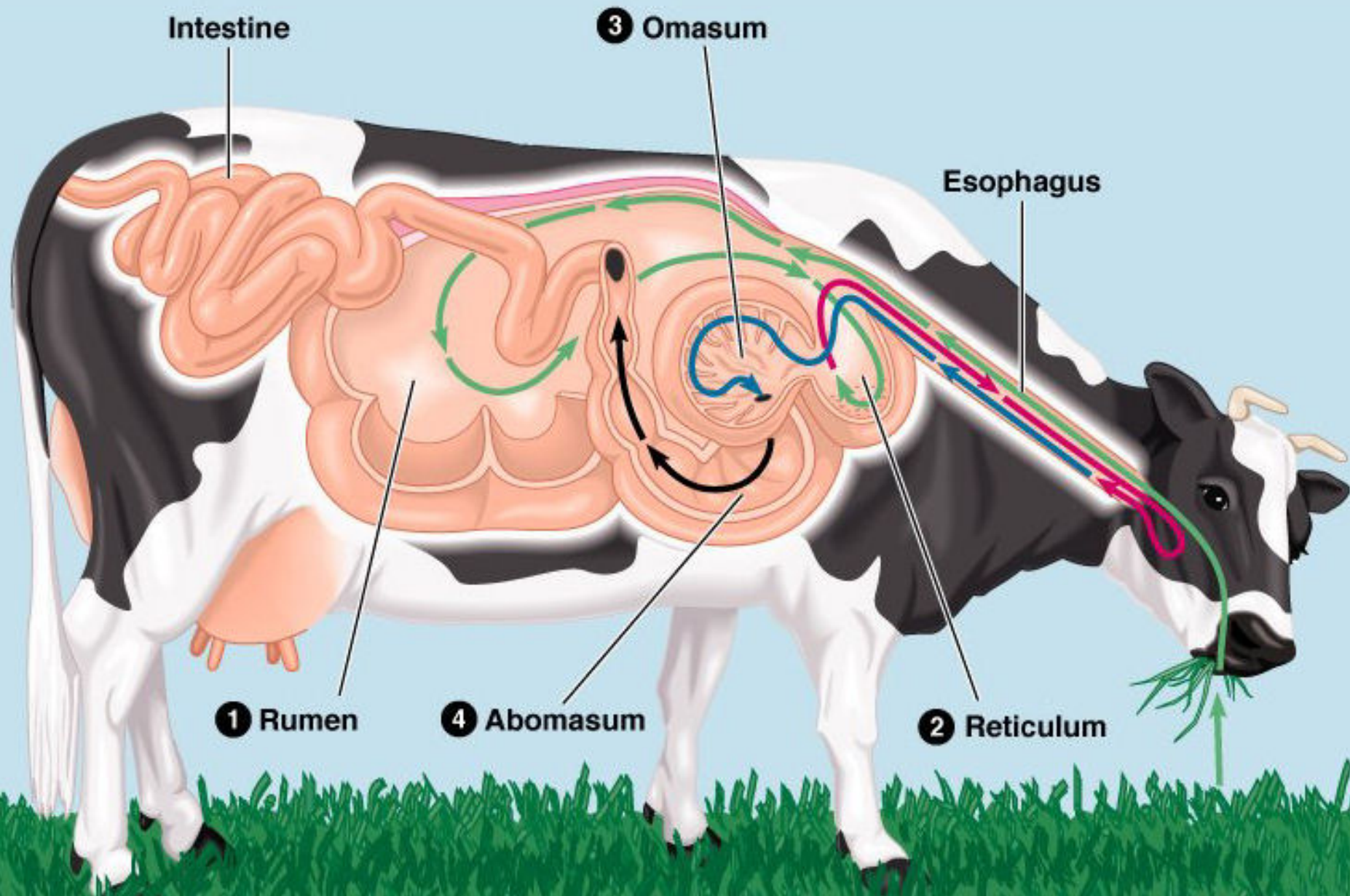


Range Nutrition and Supplementation



**2018 California Cattle
Grazing School**

The Ruminant Digestive System



Rumen



- Fermentation vat
- Anaerobic
- Breaks down cellulose
- Forms microbial protein and volatile fatty acids
- 80% water
- Saliva acts as a buffer.
- Cow produces 25-40 gallons a day of saliva

Reticulum

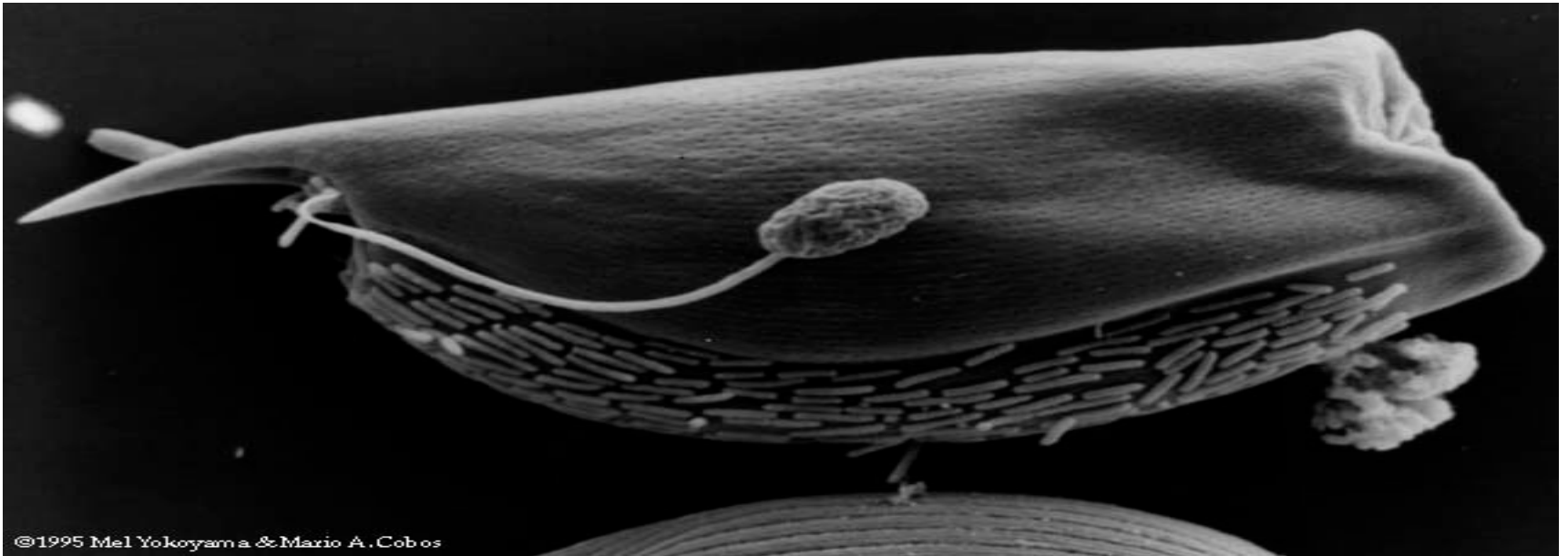
- Attached to rumen and honeycomb structure allows it to trap large feed particles for further digestion by rumination.



Omasum and Abomasum



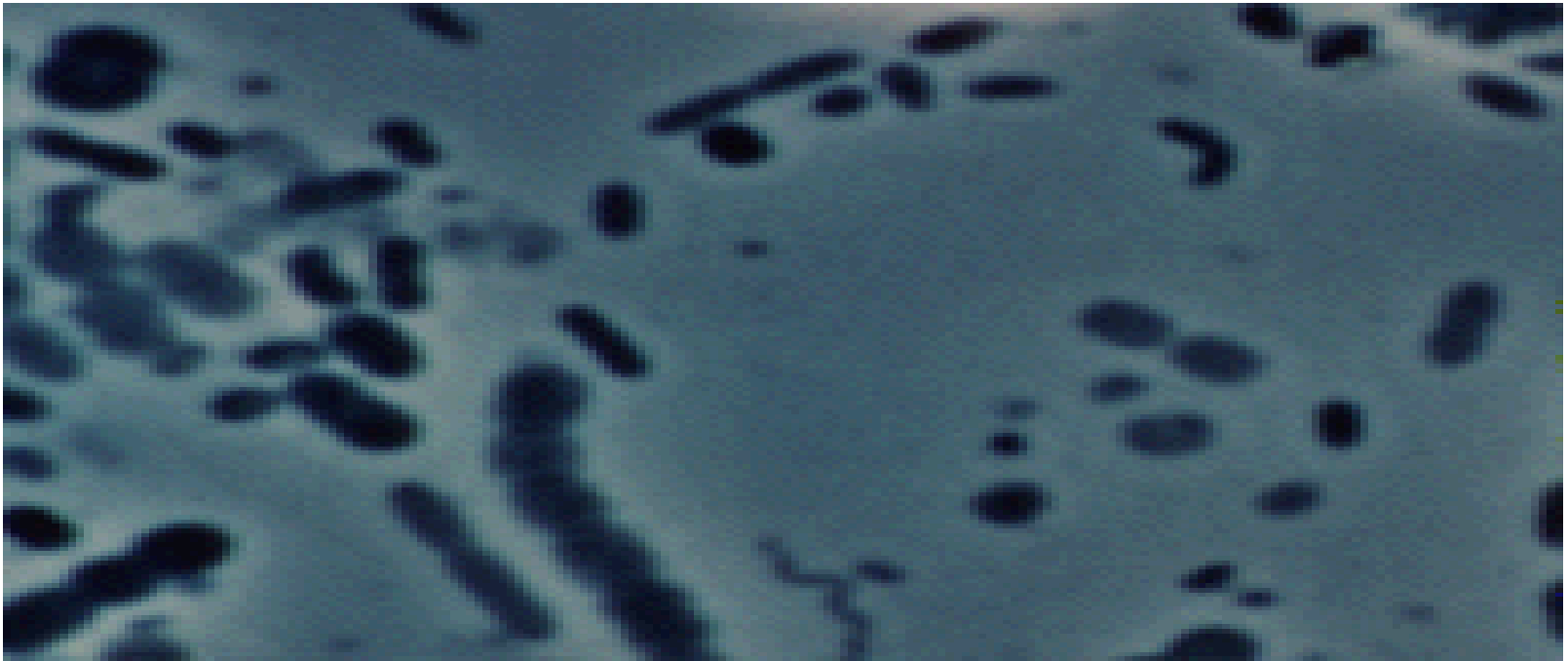
- Omasum acts like a filter and squeezes water out of the feed. The rumen is 80% water.
- Abomasum is similar to our stomach. Breaks down microbial and bypass protein into amino acids absorbed in the small intestine.



Rumen protozoa with fungi attached to side and bacteria lining its underside. They help with fiber digestion. Can reduce outflow of microbial protein.

Diet Influences Microbial Population

Cellulose-digesting Bacteria



Starch-digesting Bacteria lower rumen pH

How Much Grass Do We Have?

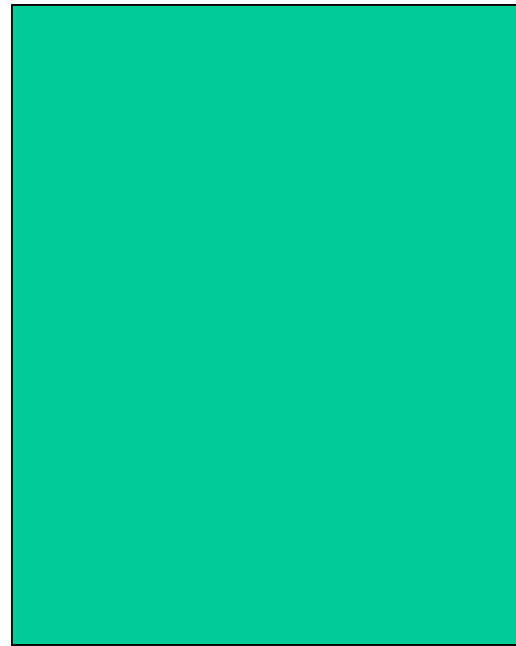


How Much Will They Eat?



Influence of Forage Quality on Forage Requirement & Actual Intake

Daily Requirement
of High Quality
Forage



Daily Requirement
of Low Quality
Forage



← Low Quality



Actual
Consumption of
low quality forage

Protein

Supplement Protein to Supply Energy

- Degradable – Broken down in the rumen
- Bypass – Passes through the rumen intact
- Grass is 80% degradable and 20% bypass protein

All Feeds are a Combination of Degradable and Bypass Protein

Feed	% Crude Protein	% Bypass	% Degradable
Alfalfa	20	20	80
Cottonseed Meal	44	50	50
Feather Meal	90	71	29
Urea	282	0	100

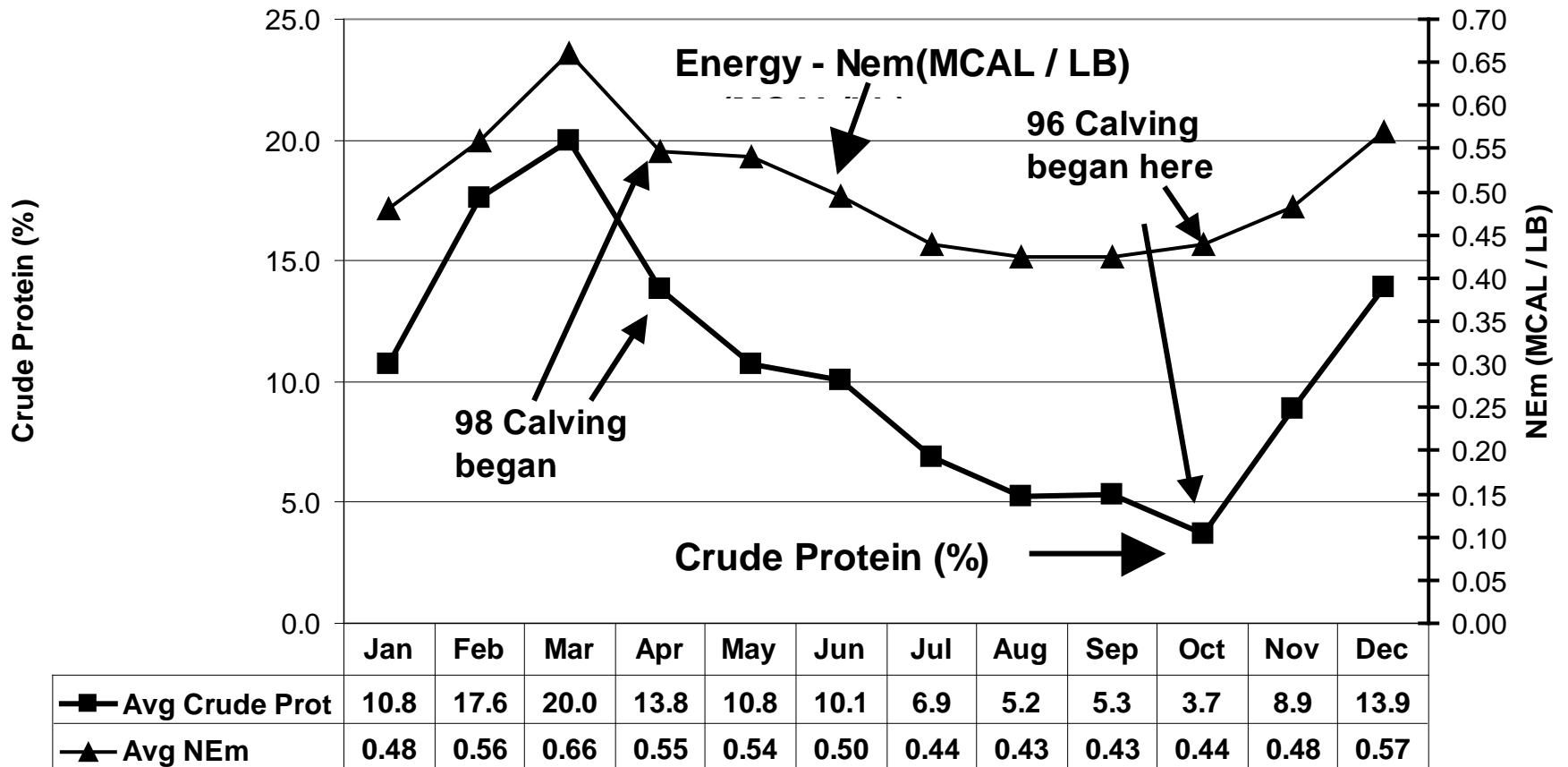
Annual Grasses

Variety	Dry Matter (%)	Crude Protein (%)	TDN (%)
Filaree			
Early Growth	29	20.9	70.0
Mature	46	11.7	59.0
Dry	85	7.1	58.0
Foxtail			
Early Growth	32.0	18.0	64.0
Mature	50.0	7.4	53.0
Dry	80.0	3.0	46.0
Soft Chess			
Early Growth	32.0	21.1	59.0
Mature	50.0	10.6	56.0
Dry	88.0	5.8	53.0
Annual Rye			
Early Growth		15.0	60.0
Mature		5.8	58.0
Ripgut Brome			
Early Growth	32.0	27.5	63.0
Mature	50.0	14.3	57.0
Dry	88.0	5.8	53.0

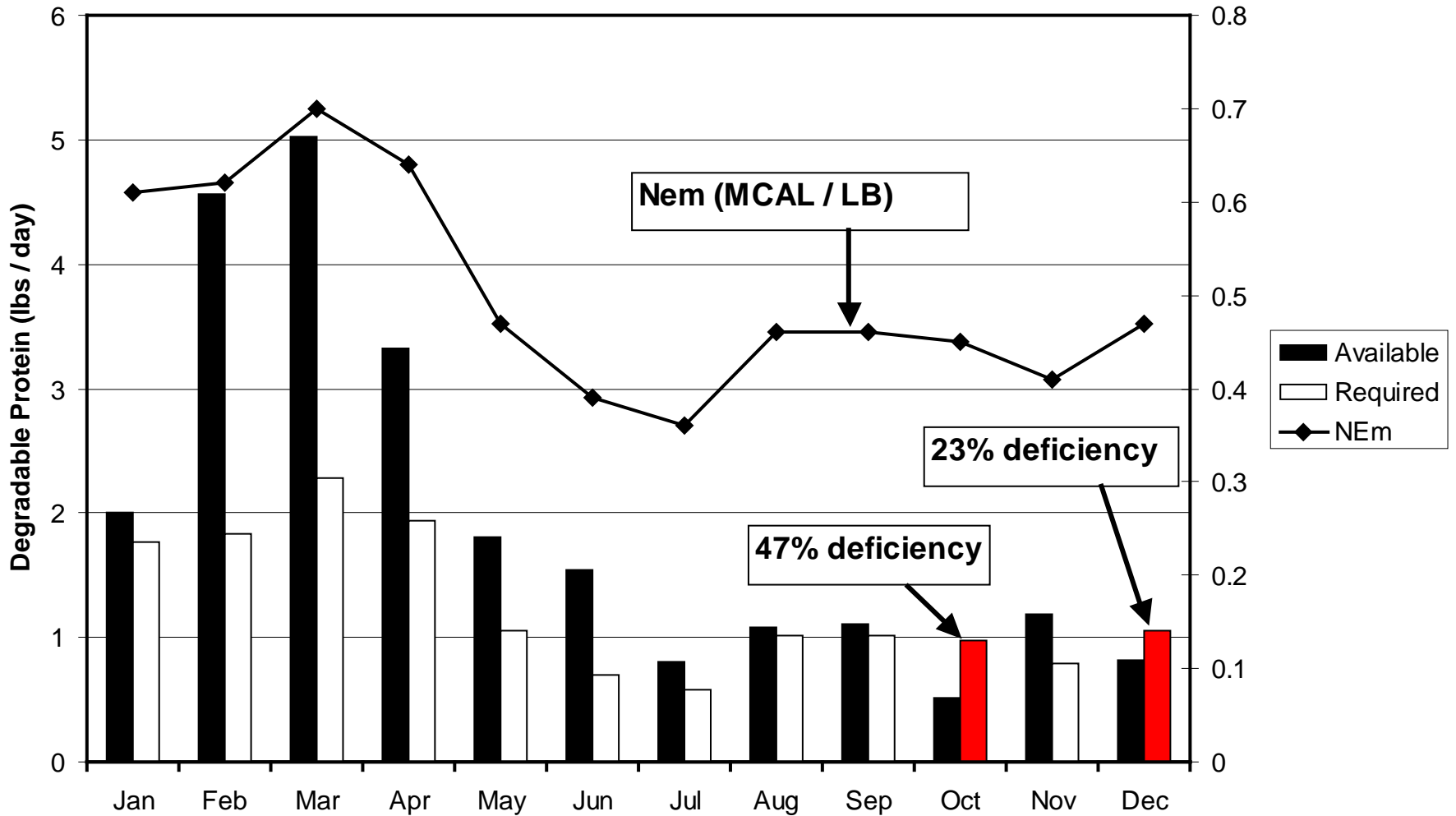
Perennial Forages

Variety	Dry Matter (%)	Crude Protein (%)	TDN (%)
Tall Fescue			
Early Vegetative	23	12.4	61.0
Early Bloom	30	9.5	48.0
Grass-Clover Mix (50:50)			
Early Vegetative	20.5	17.7	67.5
Orchardgrass			
Early Vegetative	23.0	18.4	72.0
Midbloom	31.0	11.0	57.0
Perennial Rye	27.0	10.4	68.0
Deer Brush (Sweet Birtch)			
Spring		27.0	
Summer		13.0	
Fall			

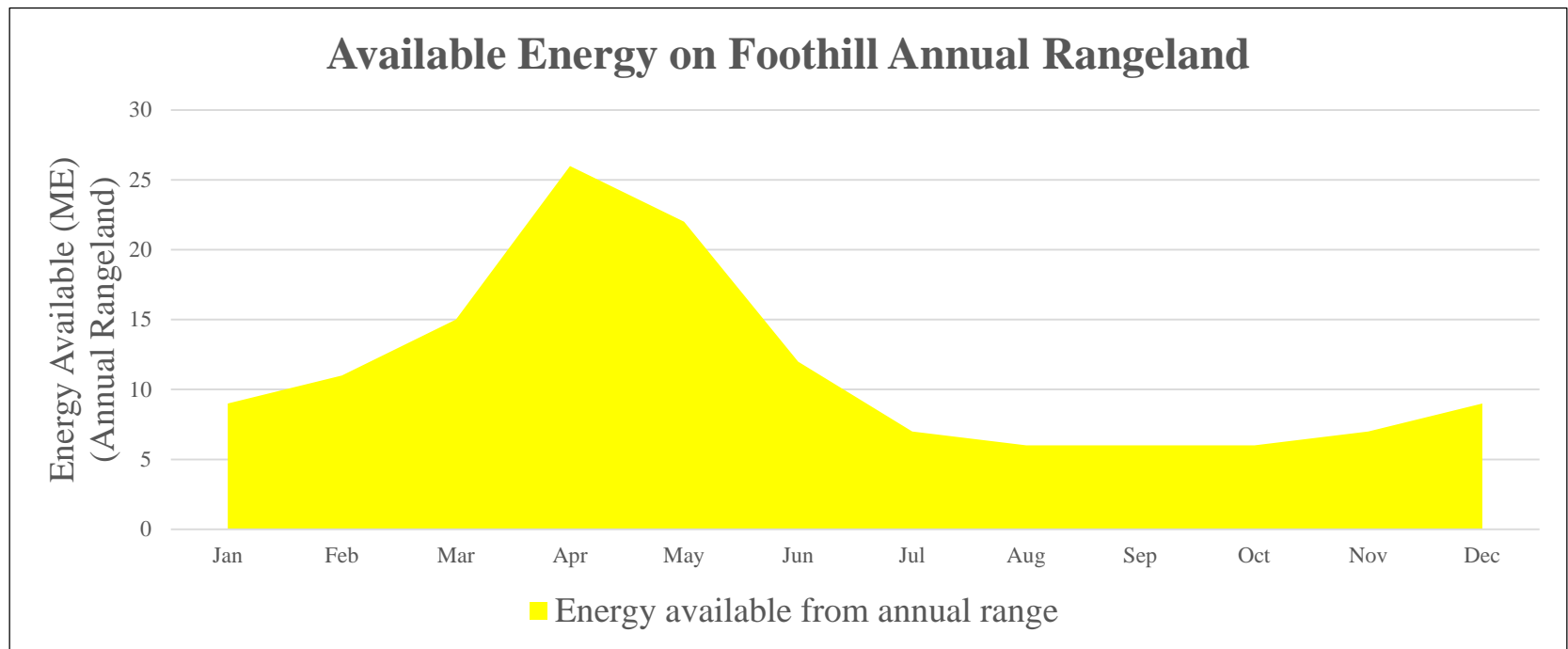
Average Forage Quality for Energy and Crude Protein 1996-1999



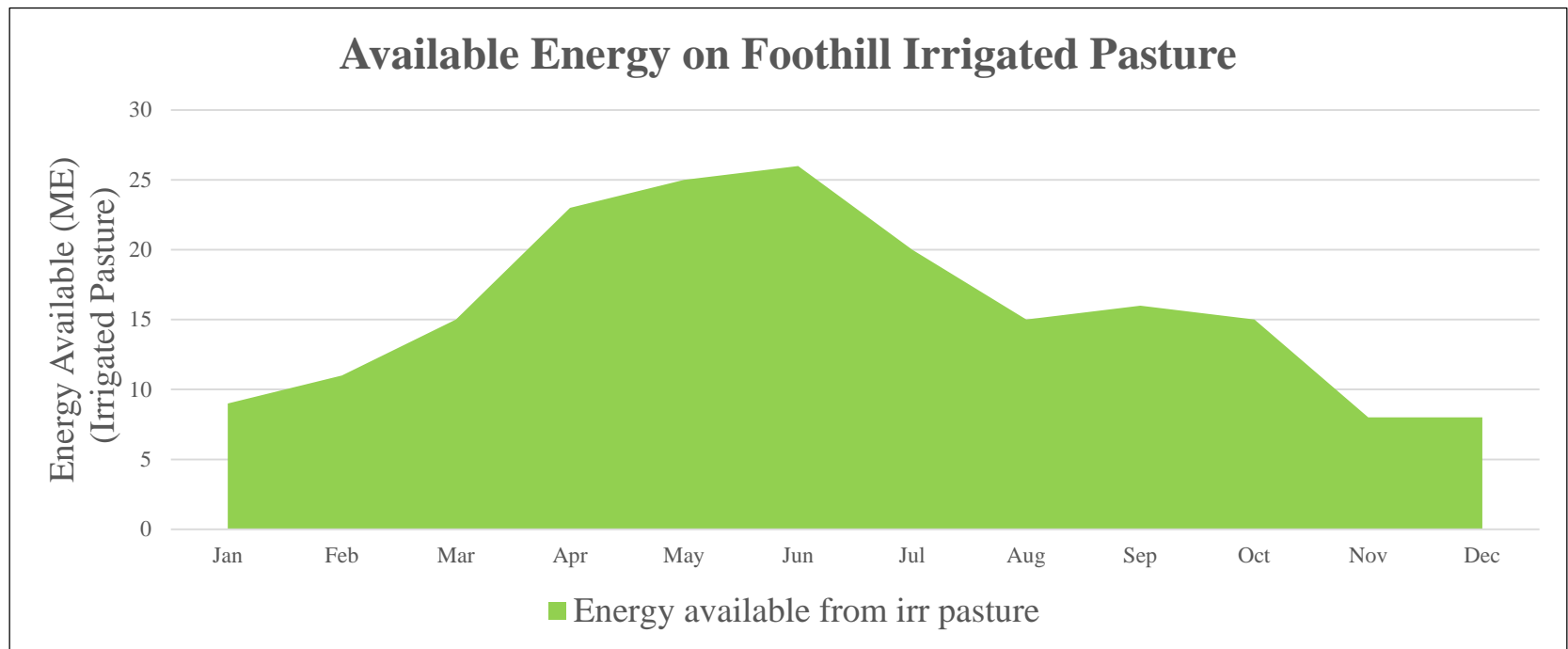
Relationship of NEm To Required and Available Degradable Protein - Campbell Area



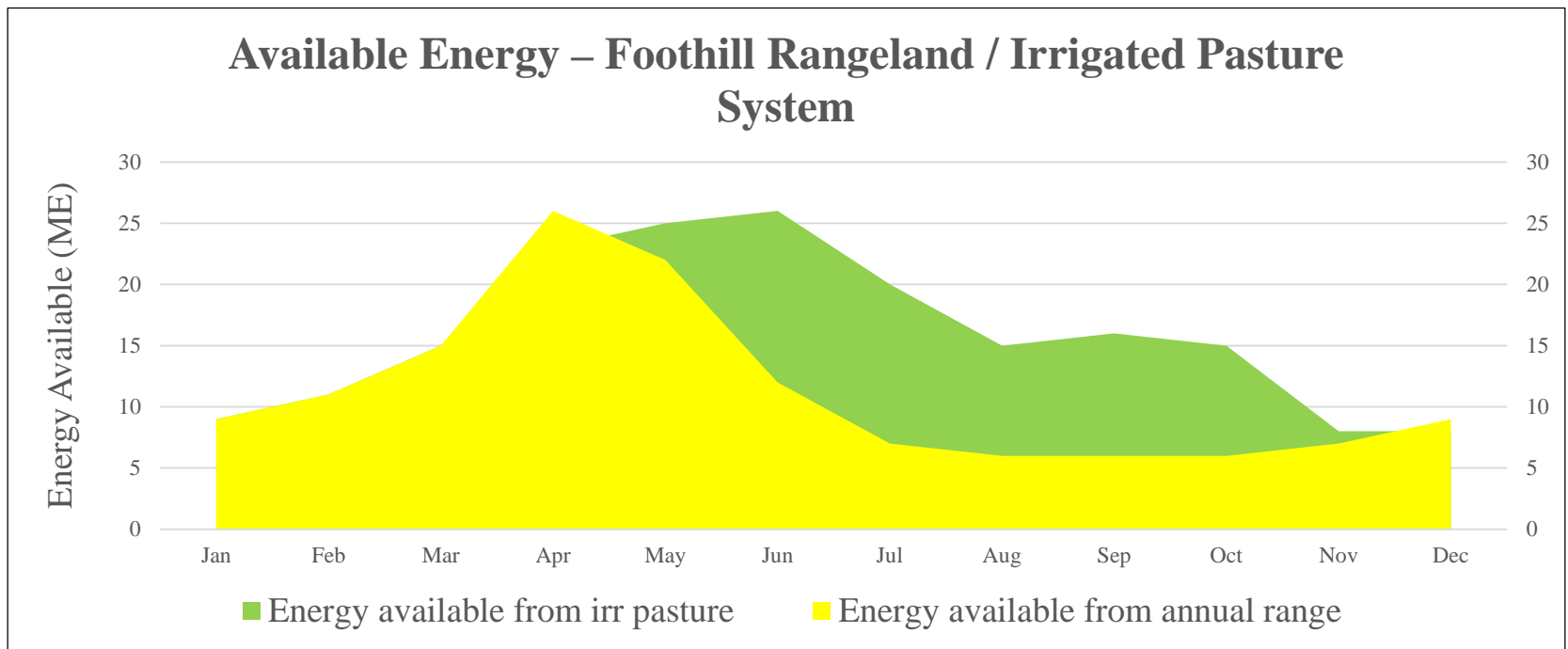
Forage Supply



Forage Supply



Forage Supply





How Much
Do They
Need?



Fall and Winter Supplementation

Feed the Microbes – or Feed the Cows?

- Rumen microbes need 7-8% protein in the diet to effectively break down cellulose (and extract energy)
- When do our rangeland forages provide adequate protein?
- What can we do when we don't have enough protein in the forage?

Sources of Supplemental Feed

- Hay
- Protein tubs (soy, urea, other sources of protein)
- Grain
- Cottonseed
- Almond hulls
- Other byproducts

Considerations

- Quality of feed
- Storage requirements
- Possibility of spoilage
- Labor and equipment needed
- Consistency of supply



Supplemental Feed Delivery Systems



Capacity?

Economical?



Control?

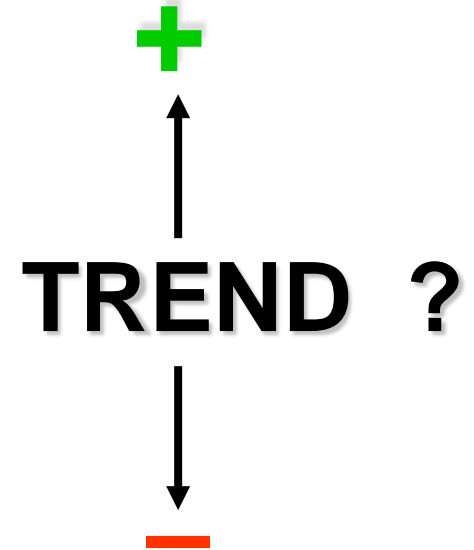
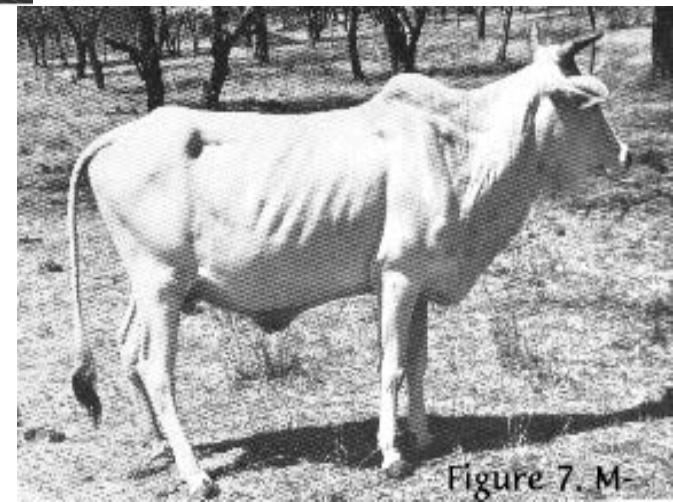
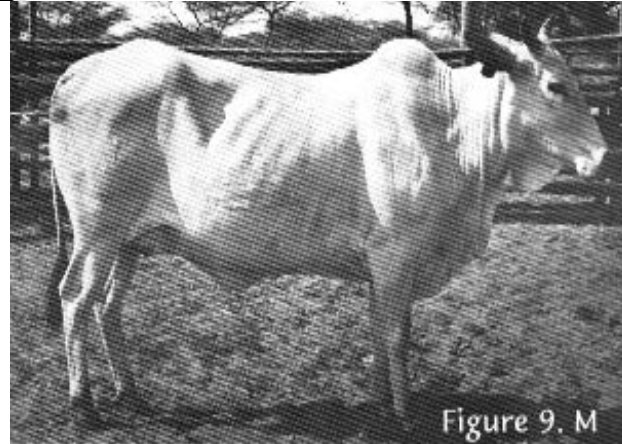


Convenience?



Consistency?

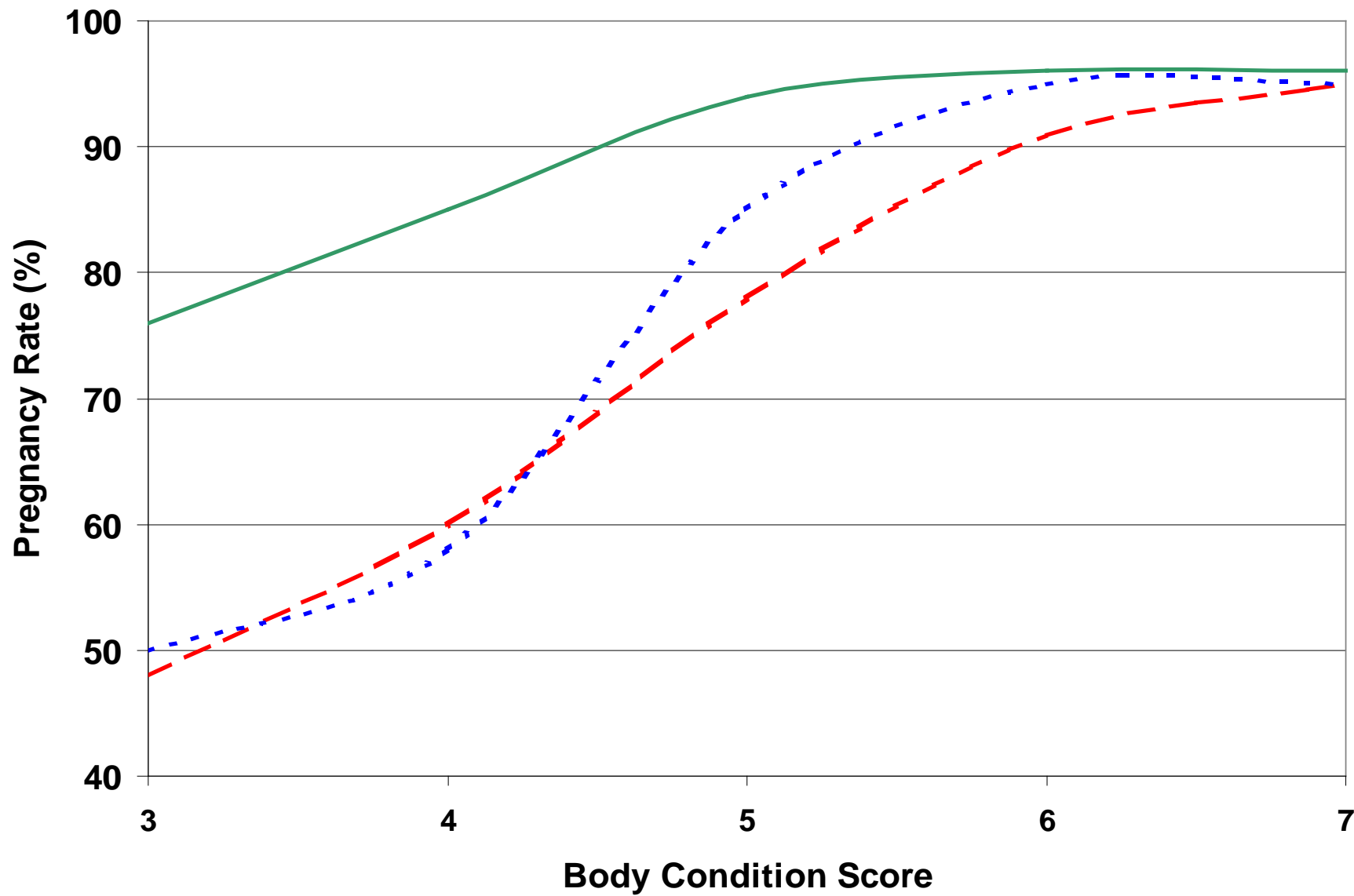
Body Condition



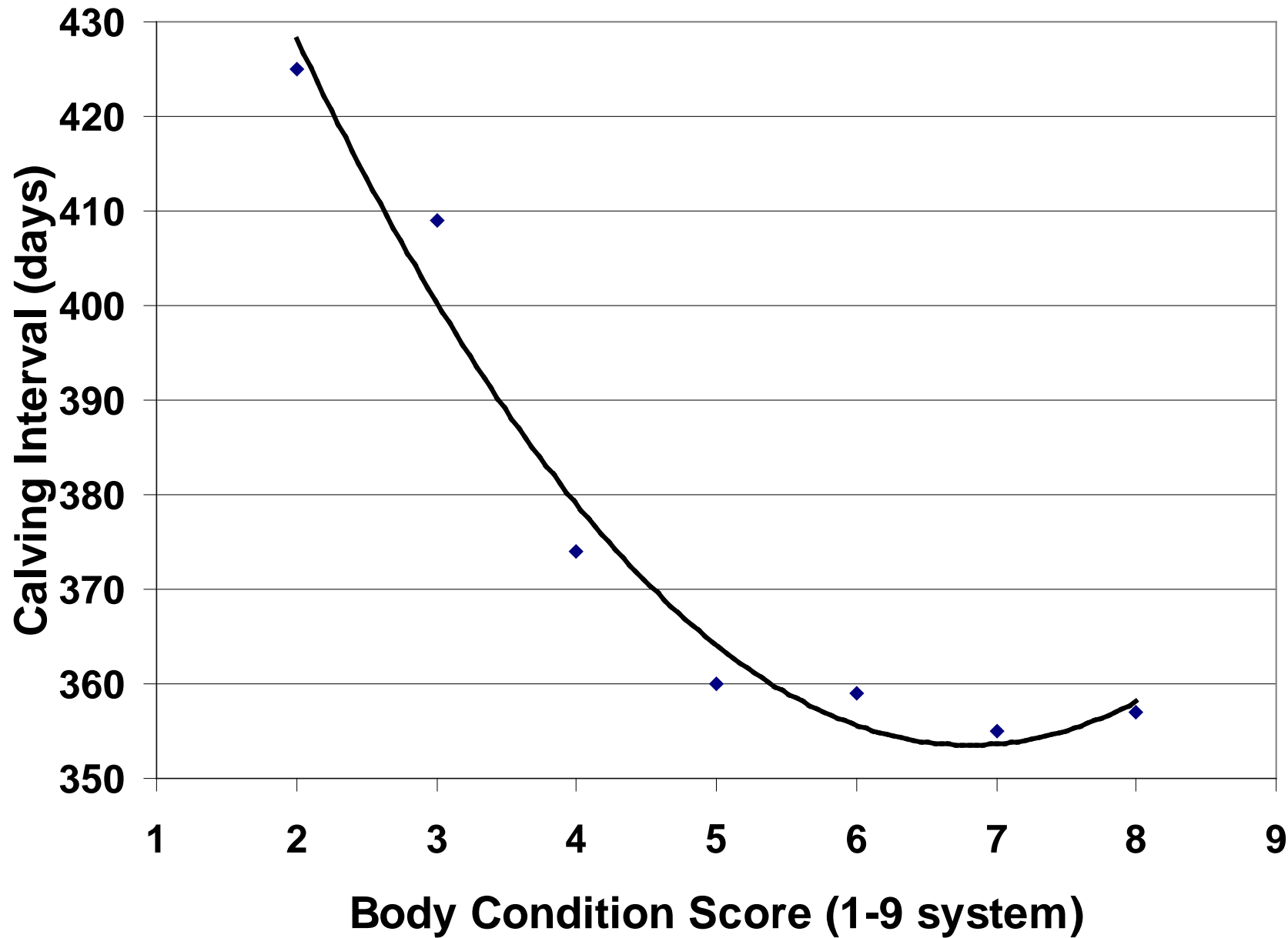
...85-98 lb/BCS
(1-9 system)

... a reflection of past nutrition

...critical for goal setting



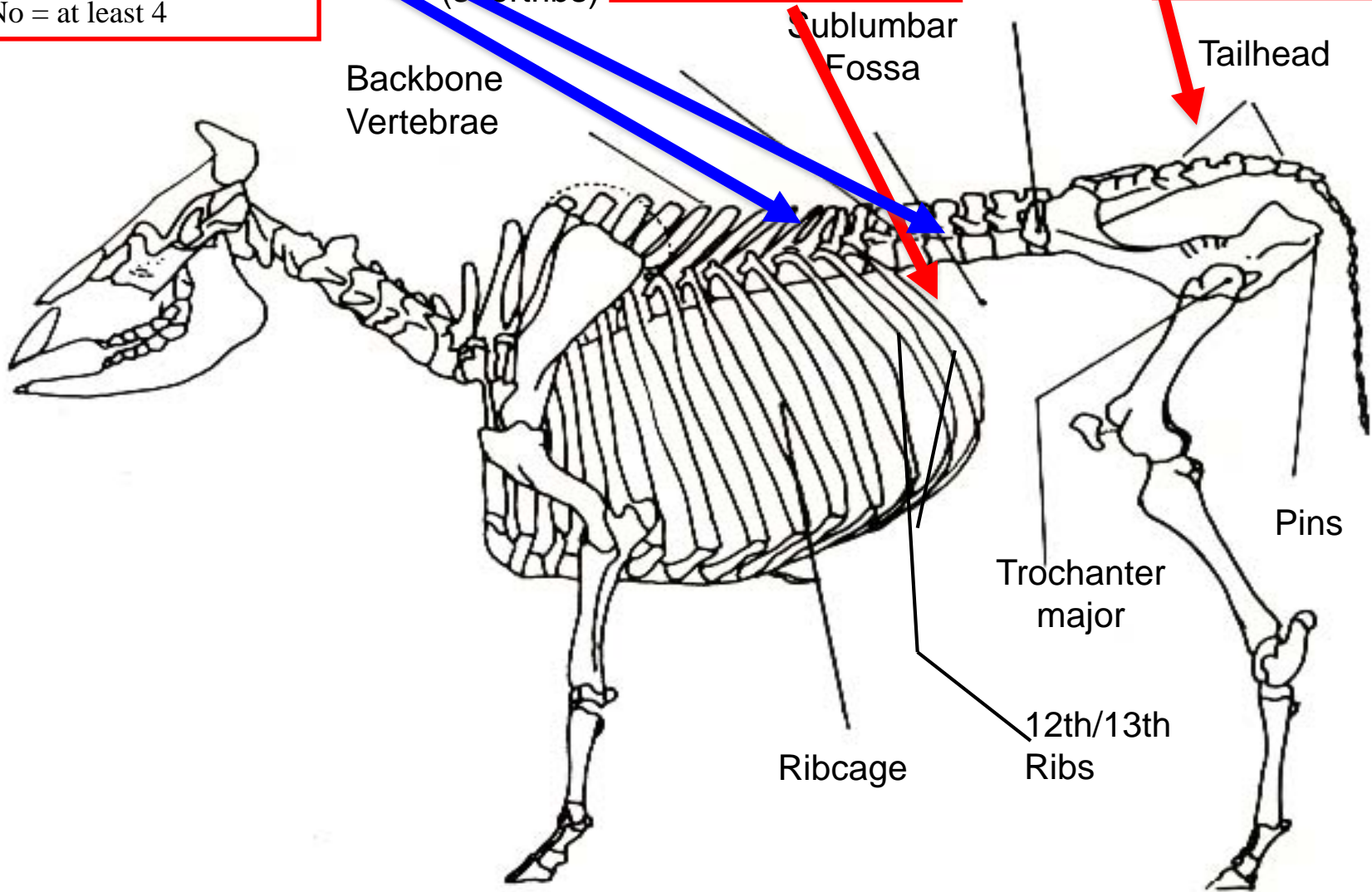
— Calving - - Breeding — Weaning



Do you see a backbone
or transverse processes?
Yes = at least 3
No = at least 4

Do you see a rib?
Yes = at least 4
No = at least 5

Fat at tailhead?
Yes = at least 6
No = at least 5



Backbone
Vertebrae

Transverse
Process
(short ribs)

Sublumbar
Fossa

Hooks

Tailhead

Pins

Trochanter
major

12th/13th
Ribs

Ribcage

BCS 5+



BCS 4





BCS 3



5 - Teepee effect from rear, shallow umbrella effect between hook and pins



6 - Flat across the back slight indentation between hook and pins



7 - Indention across back with rounding out between hook and pins



8 - Deep indention across back with square definition of body, patches of fat across side.

9 - Excessively fat, trouble walking



BCS 6



BCS 7

BCS 8



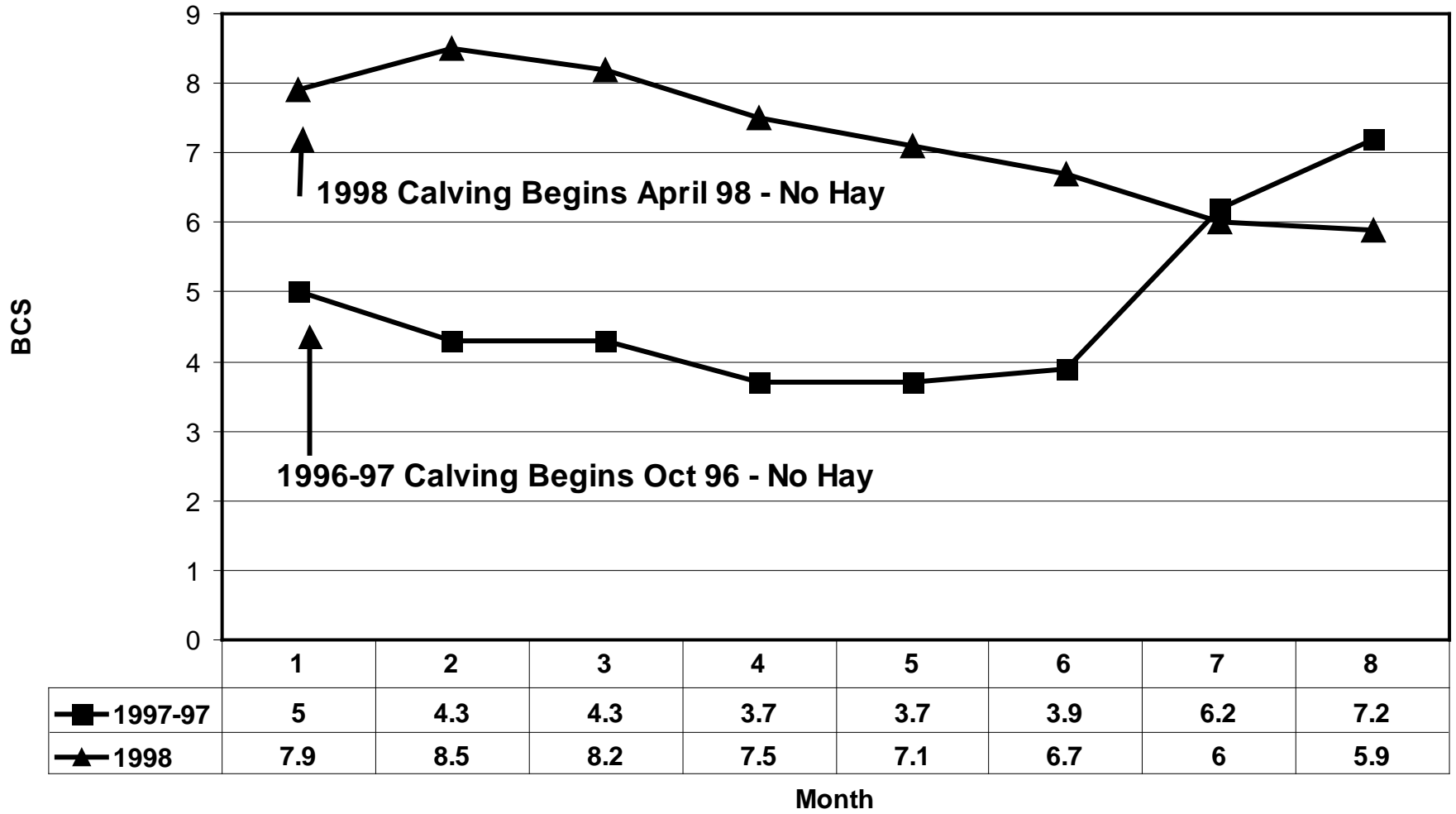


BCS 6-



BCS 7

Body Condition Scores (BCS) At Calving (Month 1) Through Month 8 Post-Calving



Review

- Feed the cow – and feed the microbes!
- Nutritional status has a direct link to reproductive success!
- What's our window for getting a cow back in condition to breed?