Feeding Fodder Beet to Pregnant Ewes: What You Need to Know

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Posted April 5th, 2016 by Staff & filed under News, Rural

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Why the Fodder Beet (FB) Revolution?

- Farmers are exploring feed options other than pasture to meet feed shortages over winter, and to increase stocking rates and productivity
- FB – the '**game changer**'
- High DM yield, low cost per unit of feed, high energy, and reported increased cattle weight gains, compared to pasture

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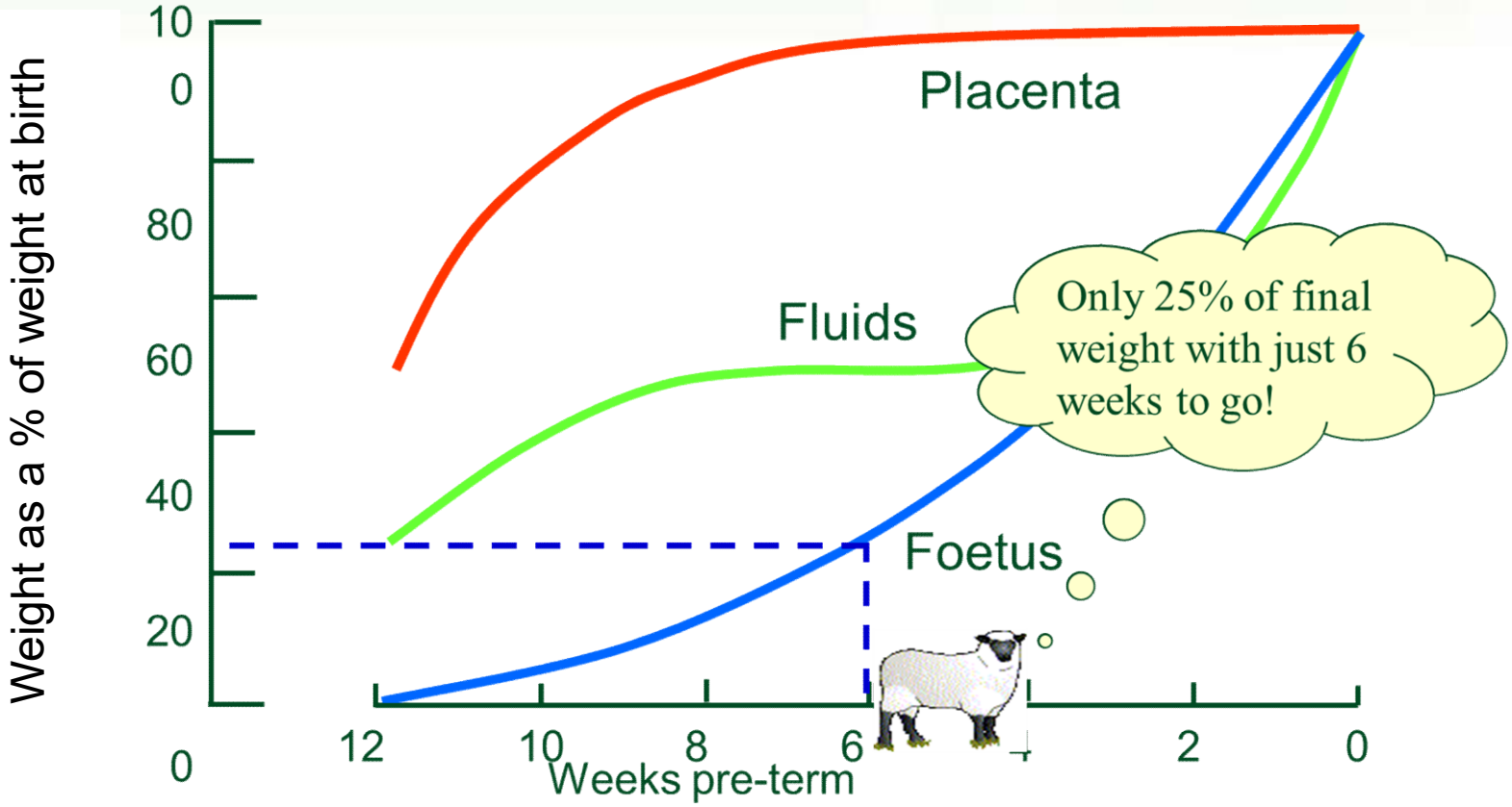
You Really Can't Beet it? What of the Science?

- Recent AgResearch/AGMARDT/B+LNZ study
  - 'Improving lamb growth using fodder beet'
  - Based on diet composition and digestibility, feed formulation modelling expected FB-rich rations (>60%) to support lamb LWG of 100-120 g/d
  - However, LWG was lower than predicted when implemented on-farm (~72 g/d)
- Nutrients other than ME limiting?
- FB is **low in crude protein (CP)**
- Livestock need sufficient CP in the diet
  - Particularly growing/pregnant animals

Late Gestation Nutrition Drives Birth Weight



The time to get nutrition right

Modified from J Vipond, SAC consulting

Hard Questions of Fodder Beet

- Should we be feeding it to pregnant animals?
- Is it a feed with adequate nutrition?
- What is the impact on ewe and offspring survival and performance?

We predicted that:

1) Compared to ryegrass/clover pasture (RG), ewes fed a high energy diet such as FB, in late gestation will have improved LW and BCS
2) But, as FB is low in dietary CP, lambs will an increased risk of mortality and poor postnatal growth

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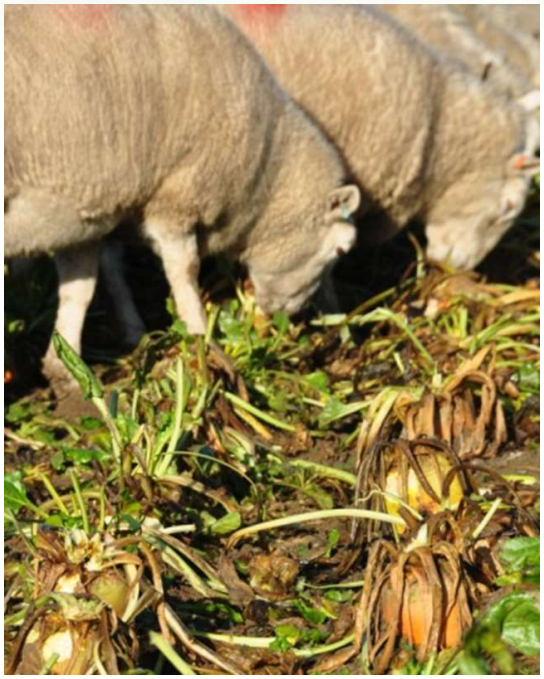
Our aim was to identify any unintended nutritional consequences of feeding FB on the survival and performance of ewes and their offspring

Our Current Work

- **B+LNZ funding** to focus on **what would happen** when ewes grazed FB vs. RG in mid-late pregnancy

- **AgResearch Investment** to focus on the 'why' i.e. the **science** behind the effect of FB on measured ewe/lamb productivity outcomes



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What We Did

- We took 200 twin-bearing ewes and assigned them to either FB or RG diets from ~day 80 of pregnancy (P80) through to lambing
- We transitioned them onto their feeds as per good practice, and provided standard animal health treatments
- They went back onto pasture at the start of lambing in mid-August
- We kept monitoring both ewe and lamb performance until weaning in early December

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Feeding

- FB (cultivar 'Rivage')
  - Estimated yield of 30 t DM/ha
  - Fresh allocation of FB provided every 2nd day
  - No back fencing used
  - *Ad lib* ryegrass hay available in racks
  - Feed disappearance (kg DM/ewe/d)
    - Fodder beet: 1.8; hay: 0.50
- RG (ryegrass/clover pasture)
  - Fresh allocation of RG every 2nd day
  - Pre- and post-pasture covers of 2800 and 1200 kg DM/ha
  - No back fencing used
  - *Ad lib* ryegrass hay available in racks
  - Feed disappearance (kg DM/ewe/d)
    - Ryegrass: 1.2; hay: 0.0

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Feeding

Results: Diet Composition

Lab Analysis of Diet Composition

g/kg DM	FB treatment		Ryegrass hay	RG treatment
	Bulb + Leaf 78:22 ratio	FB + hay (72:28 ratio		RG*
DM, g/kg	142	334	828	157
Ash	94	96	99	171
CP	117	118	119	224
Fat	6.7	8.6	14	41
NDF	152	293	655	429
Soluble sugars	506	372	27	70
ME, MJ/kg DM	12.1	11.1	8.6	10.8

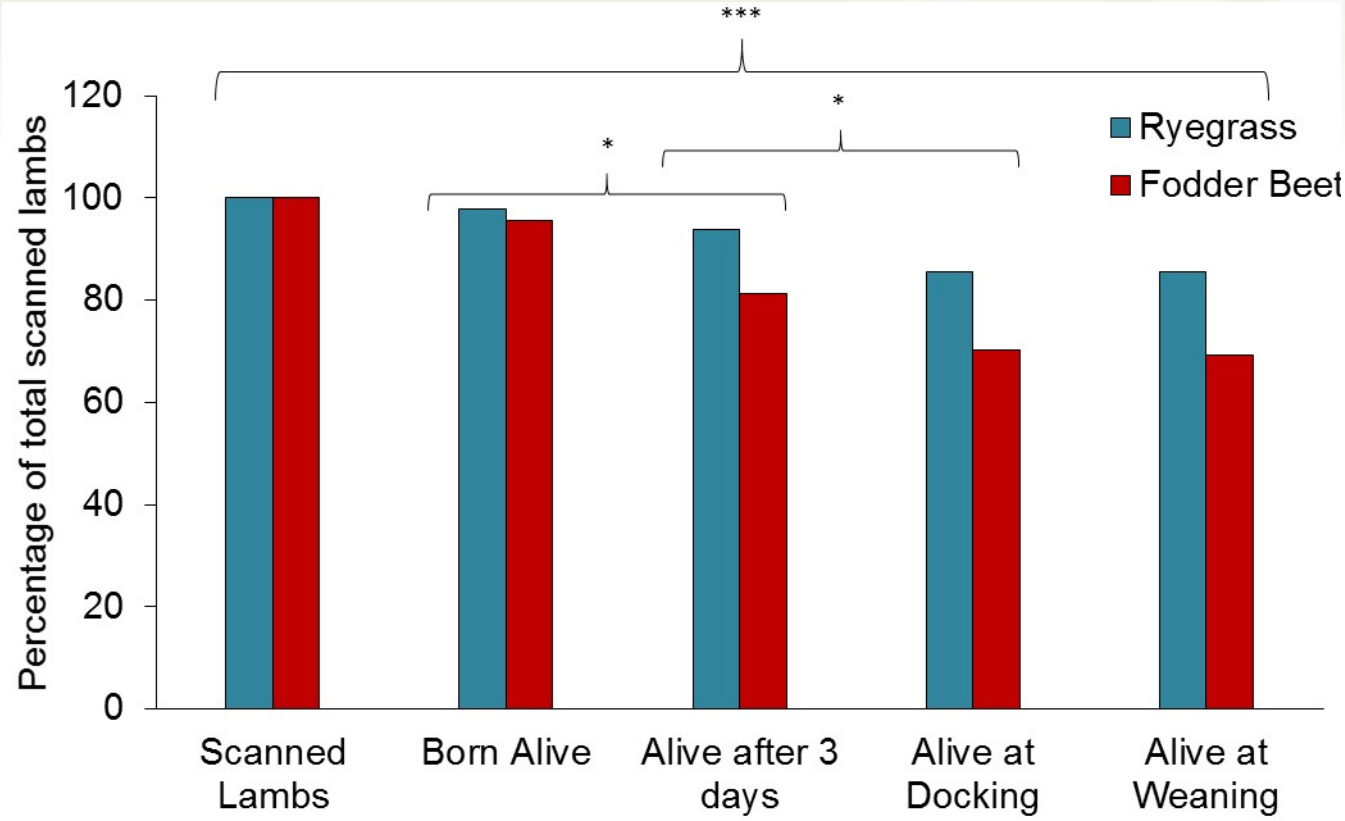
*No hay consumed for ewes grazing ryegrass treatment
DM, dry matter; CP, crude protein; ADF, acid detergent fibre; NDF, neutral detergent fibre; ME, metabolisable energy

Lower than recommended minimum NDF content of 350 g/kg DM

CP offered should be **no less** than 110 g/kg DM, but **greater** (14-18%) for twin-bearing ewes on highly degradable diets

Results: Lamb Survival and Performance

Lamb Survival



Diet P value
* P<0.05
** P<0.01
*** P<0.001

Diet	No. of Ewes	Scanned lambs	% of deaths				
			Scanned to birth	Birth to 3 d	3 d to docking	Docking to weaning	**Scanned to weaning**
RG	97	194	2	4	9	0	**15**
FB	101	202	4	15	13	1	**34**

Lamb Weight

	FB	RG	SEM	P value
No. of lambs	202	194		
Live weight, kg				
Birth	4.87	5.16	0.11	***
Docking	16.6	17.4	0.36	**
Weaning	32.0	33.7	0.60	**

Diet P value:* P<0.05;** P<0.01; *** P<0.001; NS not significant
SEM: Standard error of the means

Lambs from FB-fed ewes also had a smaller body size at birth than lambs from RG-fed ewes

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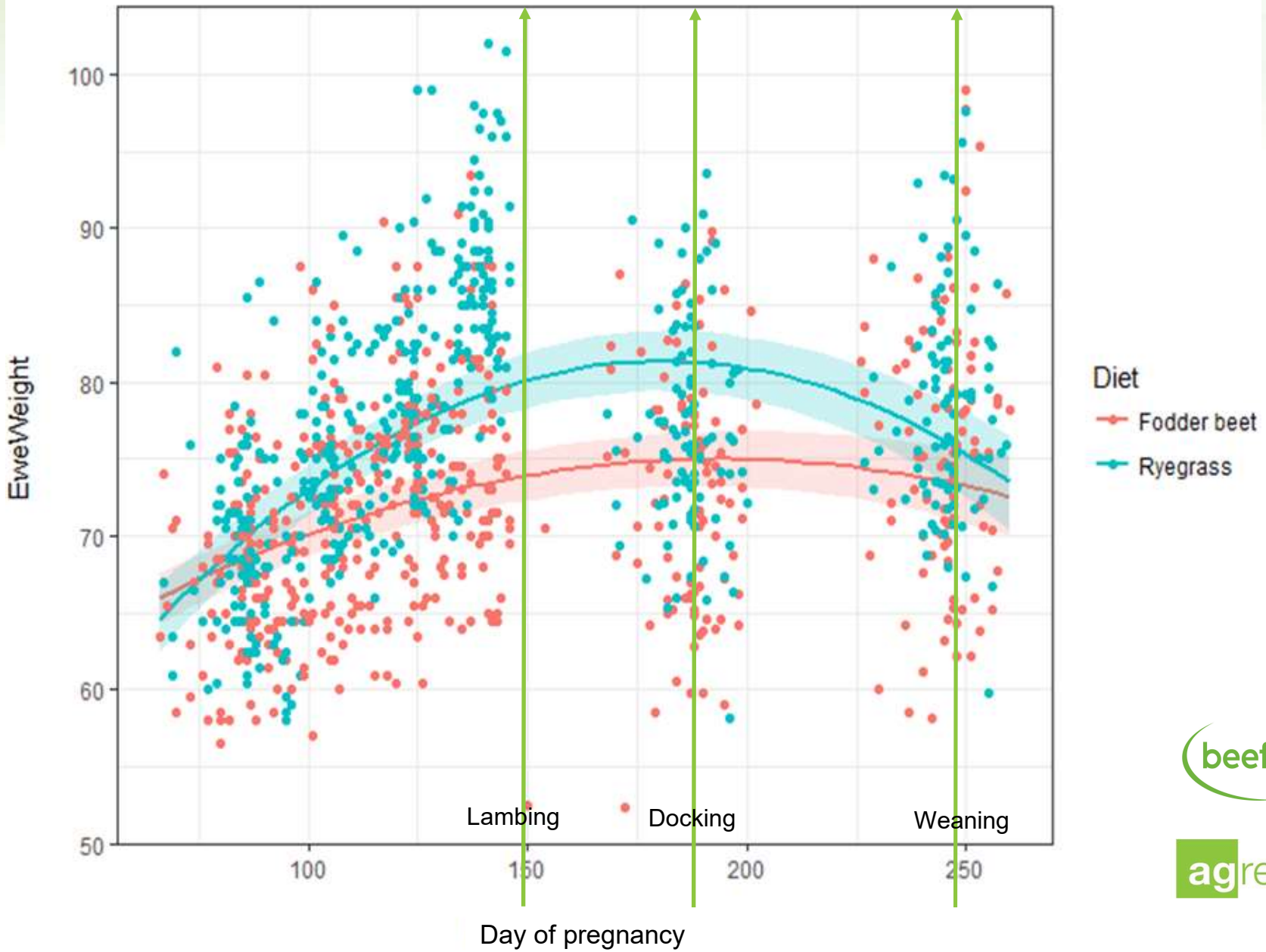
Lamb Performance: Body Measurements

Results: Ewe Performance

Ewe Live Weight (LW)



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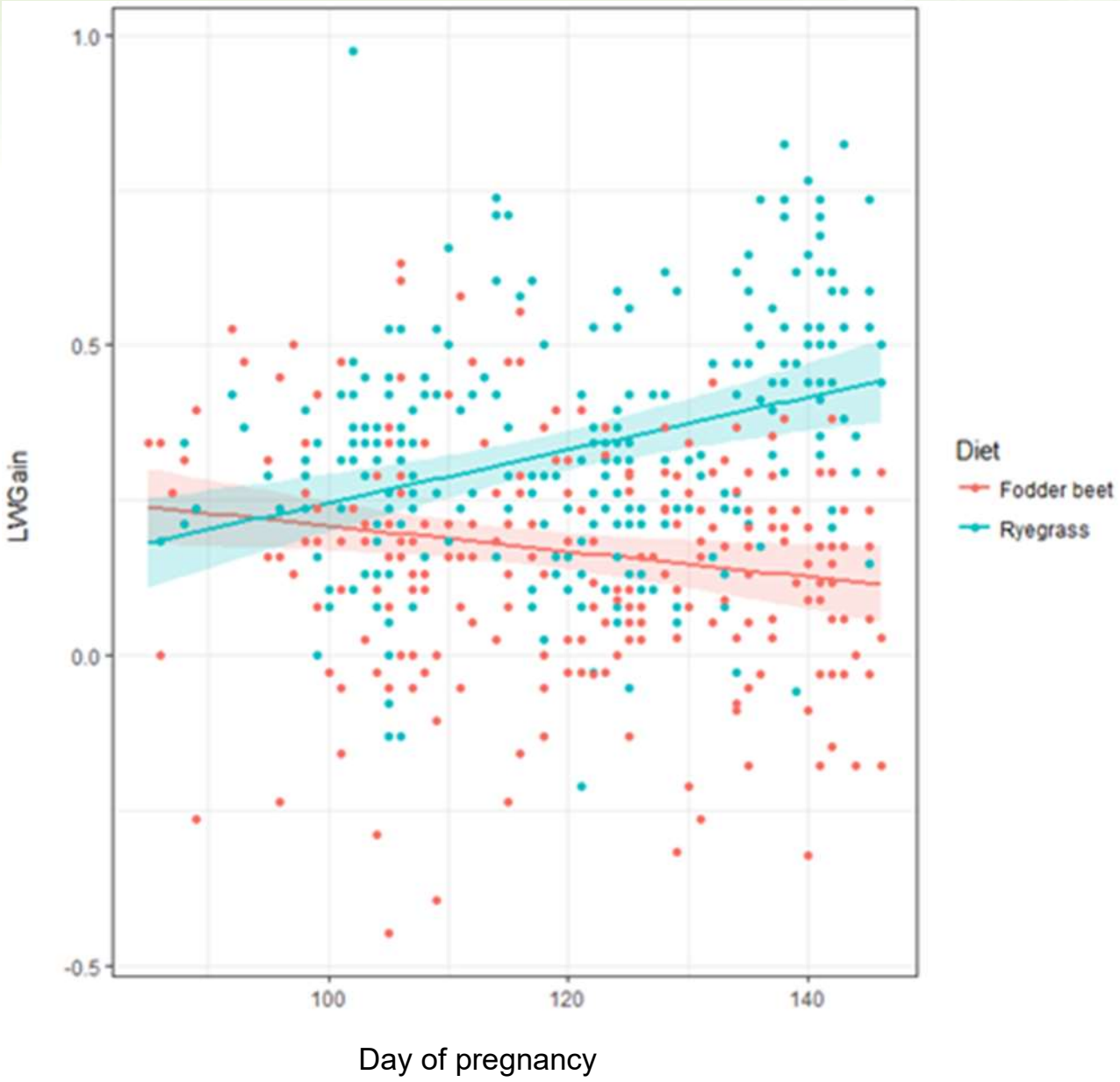
Ewe Liveweight Gain (LWG)



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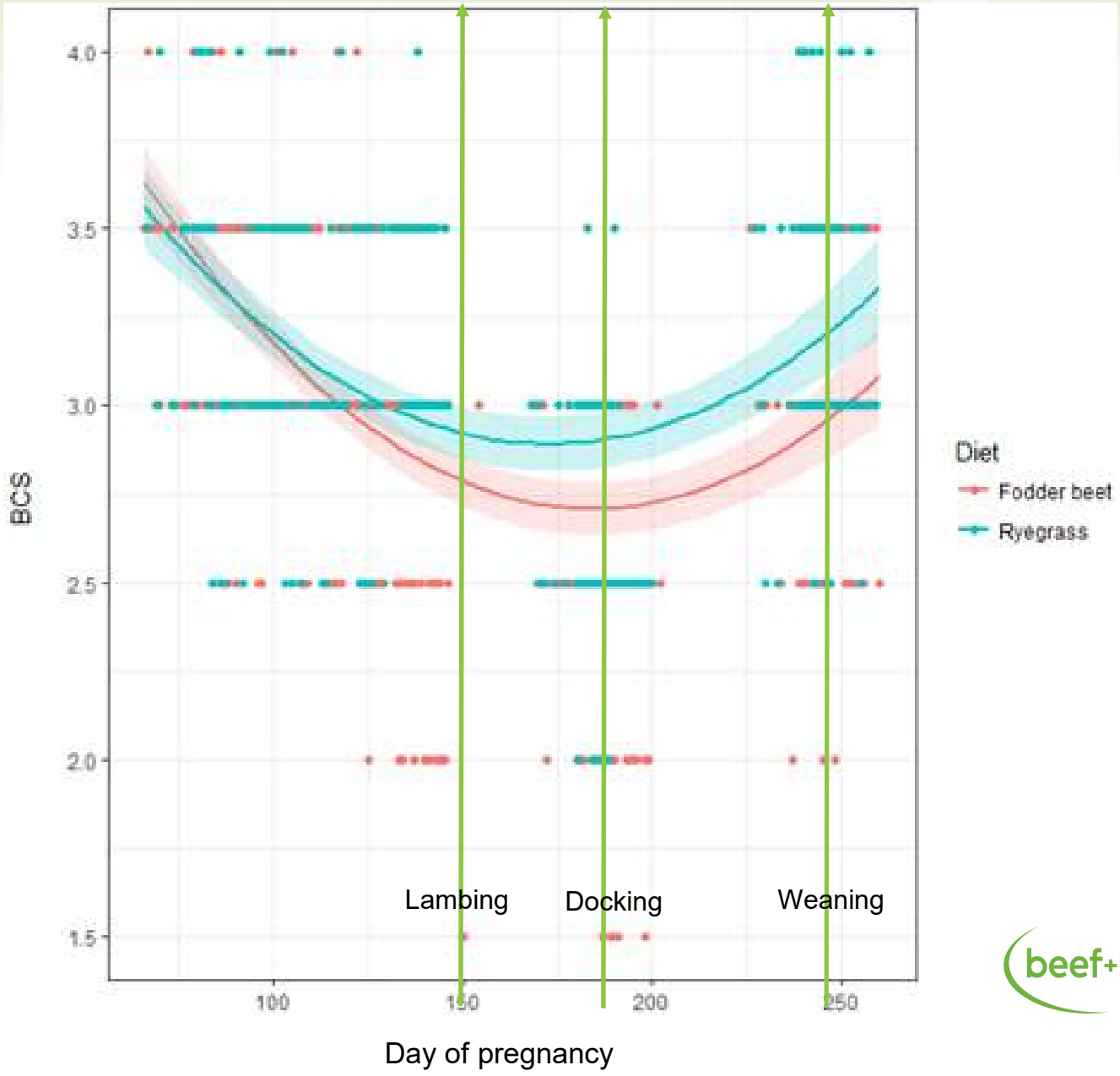
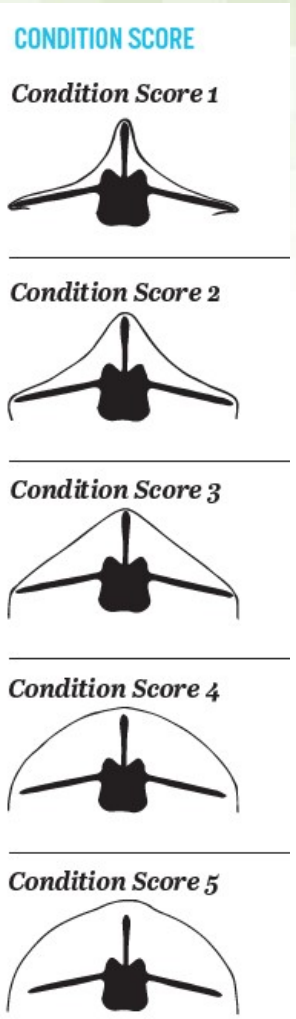
Ewe Body Condition Score (BCS)





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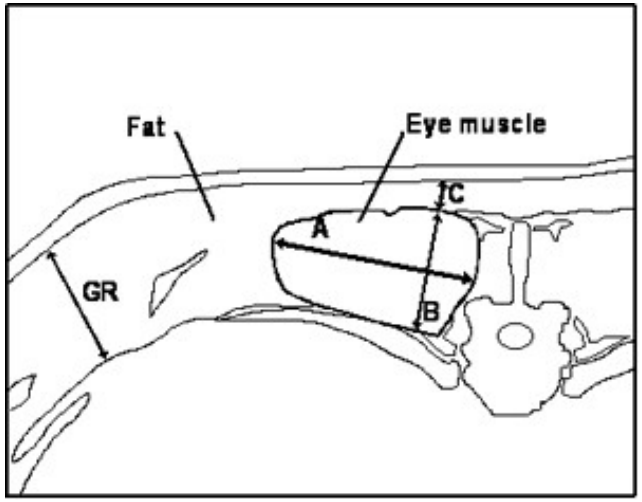
Ewe Carcass Measurements (at P140)

	FB	RG	SEM	P value
No. of ewes measured	10	10		
Carcass fat C, mm	2.4	5.2	1.12	0.06
Carcass fat GR, mm	3.6	7.8	1.71	0.09
Eye muscle width A, mm	54.5	60.7	1.11	***
Eye muscle depth B, mm	19.5	26.2	1.16	**

Diet P value:* P<0.05;** P<0.01; *** P<0.001; NS not significant
SEM: Standard error of the means



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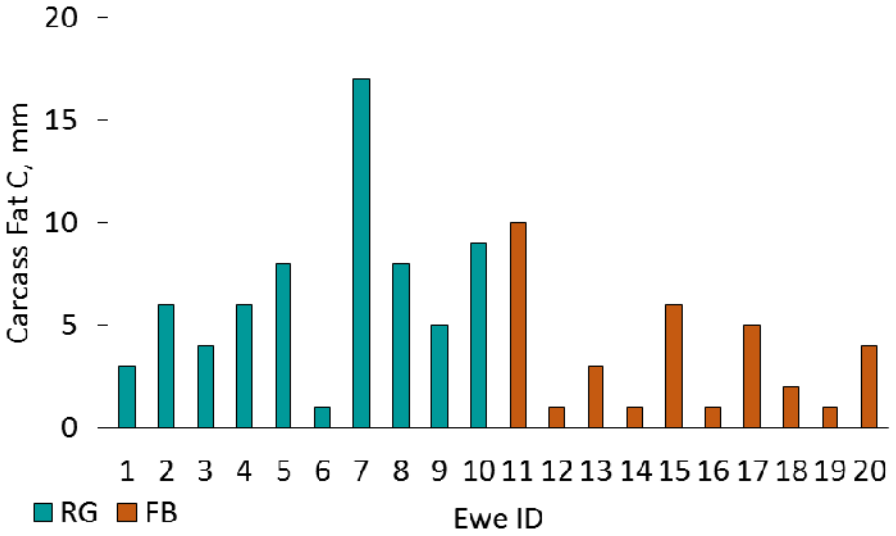
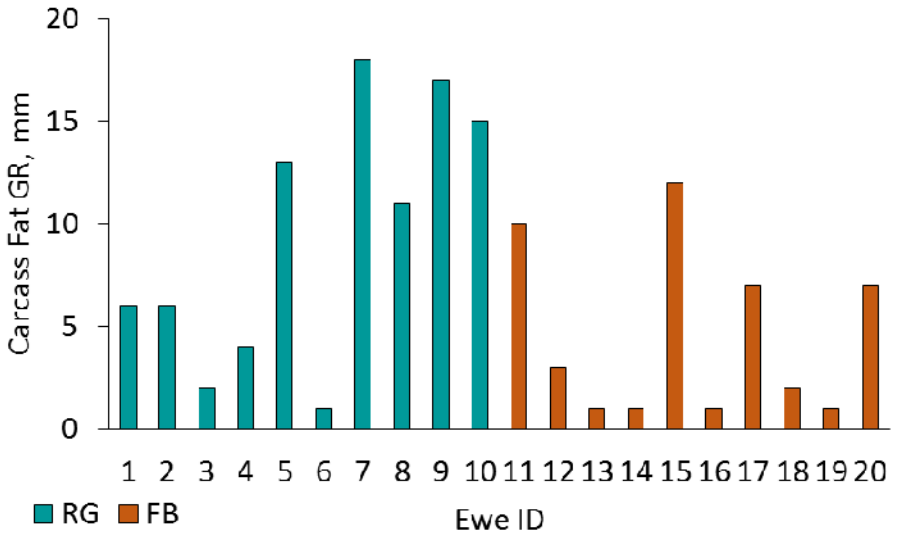
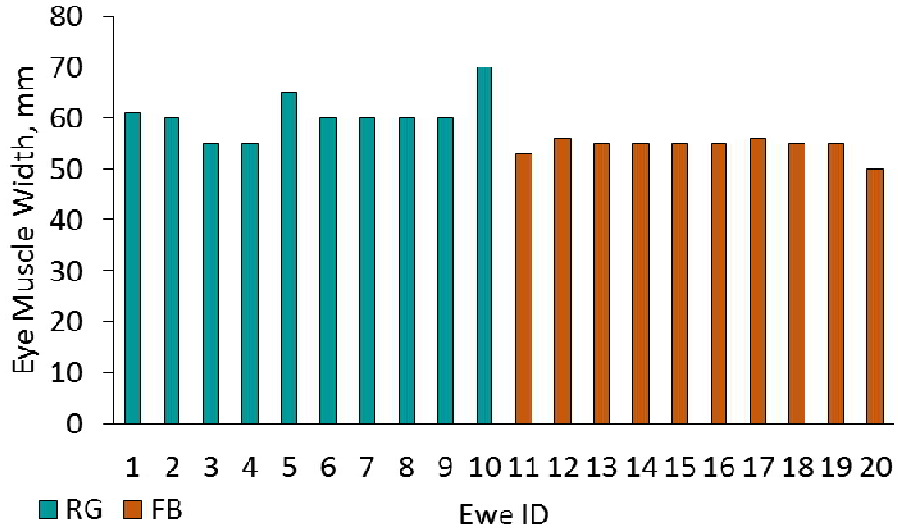
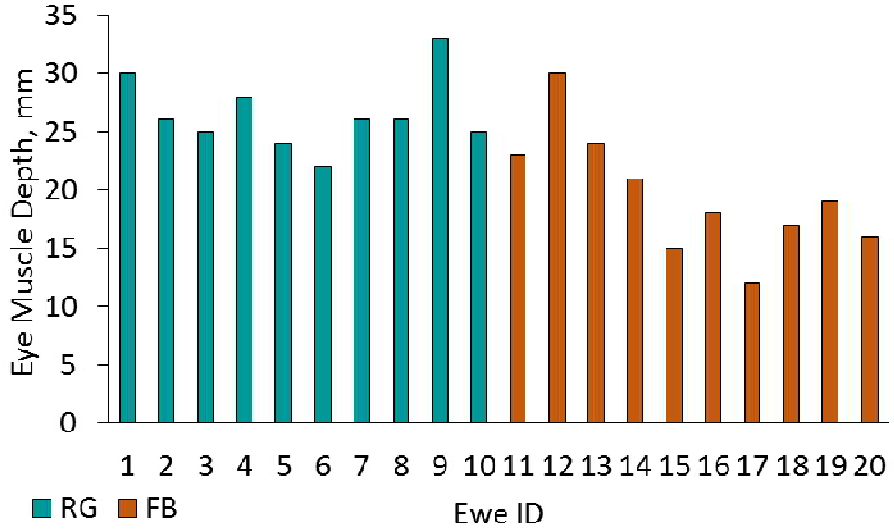


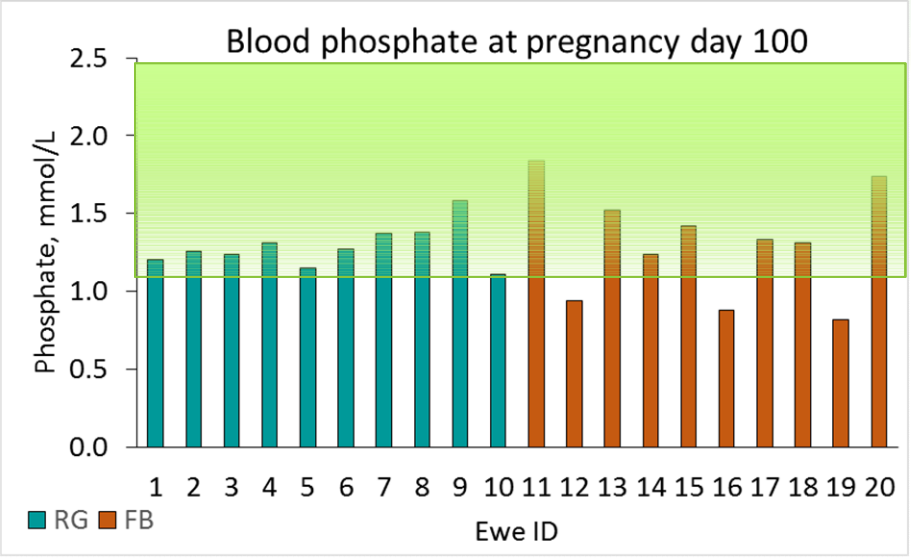


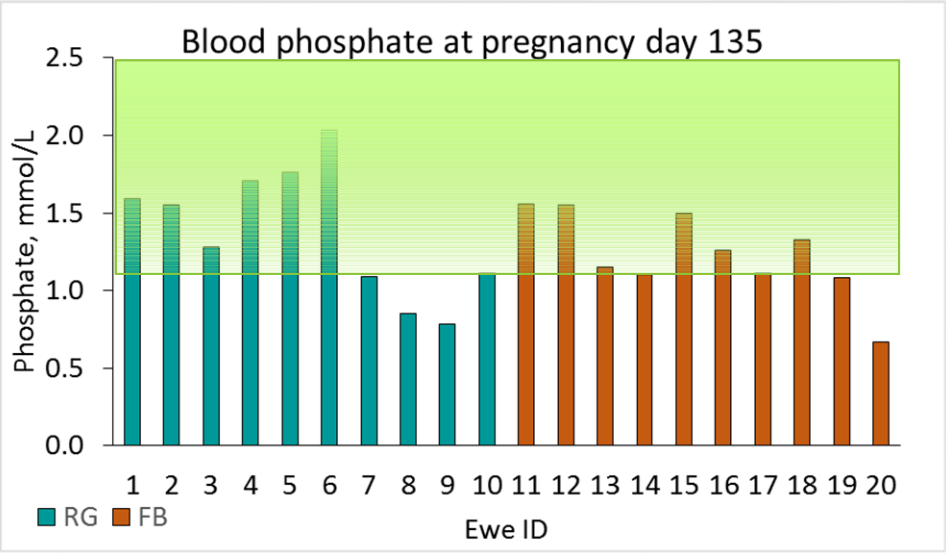




Ewe Blood Mineral Concentrations

Green shading indicates optimal range





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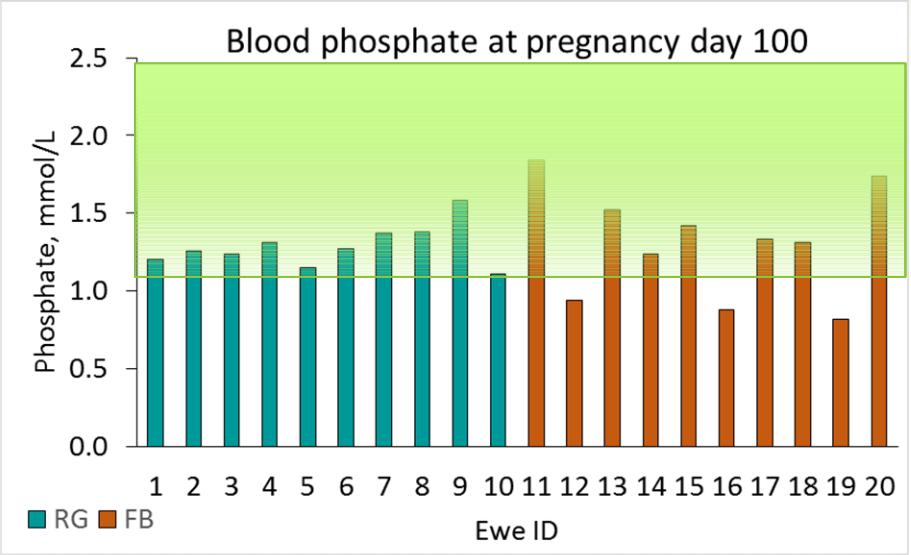

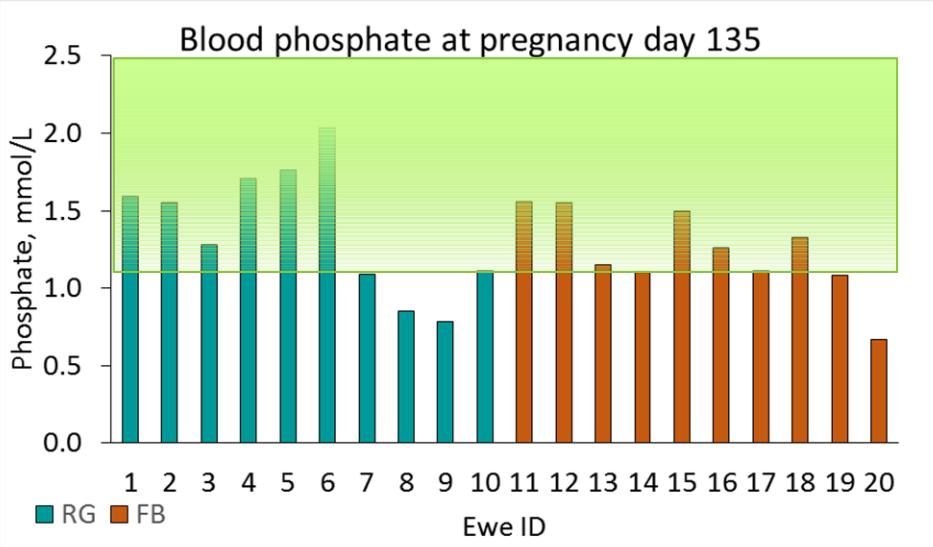

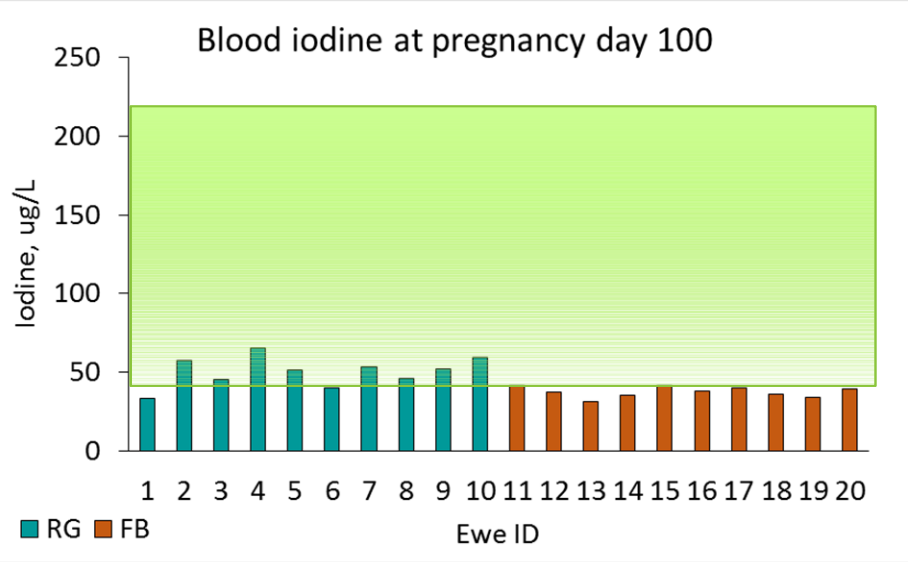

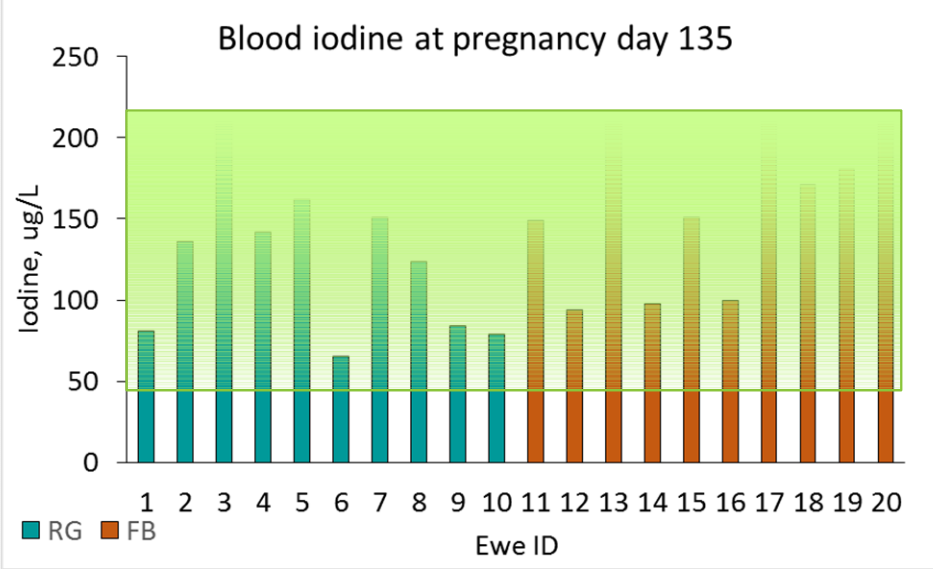

Conclusions

Key Outcomes: What You Need to Know

- FB was proven to be a high yielding forage option
  - Was able to fill pasture feed deficits
- But, compared to RG, ewes fed FB from mid-pregnancy to lambing:
  - Were unable to rely on a FB diet alone
    - FB unable to meet nutritional demands of CP and fibre
  - Had a loss of muscle and body condition
    - Indicative of protein and energy mobilisation to support fetal growth
  - Had a negative effect on lamb survival and pre-weaning growth rates
    - Indicate nutritional deficiencies during pregnancy and early lactation
  - Were iodine deficient and needed treatment

Where to Next for Science?

FB provides a feed option BUT to get the most out of it we need to….

- Find solutions to address any nutritional shortcomings
  - Where does the ME go? Is it overestimated? Energy:protein?
  - Are feeding recommendations right?
  - What other feed options compliment FB?
- Inform farm management practices
  - Develop FB feed recommendations for pregnant ewes and other livestock
- Understand the mechanism behind the actions of FB
  - What role does protein and its different amino acids play?
    - Demands of the mother/fetus/offspring
- Extend research to other feeds (e.g. swedes)

How do Farmers Capture the Fodder Beet Revolution?

- Avoid feeding FB as a sole feed source
  - Provide an additional source of protein and fibre
- Find the balance between per ha performance vs individual performance
  - Pregnant animals: feeding future generations
- Feed earlier than later in pregnancy
  - Feed a higher quality/better balanced diet later in pregnancy
- Feed FB to other livestock classes whose nutritional demands are not as great as pregnant animals

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Acknowledgments

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Questions

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