Calf Nutrition – Feed for Growth

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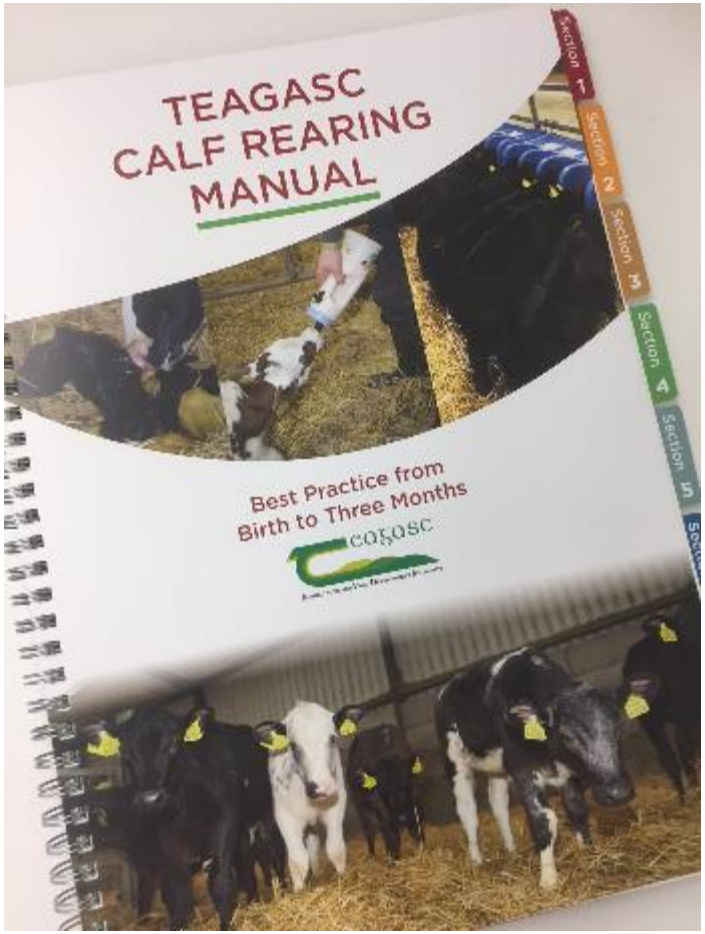
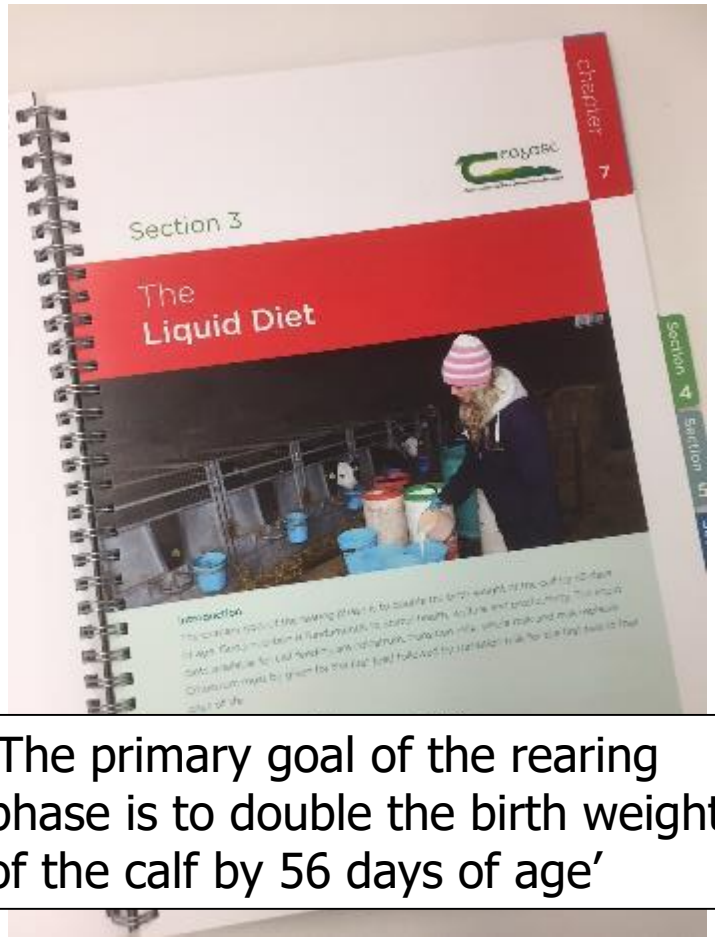
Calf nutrition – Feed for Growth

1. What's the objective?
2. Feeding the very young calf
3. Feeding the weaning calf

What's the objective?





'The primary goal of the rearing phase is to double the birth weight of the calf by 56 days of age'

Importance of Age at First Calving

- Calving at 23 – 25 months has long term benefits
  - Better fertility
  - **Higher milk production over 5 years**
  - Improved survival to third calving

Cooke et al., 2013 OJAS 3:1-12

Milk Production Over 5 Years

- Animals calving at 23 to 25 months produced the most milk per cow over 5 years of life

	Age at first calving (months)			
	<23	**23-25**	**26-30**	**>30**
Number of Days in Milk in 5 years	731	763	692	587
Total 5 year milk yield (kg)	21,072	22,477	20,605	15,777
% life in first 5 years spent in milk	46	45	40	34

Cooke et al., 2013 OJAS 3:1-12

Importance of Growth Rate

- Heifers should be 55 to 60% mature body weight (third lactation) at first breeding

Age at first calving (months)	**24**	**28**
Mature body weight (kg)	660	660
Pregnant (month of age)	15	19
Start breeding (month of age)	13-14	17-18
Body weight at breeding (kg)	370	370
	330kg/425d=0.77kg/d	330kg/547d=0.6kg/d
Growth rate required (kg/day)	**0.75-0.8**	**0.6-0.65**

Van Amburgh:
'minimum goal: double birth weight in 56d' = *ca*. 0.71kg/d

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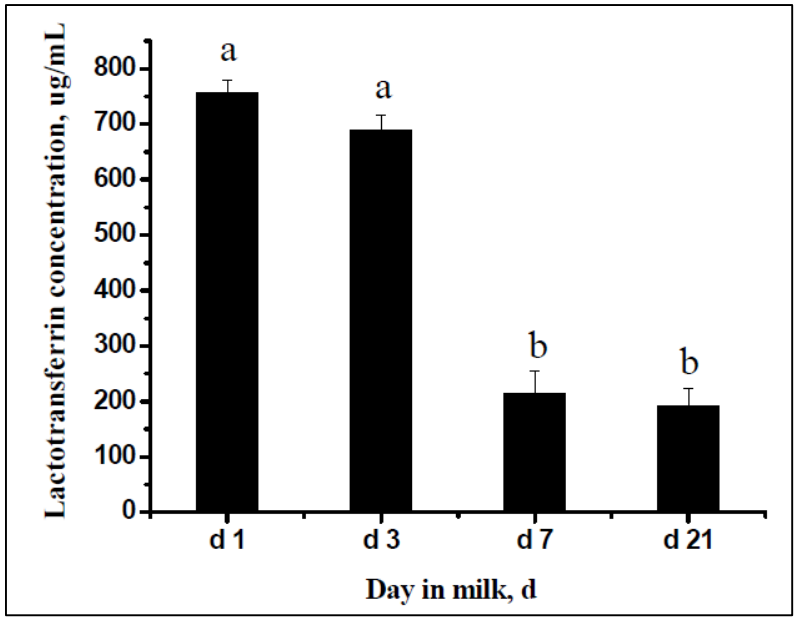
Colostrum… but then what?

'Transition milk'

- Nutrients for growth (protein, fat, lactose)
- Protection and support for development
  - Examples: IgA and lactoferrin for gut protection



'In bovine milk and colostrum, lactoferrin and lactoperoxidase are the most dominant and best studied antimicrobial components…

…many experiments have proven their activity against all kinds of micro-organisms.'

Zhang et al. (2015)
Van Hooijdonk et al. (2000)

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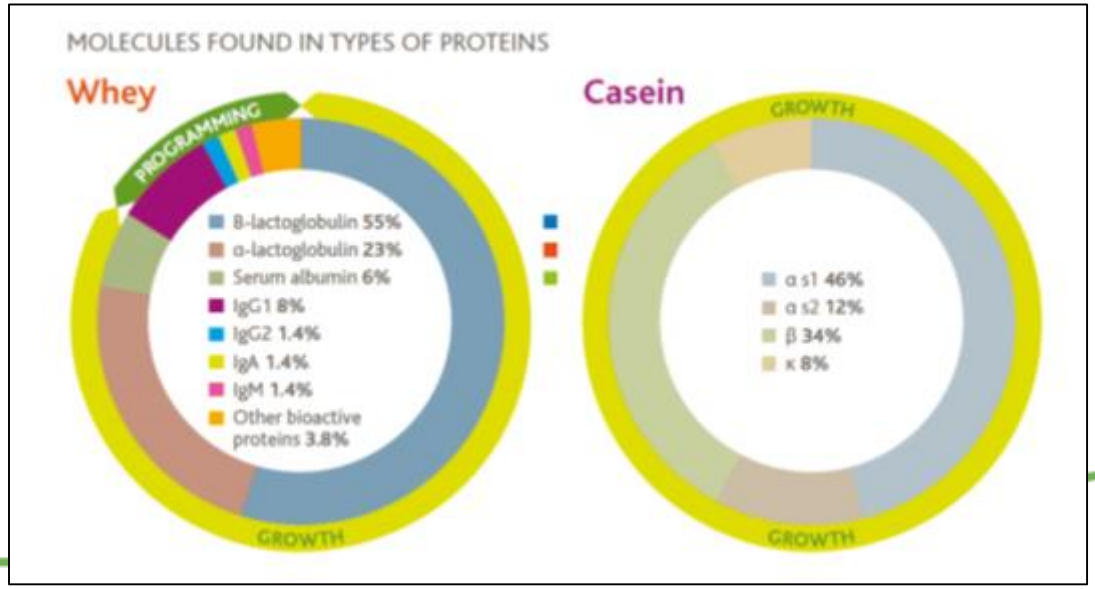
Colostrum… but then what?

- Difficulties of feeding transition milk
  - Increased risk of disease transmission (Johne's)
  - Risk of bacterial contamination

- Alternative: milk replacers based on specific whey fractions that contain the protective proteins and lipids found in transition milk



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How much milk?

- The primary source of nutrition for a calf during the first 3 to 4 weeks is milk
- During the first 2 weeks of life, the calf experiences significant health and environmental stresses
- Feeding more milk from a few days of age will help:
  - Prevent any early weight loss
  - Improve health
  - Maximise the high feed efficiency & early growth potential

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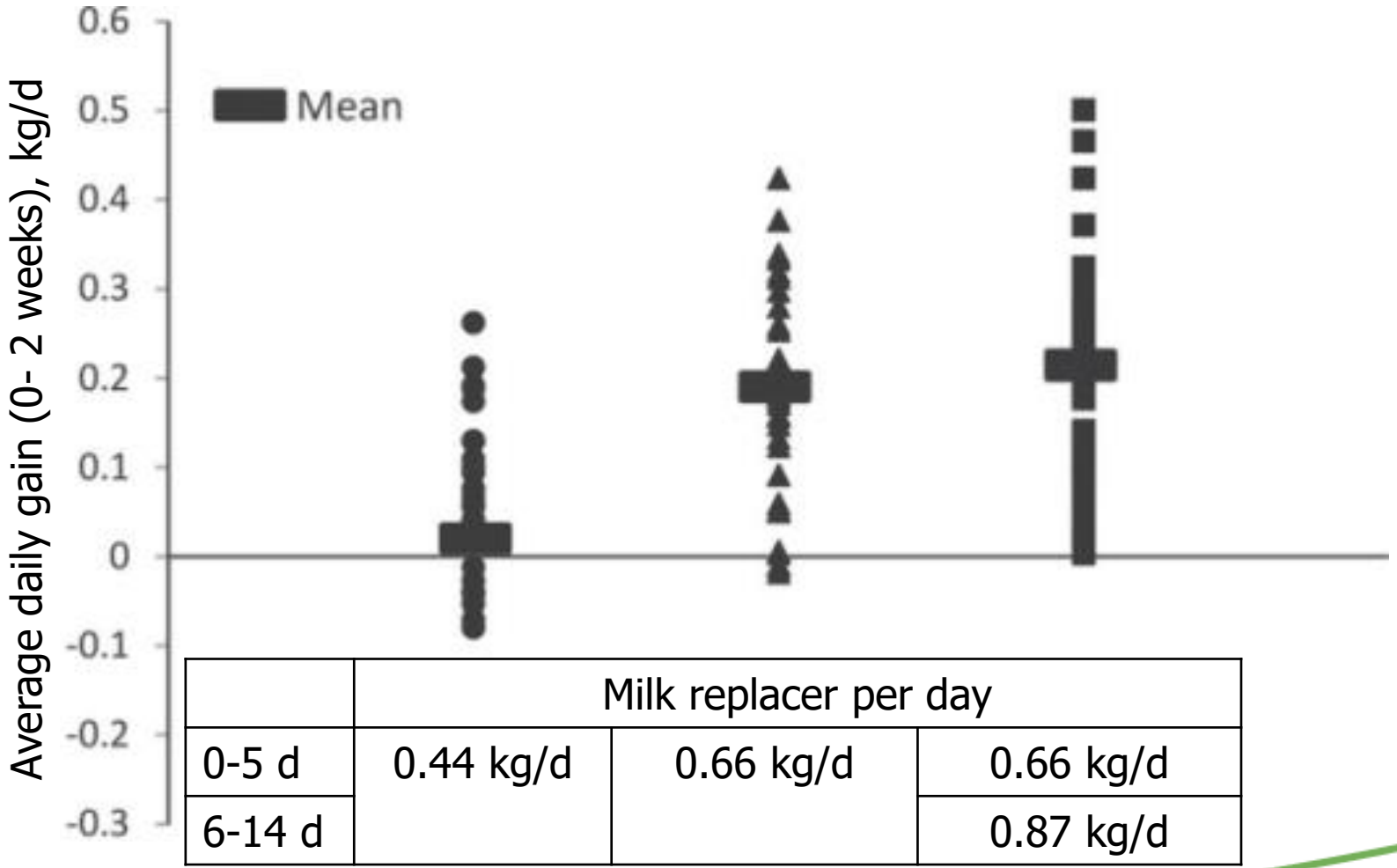
Body Weight Gain from 0 to 2 Weeks of Age



	Milk replacer per day		
0-5 d	0.44 kg/d	0.66 kg/d	0.66 kg/d
6-14 d			0.87 kg/d

Chapman et al., 2016 J Dairy Sci 99 2740

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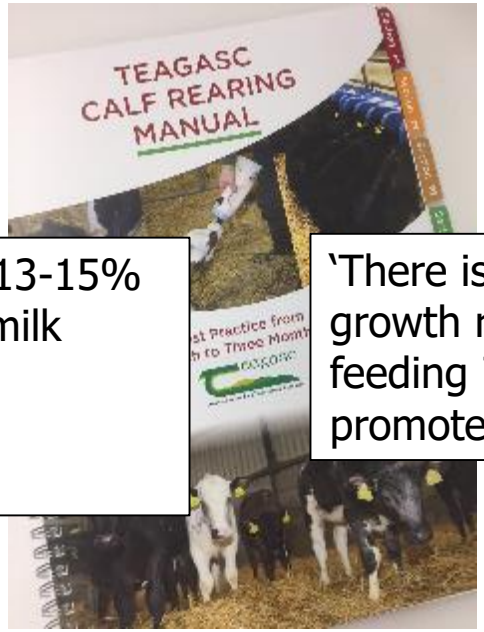
How much milk?



'…the calf should receive at least 13-15% of its birthweight in good quality milk replacer'

40kg x 15% = 600g/d

'There is growing evidence that high growth rates in early life (0.6-0.8kg/d by feeding 750-900g milk replacer per day) promote health in calves…'

A cautionary recommendation:
Know the weight of your calves!

Interpreting Faecal Score

- A calf drinking high amounts of milk *may* have more liquid faeces **BUT** this is not the same as diarrhoea caused by a pathogen
  - Calves fed ad lib increased their voluntary intake to 7.6L/d (950g/d) by day 5 & 13.3L/d by day 26 – calves did not suffer from nutritional scours+
  - No difference in faecal scores when calves were fed 0.66 kg/d from birth to day 5, followed by 0.87 kg/d, compared to providing only 0.44 kg/d over the first 14 days*
- Calf diarrhoea is much more likely a problem related to:
  - Infectious agent (e.g. Rotavirus, Coccidiosis, *Cryptosporidium*)
  - Management (e.g. colostrum intake, hygiene, housing, ventilation, stress)

+G Curtis PhD Thesis 2015, Liverpool University; *Chapman et al., 2016 J Dairy Sci 99 2740

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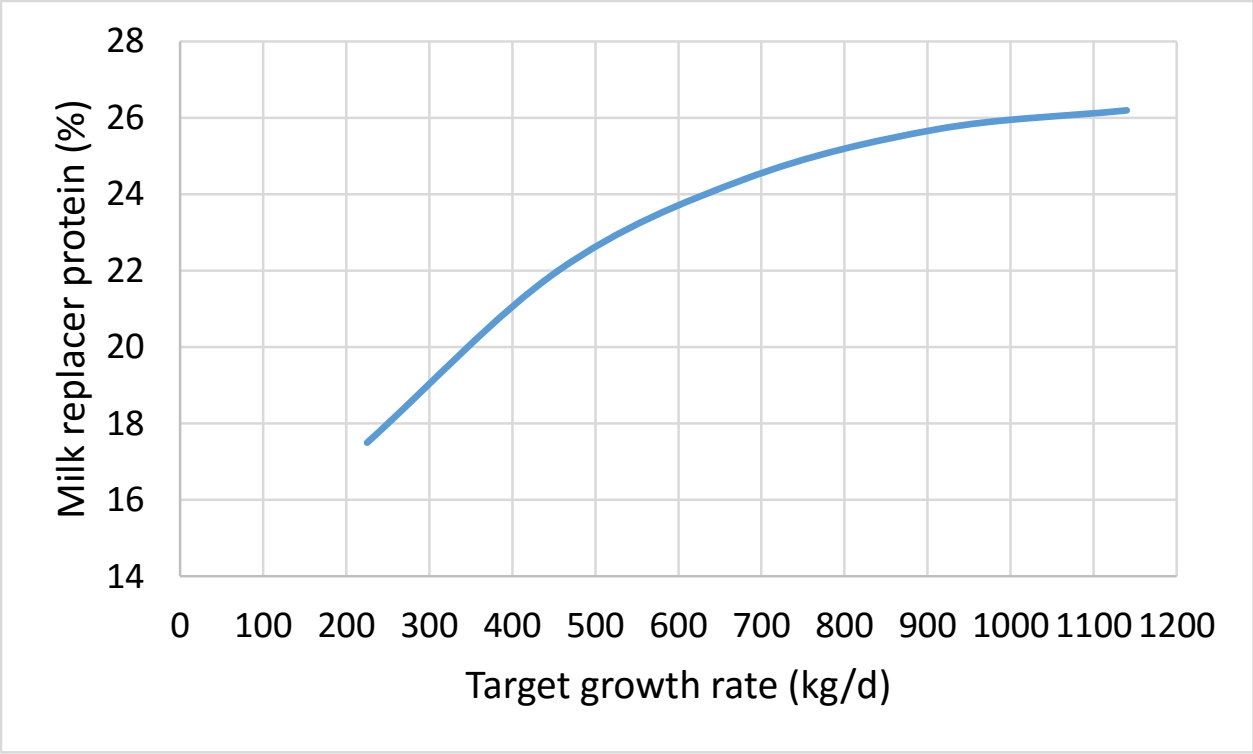
Protein for growth

Faster growth needs more protein in milk replacer



After Drackley (2001)

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Starter Intake & The High Milk Fed Calf

- Feeding high volumes of milk enables calves to achieve their early growth potential, but…
- …feeding more milk may delay solid feed intake which can lead to poor growth in the weeks immediately after weaning
- Starter intake can be encouraged by:
  - Providing palatable, fresh starter & water from day 1
  - Using social housing (pair or group)
  - **Reducing the milk offered over a 3 week period**
  - Offering chopped forage

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Twice daily feeding (up to 23% CP milk powder)

Housing	Week	Age (days)	Twice daily feeding rates (litres)		Mixing rate (g/L)	Total solids per day (g)
			am	pm		
Individual	1	0-3	Colostrum			
		4-7	2.5	2.5	125	625
Pair or group	2	8-14	3	3	125	750
	3	15-21	3	3	125	750
	4	22-28	3	3	125	750
	5	29-35	3	3	125	750
	6	36-42	2.5	2.5	125	625
	7	43-49	2.5	2.5	125	625
	8	50-56	2.5	-	125	312.5
	9	57	0		*Total CMR:*	*34 kg*

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Twice daily feeding (26% CP milk powder)

Housing	Week	Age (days)	Twice daily feeding rates (litres)		Mixing rate (g/L)	Total solids per day (g)
			am	pm		
Individual	1	0-3	Colostrum			
		4-7	2.5	2.5	150	750
Pair or group	2	8-14	3	3	150	900
	3	15-21	3	3	150	900
	4	22-28	3	3	150	900
	5	29-35	3	3	150	900
	6	36-42	2.5	2.5	150	750
	7	43-49	2.5	2.5	150	750
	8	50-56	2.5	-	150	375
	9	57	0		*Total CMR*	*41 kg*

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Computerised Feeder Principles

Housing	Week	Age (days)	Day on feeder	Milk volume per day (litres)
Individual	1	0-3		Colostrum
		4-7		5
Introduce healthy calves to feeder at 1 week of age				
Group	2	8-14	1-7	6
	3	15-21	8-14	6
	4	22-28	15-21	6
	5	29-35	22-28	6
	6	36-42	29-35	6
	Reduce milk allowance by 0.19 L/d from d 36			
	7	43	36	5.81
	8	50	43	4.48
	9	57	50	3.14
		63	56	2
	10	64	57	0

- Introduce calves to feeder at 1 wk of age
- Offer 6 L of milk from day 1 on feeder
- Allow a 3 wk weaning period (reduce milk allowance by 0.19 L/d)
- Standard feed plan is 56 days on the feeder (i.e. calves are 63 days of age at weaning)

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http://www.feedforgrowth.com/tablet/index.html

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