6.4
Subclover	36.6	19.2	10.4	8.5
French serradella	39.5	18.8	10.2	7.4
Chicory	27.0	17.7	10.6	17.2
Balansa clover	33.9	17.4	11.7	15.1
Plaintain	34.1	14.7	10.5	12.6
Biserrula	33.3	12.5	11.4	13.8
Phalaris	46.1	10.7	11.2	20.1
Tall Fescue	51.4	9.9	10.2	14.8


Gas Production
ANKOM
Easy Data Conversion to Gas Production Curves
2-Way RF Communication
RF Data Collection up to 100'

Methane Reduction Potential

Pasture Type	Gas (ml) per gram of sample	Methane mL/g DM	CH4 reduction% compared to phalaris
Biserrula	155.2	8.7	-78.64
Plantain	217.2	31.1	-23.39
French Serradella	202.9	32.1	-21.06
Yellow Serradella	212.8	33.2	-18.26
Chicory	236.5	34.2	-15.83
Sainfoin	235.3	34.6	-14.9
Lucerne	209.1	35.9	-11.68
Subclover	221.7	37.3	-8.27
Sulla	239.5	38.4	-5.42
Tall Fescue	261.6	39.6	-2.49
Phalaris	253.3	40.6	0
Balansa Clover	236.4	40.7	0.25

Emission Intensity



Conclusion:

- Identified pasture species with potential for lower emissions

- Complementary combinations with legumes

- Regional adaptability

Next Phase:

- Animal testing: respiration chambers

productivity

Team Cowra

Emission Intensity

Assumptions

Based on quality can calculate consumption, utilisation and carrying capacity

Grazfeed will calculate a methane production profile liveweight output

Can modify the methane production based on our invitro tests

Based on 40kg xb weaner 10mth old