Understanding sheep milk composition in the NZ environment

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Research Objective 1.1; Understanding product characteristics

Question: ***What are the effects of seasonality, ewe lactation status, farm of origin,*** *and breed* ***on the composition****, physico-chemical properties, and* ***nutritional value of NZ sheep milk*** *and the consequent effects of processing, storage, and desired product qualities?*

Outcomes:

Information on nutritional characteristics of sheep milk produced at all stages of the year;

- animal management
- product development
- marketing
- regulatory/compliance purposes.

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Mobile sampling

Full milking volume from each animal at each collection time

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Composition Study;

400 Individual milk samples; 300 random samples

Age selected animals

Lactation cycle selected animals

Mixed genetics / selected genetics

Variability of major milk components; lactation cycle (DIM),

animal age (lactation No)

calendar month

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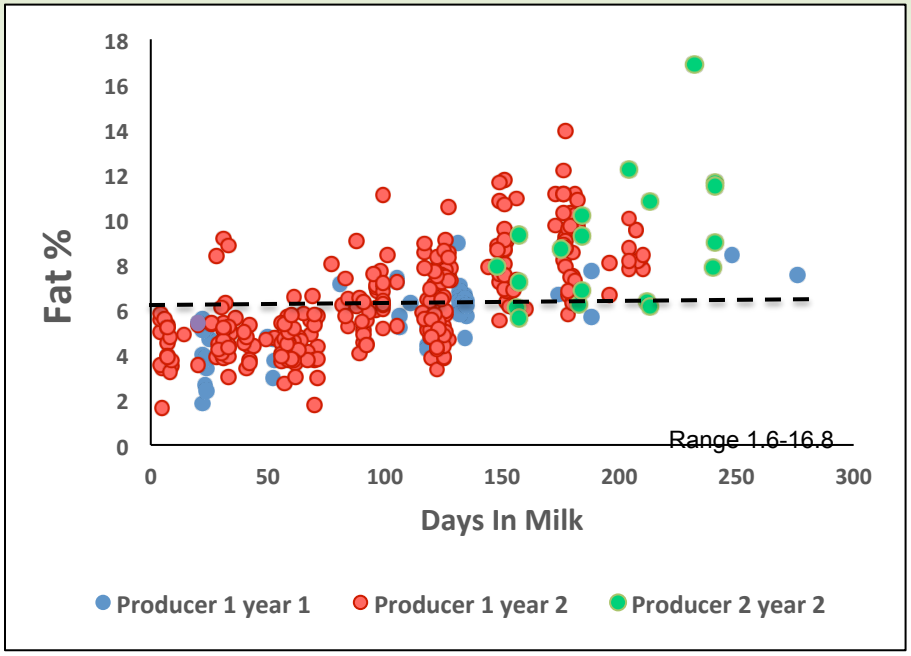
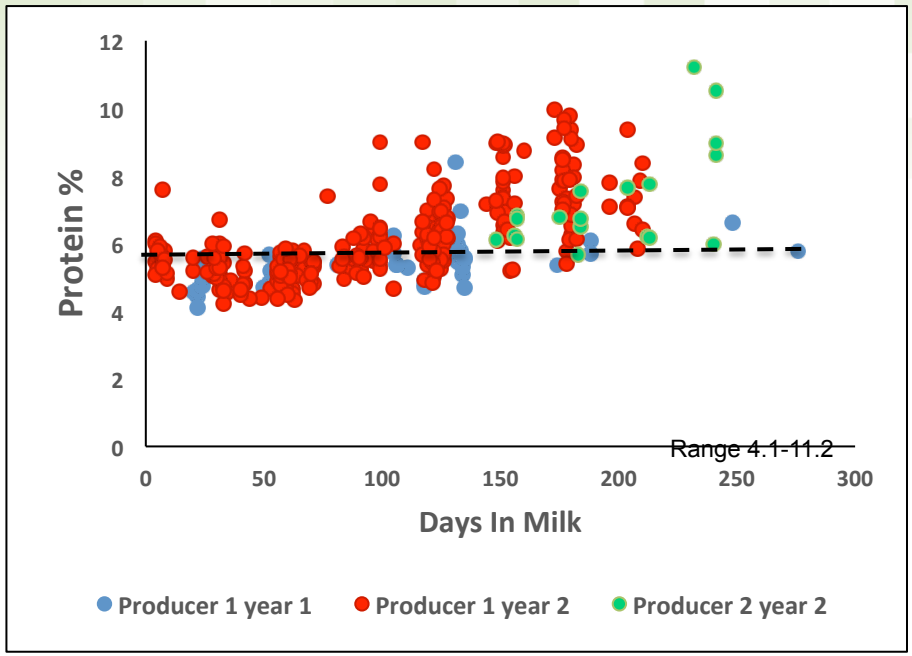
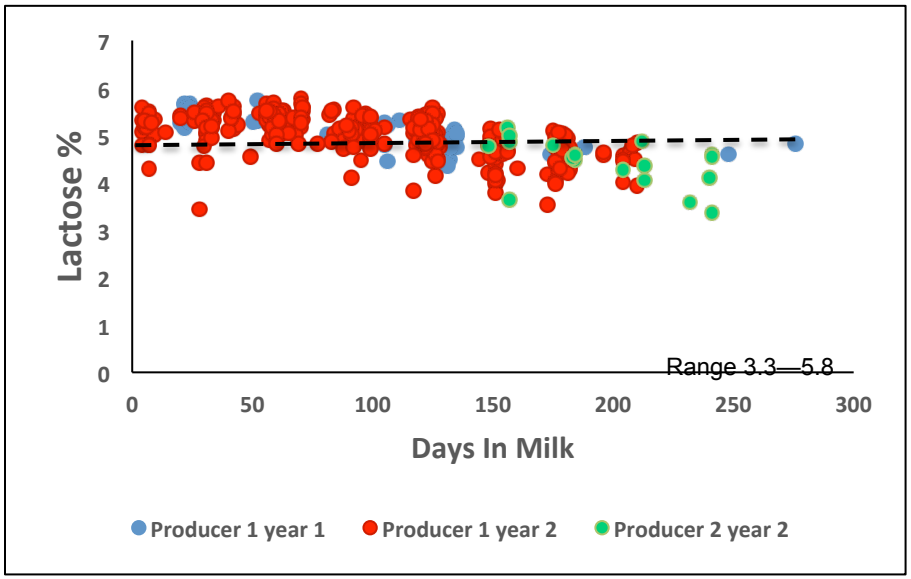
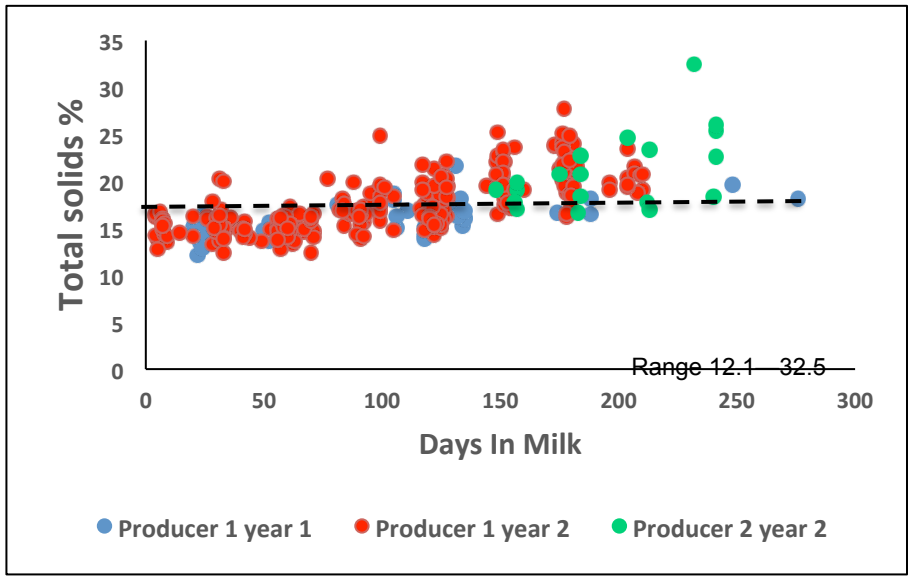
Composition results;

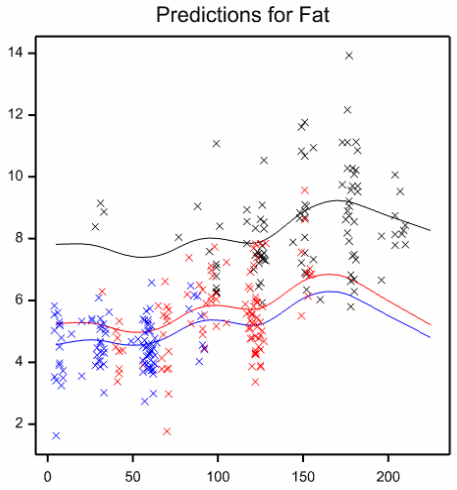


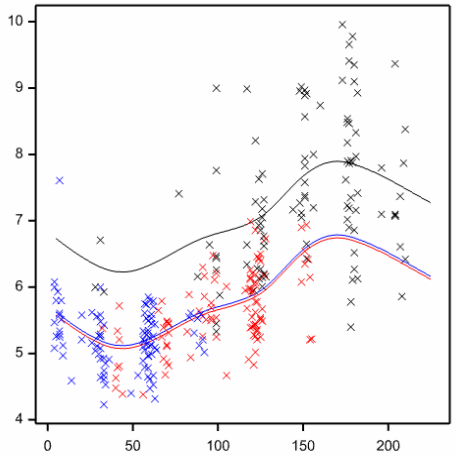


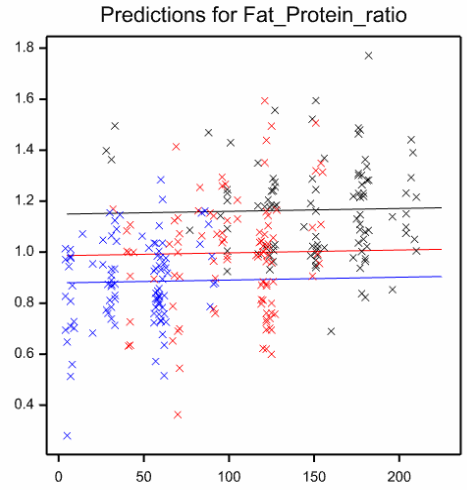


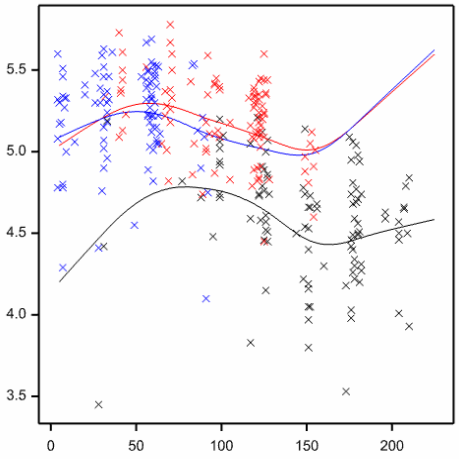


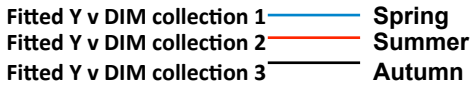
Composition results;











No significance of age of animal

DIM significant

Calendar month significant

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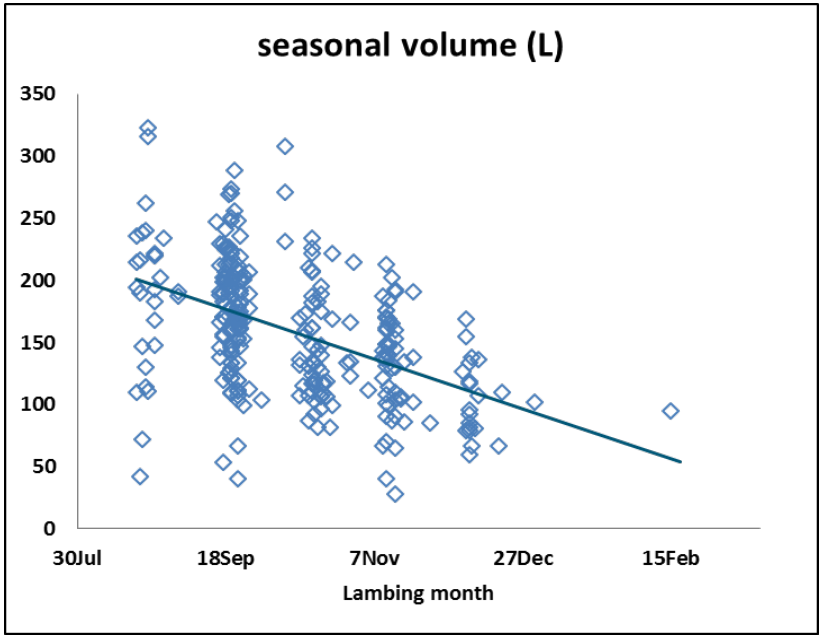
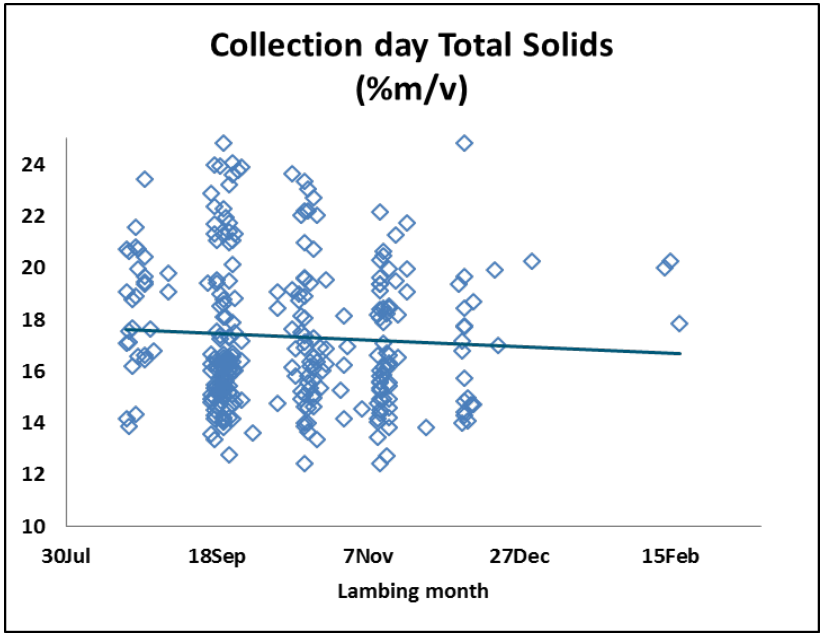
Composition results;

Effect of lambing month on season volume and total solids concentration





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Sheep study and cow milk comparison

Component	NZ Sheep milk		Cow milk*
	Range	Average	
Total protein (%)	4.1 –11.2	6.1	3.0 – 3.9
Casein	4.1 – 5.0	4.7	2.5 – 2.8
Whey	0.78 – 1.40	1.0	0.55 – 0.70
Non-protein nitrogen	0.04 – 0.05	0.046	0.03 – 0.04
Fat (%)	1.6 –16.3	6.3	3.3 – 5.0
Phospholipids (%)	0.03 – 0.12	0.053	0.01 – 0.03**
Cholesterol (mg/100mL)	10 – 23	15	13 – 31
Lactose	3.4 – 5.5	4.9	4.4 – 5.6
Ash	0.89 – 0.93	0.91	0.7 – 0.8
Total solids	12.1 – 32.5	17.4	11.8 – 13.0
Water (by diff)	78.3 – 84.7	81.9	87.0 – 88.2

**Claeys, W. L. et al(2014). Consumption of raw or heated milk from different species: An evaluation of the nutritional and potential health benefits. Food Control, 42(0), 188-201.*

***adapted from Braun M et al. Quantification of phospholipids in infant formula and growing up milk by high-performance liquid chromatography with evaporative light scattering detector. Journal of AOAC International. 2010;93(3):948-55. Epub 2010/07/16*

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Summary

- Component composition;

  variability driven by fat and protein content = high total solids

  effect Lactation cycle (DIM) and calendar month -processing impacts

- Averaged composition consistent across NZ producers, across years and with reported levels

- Studies to address the impact of processing on composition underway

  input into optimisation of storage and processing conditions.

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