

DEPARTMENT OF ANIMAL NUTRITION

Feeding of High Lactation Dairy Cattle

Nutritional needs of the high-yielding cow

- High energy and nutrient intake
- A high energy diet fed *ad libitum*
- Managed body condition
 - Not too fat, avoid excessive loss
- Balanced diet
 - Avoid excesses as well as deficiencies
 - Maybe adjust to cow's physiological state?

High yielding Dairy Cattle

- **High yielders:**
- Cows yielding more than 20 kg/day
- Buffaloes yielding more than 15 kg/ day
- Nutrient requirements vary with :
 - The stage of lactation and gestation.
 - Quantity of milk
 - Quality of milk
 - Fat
 - Lactose
 - Solid not fat (SNF%)

How much does a cow eat?

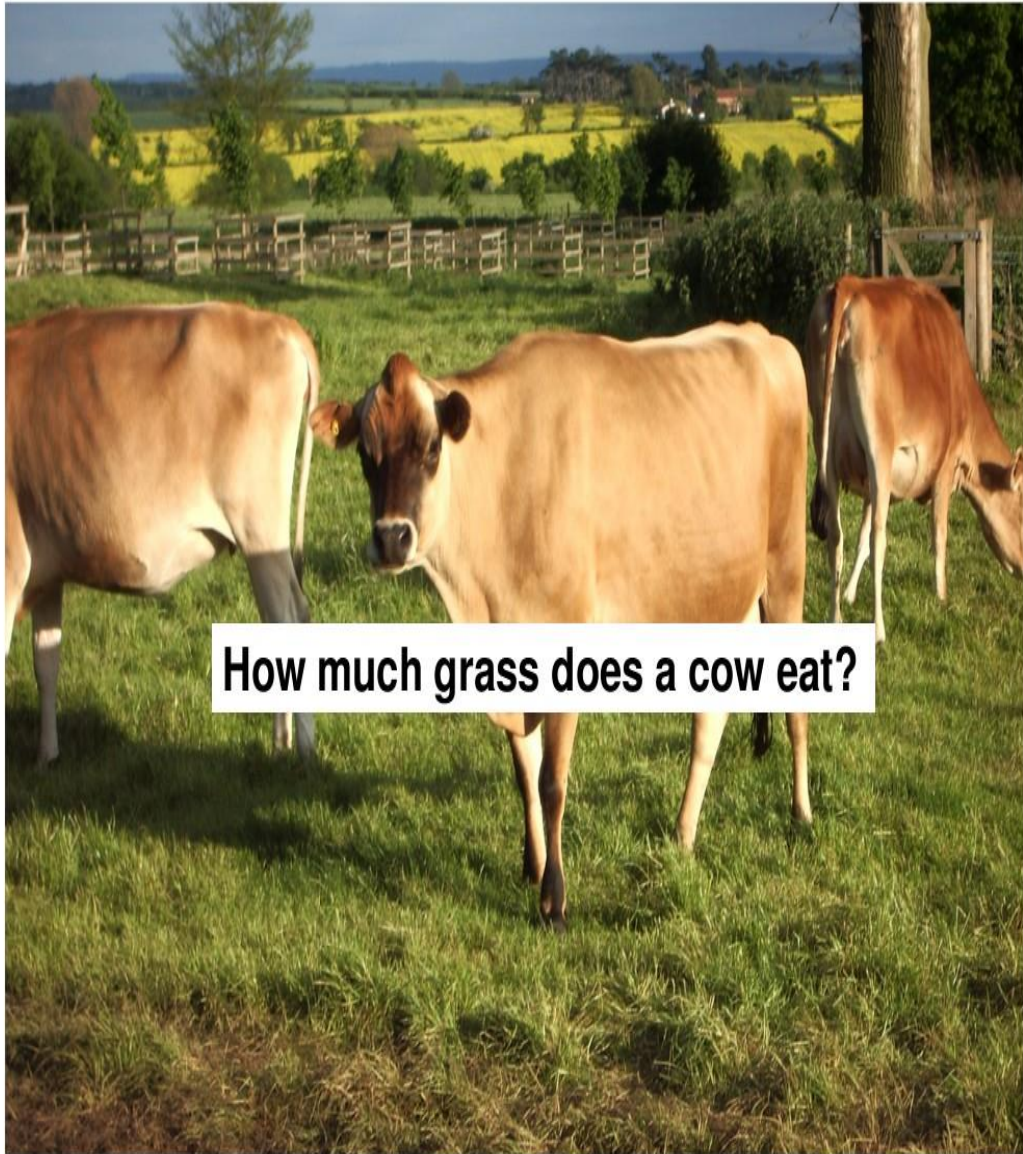
- Animal factors e.g. live weight, milk yield, condition score etc.
- Diet factors e.g.
- Dry Matter, Digestibility
- Forage Palatability
- Acid Loading of Forages
- Long fibre (saliva buffering)
- Total Mixed Rations



How much does a cow eat?

- Feed access (trough space 0.5-0.75 m/cow)
- Feed availability (ad-libitum is 110%)
- Ad-lib fresh clean water
- Number of feeds per day
- Remove old feed
- Comfortable bed for rumination





How much grass does a cow eat?

Potential Milk Yield from Grass

Milk (kg/d)	DMI (kg/d)	Grazing time (h/d)		
		early	mid	late
5	10.6	6	7	9
15	13.5	8	9	11
25	16.4	9	11	14
35	19.6	11	13	16

Cows will not graze for longer than 9 hours per day

Cows prefer to stay indoors!

Dietary Calcium & Phosphorus

- **Minerals & vitamins are essential for optimum Milk production**
- **Calcium:**
 - Essential to prevent milk fever & dystocia
 - 0.4% pre-partum
 - 0.6% post-partum

Phosphorus:

High P has negative effect on Ca metabolism

0.4% Pre & Post-partum

Magnesium :

Protective role in preventing milk fever

0.4% Pre & Post-partum

NUTRITION & MILK PRODUCTION

- Major constituents of milk
 - Lactose, fat and protein
- Synthesised in the mammary gland from precursors absorbed from the blood and transported either from the digestive system or from body reserves.
- The primary building blocks of milk fat are the VFAs, acetate and butyrate,
- Milk protein - primarily casein - is produced from amino acids.

Lactation cycle

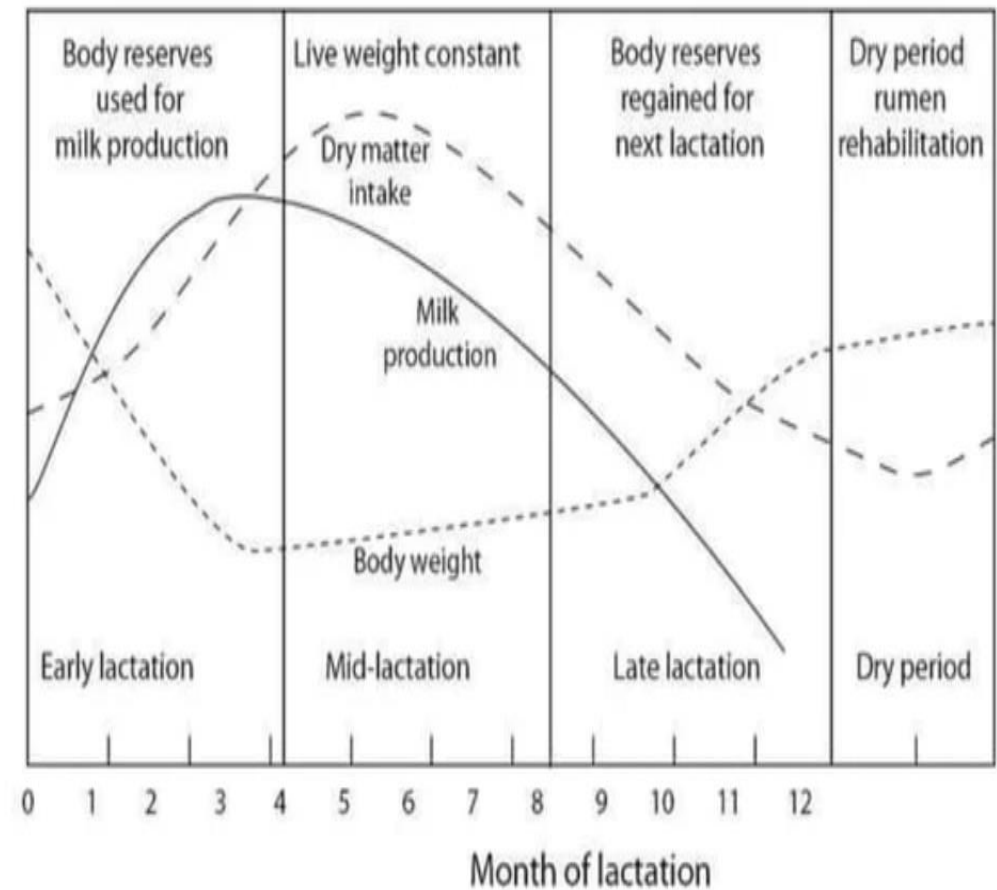


Figure 1. Dry matter intake, milk yield and live weight changes in a cow during her lactation cycle

Challenge feeding

- Cow is "challenged" to produce more milk by increasing concentrates before calving
- High milk producing animals are fed increasing quantity of feed challenging them to produce at their maximum potential.
- **Starts 2 weeks before the expected date of calving.**
- Concentrate mixture should be started initially at 500 g/ day and increase it gradually to a level of 1kg /100 kg body weight.
- Adaptation of the digestive system for the increased quantity of feed to initiate lactation on a higher plane.
- Higher total milk yield in the lactation.

Feeding Strategies

- **Extra ration demands**
- **Top quality roughage (minimum of 10 – 15% of the ration dry matter should comprise of highly digestible forage like young grass and/or legume)**
- **Make sure animals eat plenty of roughage**
- **Slowly increase concentrate supplementation (increase with 200 grams per day).**
- **CP level in ration 14%, this makes sure that cows slowly increase milk production (they are not “pushed” too much)**
-
- **Provide minerals/ vitamins according to requirements**

Buffering Agents in Dairy Cow Rations

- Feeding high grain, low roughage diets can lead to
 - Acidosis (Rumen pH below 6.0)
 - Depressed milk fat
 - Reduced starch digestibility.
- Buffers and alkalis (eg. Sodium bicarbonate, magnesium oxide)
 - Maintains rumen pH (6.4-6.8)
 - Prevent Acidosis
 - Improves fiber digestion,
 - Acetate: propionate ratio
 - Increase milk fat percentage and overall milk yield.

Dose: Sodium Bicarbonate @ 0.7 to 1.5 % of concentrate mixture
or 50-100 g/cow/day

Dietary factors affecting milk Production

- Mobilization of body reserves during early lactation can be prevented by feeding high fat and high protein to supply both protein and long chain fatty acids (LCAs).
- **Bypass fat:** 250-500 g/day
- **Bypass protein:** 10 % of dry matter
- **Chelated minerals:** 2% of concentrate mixture or 50-100 gram/day
- **Water:** 4-5 times of milk production

Conclusions

- Nutrition can have profound effects on all aspects of production, health and reproduction
- Negative energy balance must be minimised by controlling body condition in late lactation
- Avoid extremes of fat, starch [and protein] – an excess can be as bad as a deficiency
- Resumption of oestrous cycles is encouraged by high insulin, oocyte quality by low insulin
- Optimum nutrition at each stage of the lactation cycle significantly improves health and fertility

Thank you for your attention

*Thank
you*





