Small Ruminant Production Conference

Nutrition for Breeding flocks

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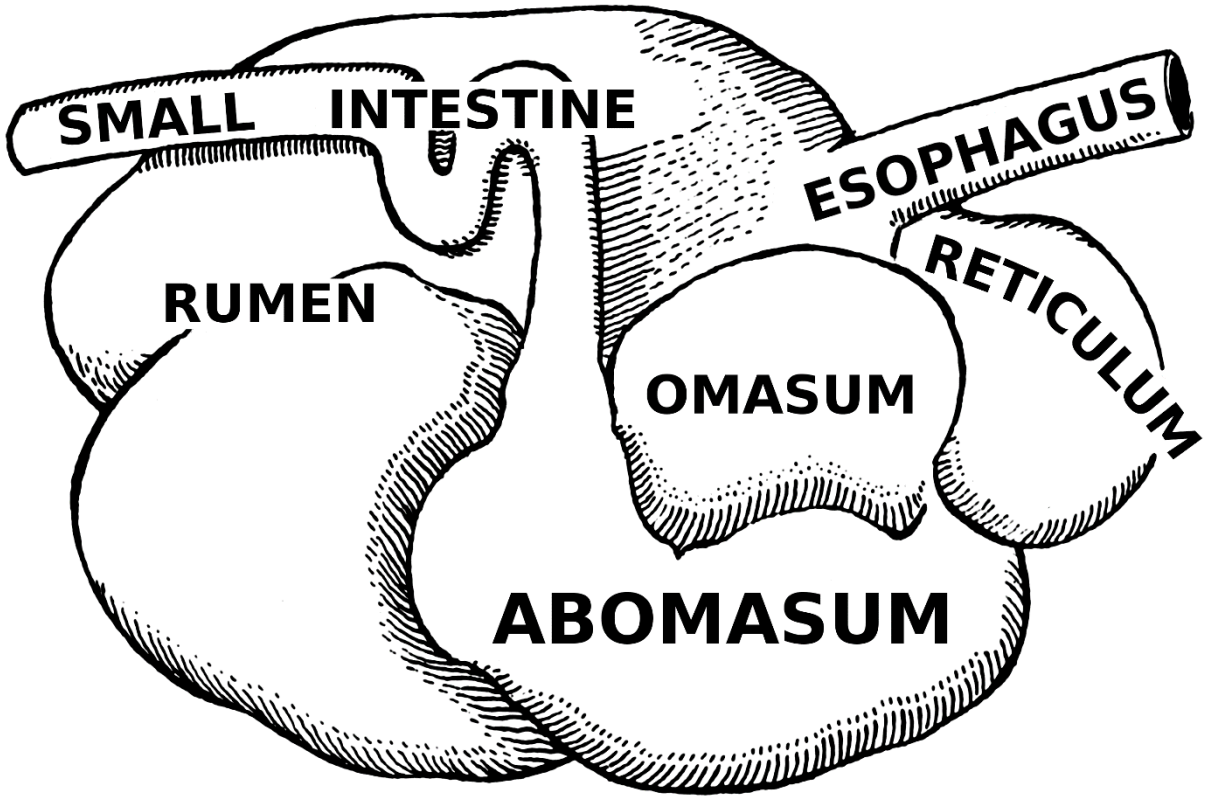
OVERVIEW

- Fundamental of Nutrition
  - TDN
  - CP
- Pre-breeding nutrition and reproductive outcomes in ewes
- Diet formulation
- Summary

IMPORTANCE OF NUTRITION

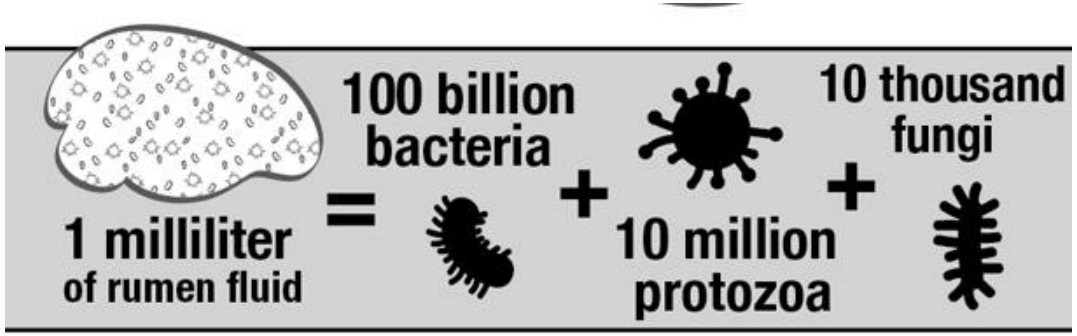
- Feed accounts for the majority of the cost of raising sheep
- Nutrition is foundation of good health
- Animals on high plane of nutrition are more resistant to many diseases
- Nutritional problems are second only to respiratory problems in frequency of occurrence
- Nutrition has large effect on reproduction

RUMEN

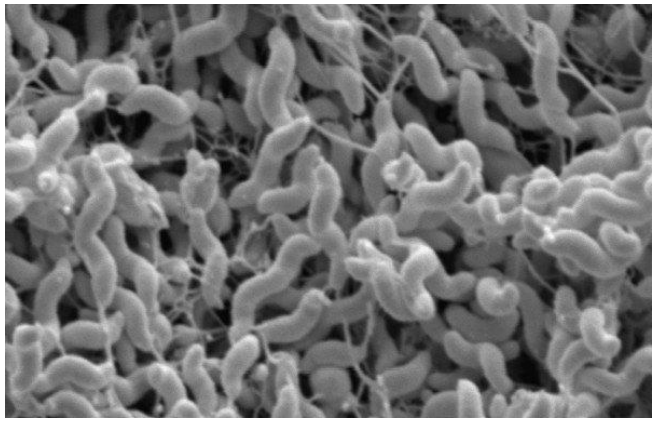

SMALL INTESTINE
ESOPHAGUS
RETICULUM
RUMEN
OMASUM
ABOMASUM

RUMEN

- Fermentation chamber
- Feed is digested by rumen microbes
  - Bacteria, protozoa
  - Creates lost of gases (methane)
  - Ruminants have to be able to eructate (belch)



≥ 1,000,000,000,000,000 rumen bugs per cow



NUTRIENTS REQUIRED

- **Energy (Total digestible nutrients)**
  - Estimate of total digestible energy in the diet
  - Expressed in kg, lb, or percent
  - **digestible** crude protein (CP) + (**digestible** crude fat (EE) x 2.25) + **digestible** cell wall (NDF) + **digestible** nonstructural carbohydrate (NSC).

NUTRIENTS REQUIRED

- **Protein (Crude)**
  - Crude estimate of protein
  - Rumen degradable protein (RDP)
  - Rumen undegraded protein (RUP)

NUTRIENTS REQUIRED

- **Minerals**
  - Macro-minerals (Ca, P, Na, Cl, K, Mg, S)
  - Micro-minerals (Co, Cu, F, Fe, I, Mn, Mo, Se, Zn)
- **Vitamins**
  - Fat soluble: A, D, E, K
  - Water soluble: C and B-complex
- **Water**

NUTRITION OF FORAGES

Forage	CP %	TDN %
Bahiagrass	8-11%	50-54%
Bermudagrass	9-11%	50-58%
Pearl Millet	8-14%	50-58%
Sunn Hemp	25-30%	65-71%
Crabgrass	10-14%	55-60%
Annual Ryegrass	10-17%	56-64%
Oats	10-14%	55-62%
Red Clover	14-16%	57-62%

Adapted from Caitlin Bainum, UF/IFAS

NUTRIENT DENSITY

10 lbs TDN

25 lb Straw

11 lb Corn

18 lb Alfalfa

NUTRIENT DENSITY

25 lb Straw

1 lb Protein

5.5 lb Alfalfa

2 lb Soybean meal

CP REQUIREMENT

- 150 lb ewe with twin peak lactation needs 0.9 lbs crude protein

11 lbs DM (12.5 lbs as-fed)
Corn

5 lbs DM (5.6 lbs as-fed)
Alfalfa hay

1.9 lbs DM (2.1 lbs as-fed)
Soybean meal

25 lbs DM (28 lbs as fed)
Straw

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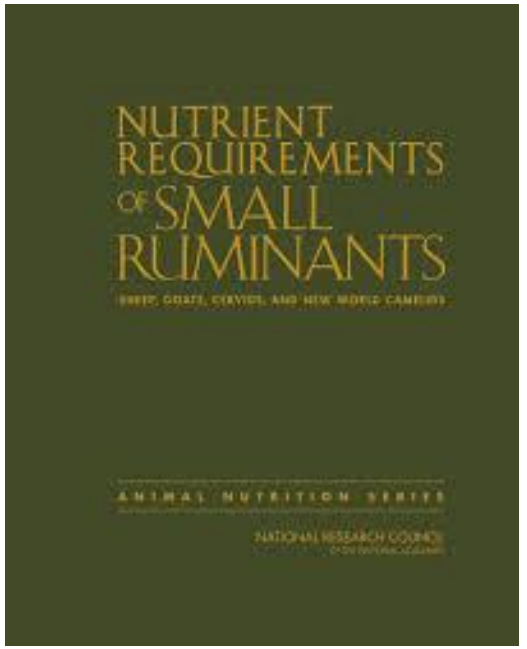
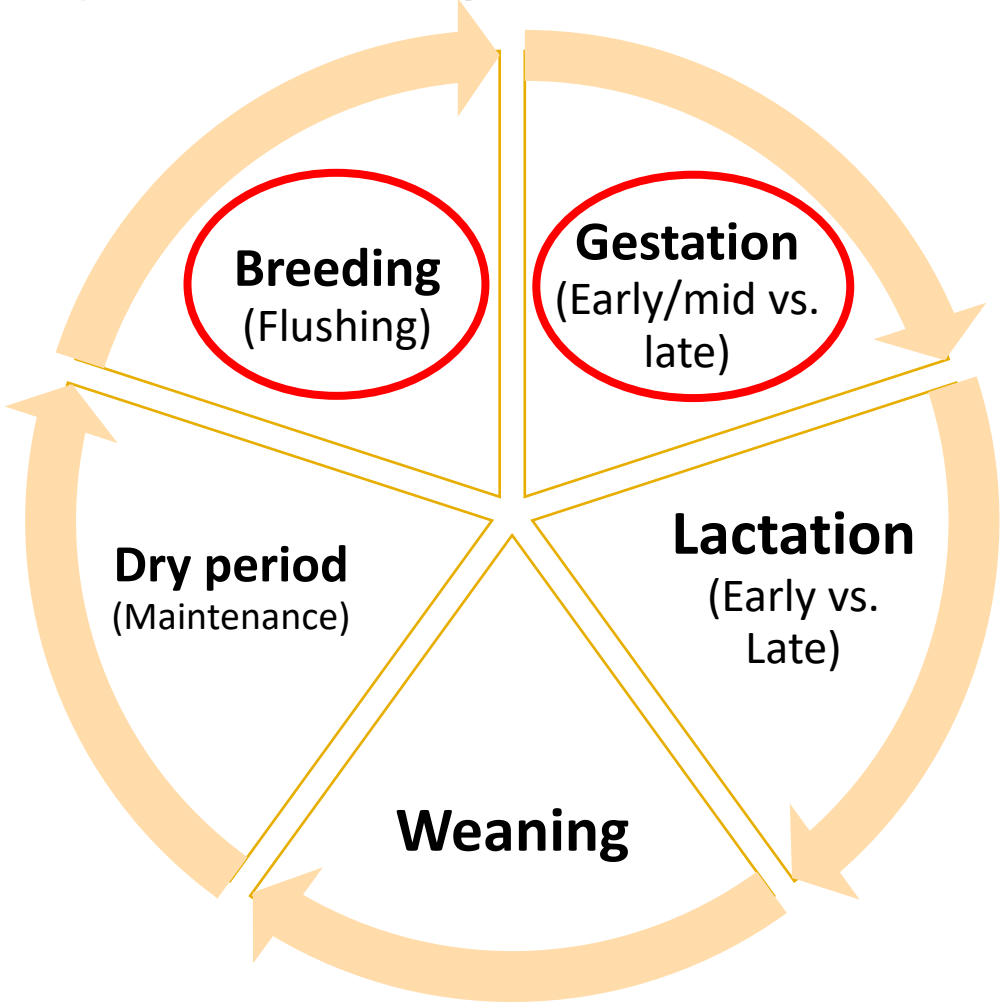
NUTRIENT REQUIREMENTS

- Species
- Breed
- Body weight
- Age and Sex
- Physiological stage
- Level of production
- Environment

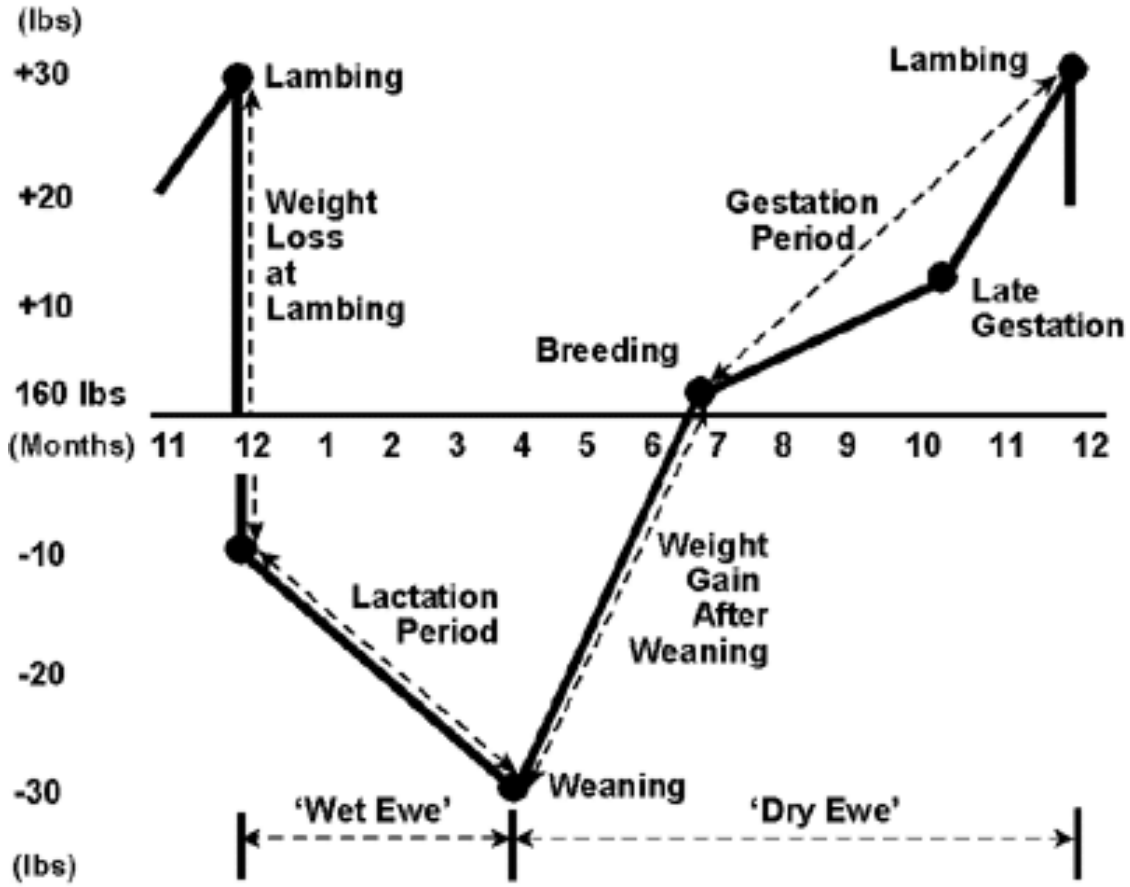


Check Alabama Cooperative Extension – **Nutrient Requirements of Sheep and Goats** https://www.aces.edu/blog/topics/livestock/nutrient-requirements-of-sheep-and-goats/

Life cycle feeding of ewes and does



EXPECTED WEIGHT CHANGES



The average 160 lb. ewe rearing twins will experience in a 12 month period

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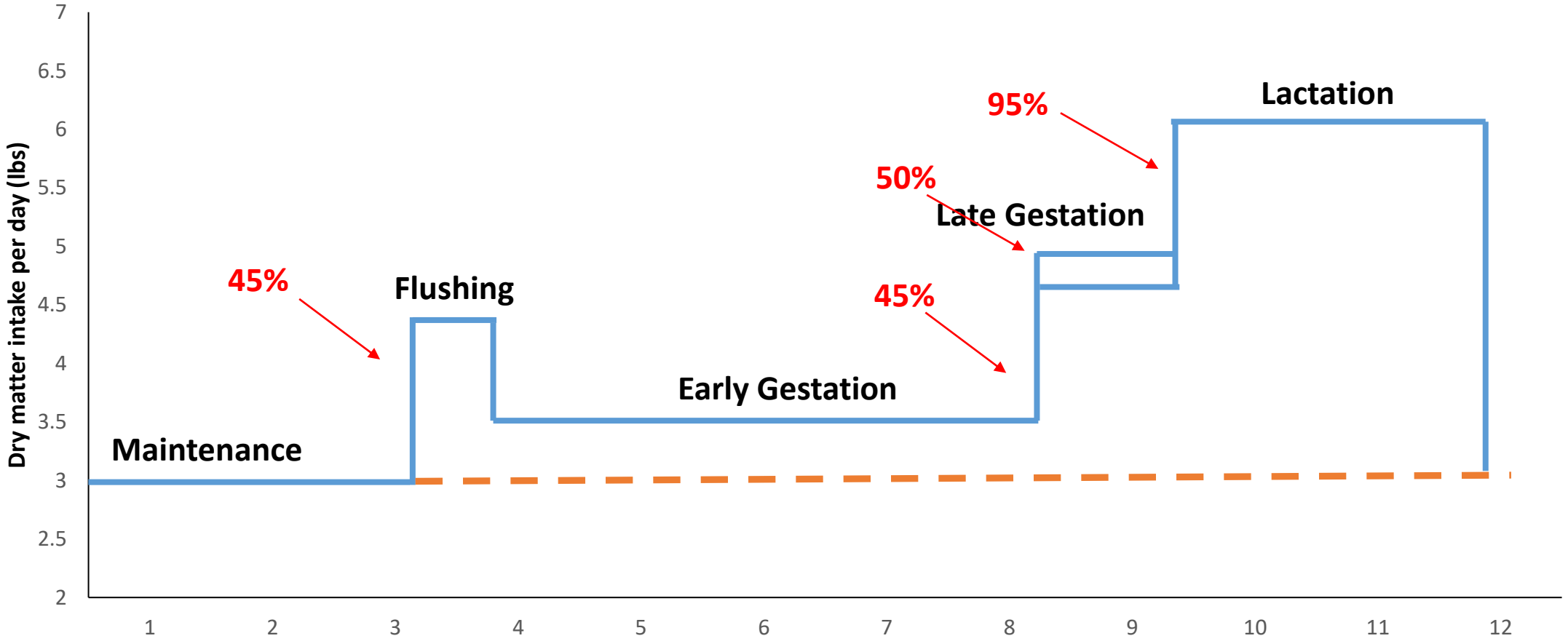
http://infovets.com/books/smrm/B/B580.htm

DAILY INTAKE REQUIREMENTS (175 LB EWES)



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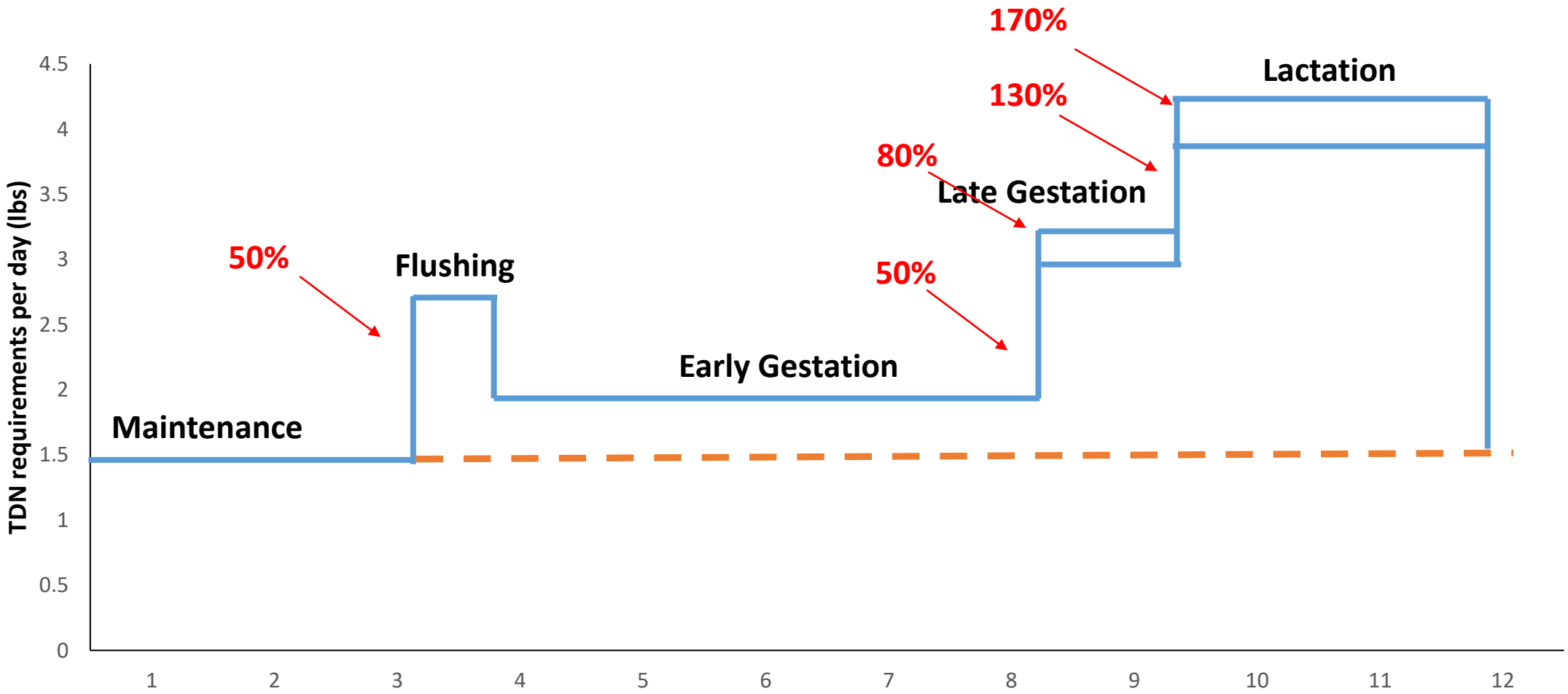
DAILY TDN REQUIREMENTS (175 LB BREEDING EWES)



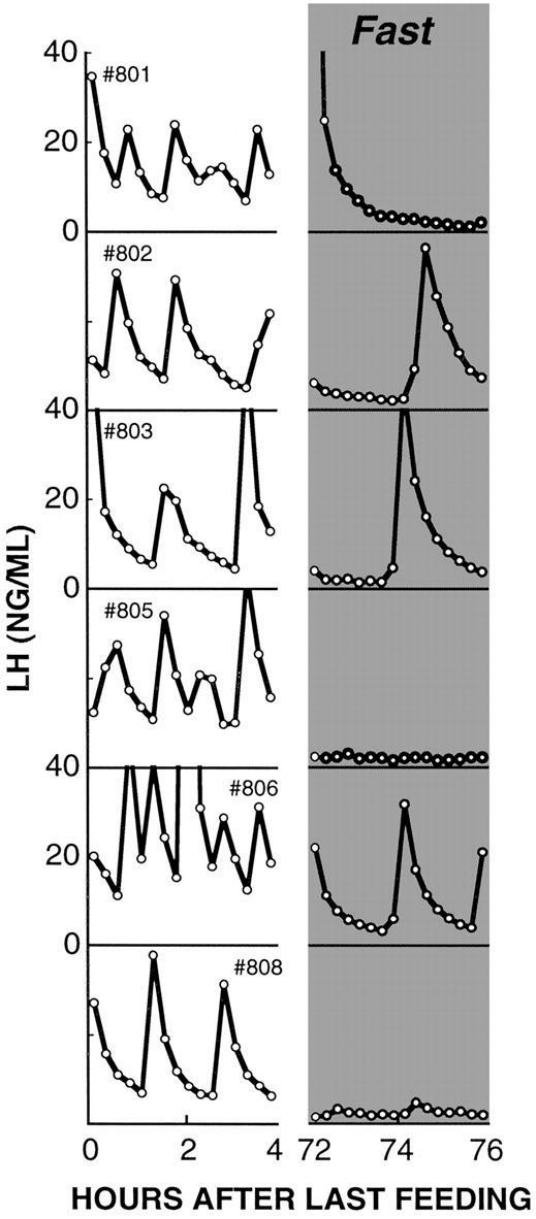
NUTRITIONAL MANAGEMENT IN EWES OF BREEDING AGE

- Pre breeding ovulation rate
- Early pregnancy-embryo survival
- Mid pregnancy-period of placental growth
- Late pregnancy-fetal growth, development, colostrum supply and mammary development

PRE-BREEDING/FLUSHING

Definition: Temporary but purposeful elevation of plane of nutrition around breeding time to boost ovulation, conception, and embryo implantation rates

Lambing crop/Kidding rates: Improve by 10-20%



PRE-BREEDING/FLUSHING

Considerations

- Increasing nutrition (primarily energy) for as little as 4-5 days can improve ovulation in under-fed ewes
- **Ewes**: Start flushing 2 weeks before breeding
- **Does**: 3-4 weeks before breeding
- Ewes/Does in positive energy balance (actively gaining weight) prior to mating tend to ovulate more than in under-fed animals
- Fat ewes (BCS ≥ 4) show little response to a pre-breeding energy boost than thin ewes (BCS≤ 2)

PRE-BREEDING/FLUSHING

- **High energy feeds** (corn, barley, wheat, oats, milo)
  - 0.5-1 lb grain per animal per day
  - Gradual adaptation is essential
  - Adequate bunk space is required

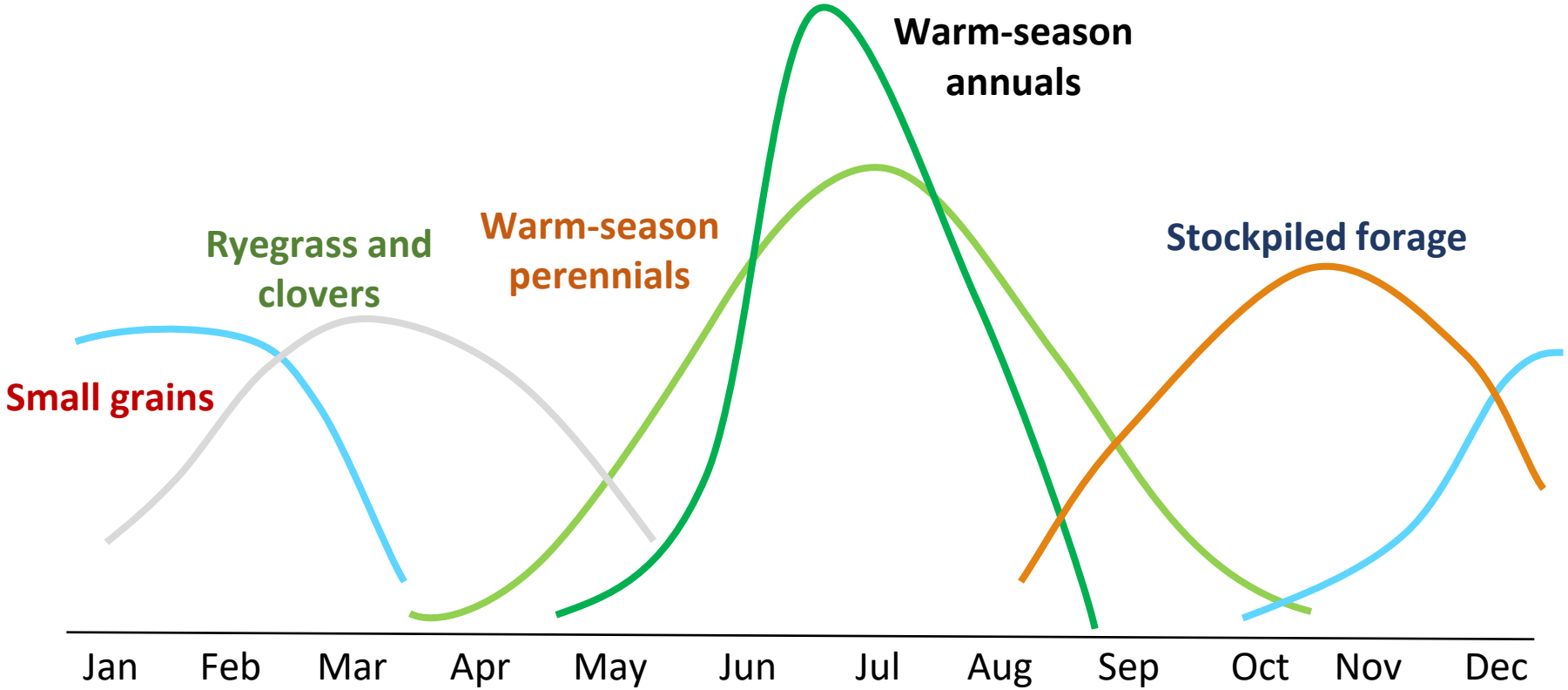
- **High protein feeds** (Only if animals are on protein-deficient diets)
  - Fresh alfalfa, clovers, vetches, birdsfoot trefoil, and other legumes contain estrogen like compounds
  - Legume and grass hays do not have this estrogenic effect.

PRE-BREEDING/FLUSHING

Herd make-up and resources available

- Identify animals most suitable for flushing (Optimum BCS: 3.0-3.5)
- If adding grains not feasible, good quality pasture can be set aside
- Legume pastures should be avoided

THINK ABOUT YOUR FORAGE PRODUCTION CHART



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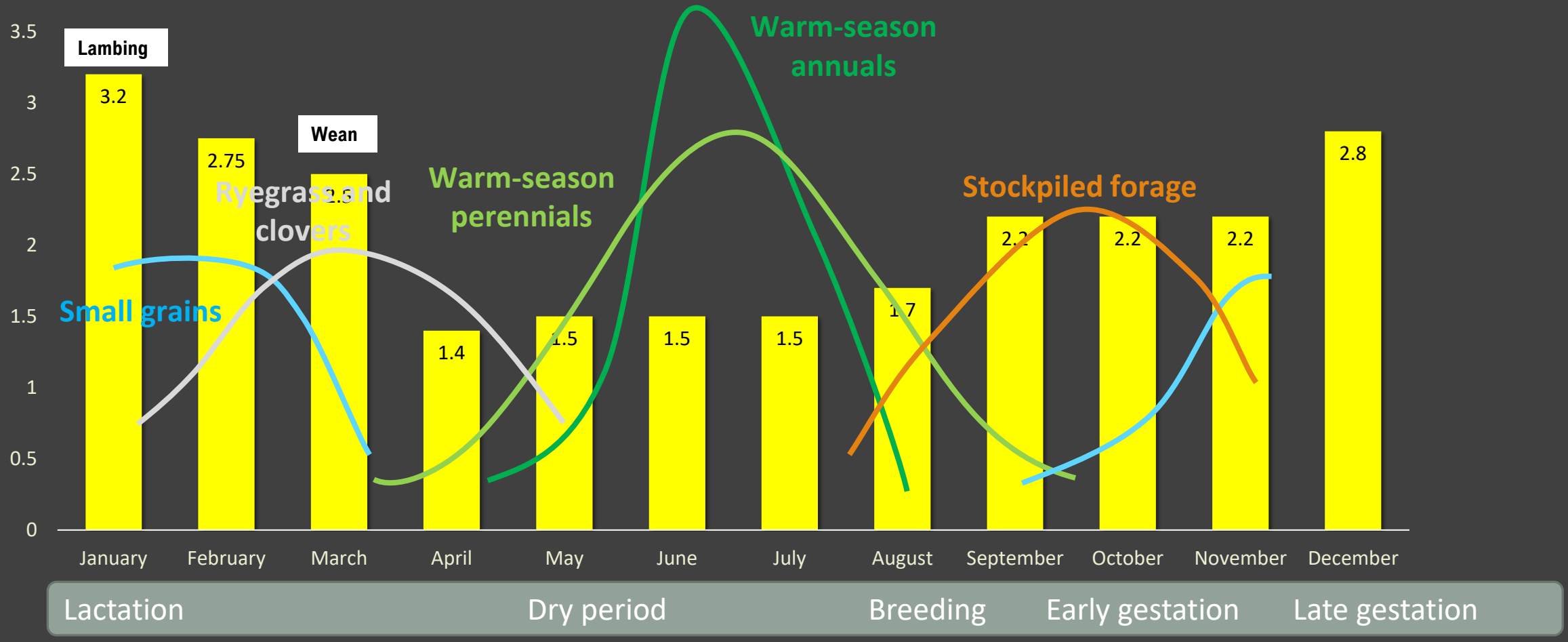
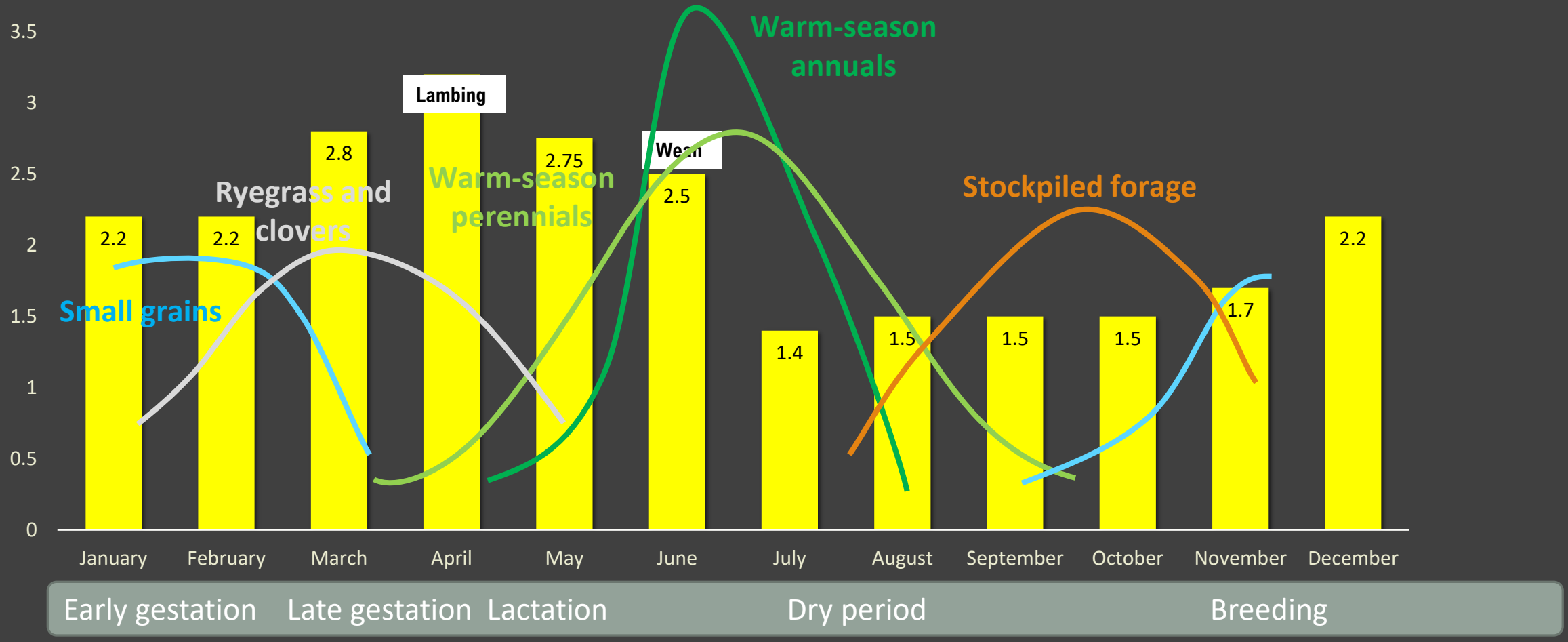
Energy requirements of ewes (176 lbs, lbs TDN/d Winter (January lambing)



Energy requirements of ewes (176 lbs, lbs TDN/d Spring (April) lambing



FORAGE ANALYSIS

- Dairy One Lab (Ithaca, NY)
- Dairyland Laboratories (Arcadia, WI)
- Rock River lab (Watertown, WI)
- Cumberland Valley lab (Waynesboro, PA)
- Forage Evaluation Support lab (Gainesville, FL)

Dairy One

DAIRYLAND Laboratories, Inc.

ROCK RIVER LABORATORY, INC. AGRICULTURAL ANALYSIS

Forage Evaluation Support Laboratory

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CVAS

CUMBERLAND VALLEY ANALYTICAL SERVICES

" Laboratory services for agriculture ... from the field to the feed bunk "

PRE-BREEDING/FLUSHING

Responses to Expect

- Increases of 25% are typical, increases up to 57% have been observed in thin ewes
- Flushing response may be lost if ewes go into negative energy balance (loose weight) in early pregnancy due to embryonic loss
- Conversely over feeding into early pregnancy may depress rate of embryos that implant
- Gains during flushing may be lost via enhanced embryonic loss

PRE-BREEDING/FLUSHING

Nutritional target

- 50-100% increase in energy intake over maintenance (1.5-2x) for 2-3 weeks
- Increase in body condition score of 0.5 units over this period (7-10 lbs)
- Place sheep in positive weight gain
- Increase or decrease flushing length based on condition score
- In grazing systems: Correct stocking rate and forage quality
- Can be done precisely with energy supplement (corn, barley, quality forage etc.)
- Embryo retention/implantation may be reduced by elevated energy intake in early pregnancy so best to stop supplementation at ram turn-in or ~7 d later

POST-BREEDING FLUSHING

- Flushing for 4 weeks is recommended, in a flock with **low body condition score**
- Early embryonic death occurs in the first month of gestation, probably due to maternal nutrition.

CONSEQUENCE OF POOR NUTRITION

Underfeeding
Pregnancy toxemia
Milk fever
Weaker lambs and kids
Higher neonatal mortality
Quantity and quality of colostrum
Less milk production

Overfeeding
Dystocia
More prone to prolapse
Oversized lambs have higher mortality
Expensive

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Adapted from University of Maryland Extension (Susan Schoenian)

Breeding

BW, lb	DMI, lb	% BW	TDN, lb	CP, lb
132	2.53	1.92	**1.34**	**0.196**
154	2.86	1.85	**1.52**	**0.218**

Diet formulation-1

Feed stuff	As Fed	DMI, lbs	TDN, lbs	CP, lbs
Bermudagrass hay	**3.20**	2.85	1.51	0.28
Corn grain, whole	**0.00**	0.00	0.00	0.00
Total nutrient supplied			1.42	0.27
Requirements			1.52	0.22

Feeds available

Hay	% DM	% TDN	% CP
Bermuda grass hay	89.0	53.0	10.0
Corn grain	88.0	88.0	9.0

Diet formulation-2

Feed stuff	As Fed	DMI, lbs	TDN, lbs	CP, lbs
Bermudagrass hay	**2.50**	2.23	1.18	0.22
Corn grain, whole	**0.50**	0.44	0.39	0.04
Total nutrient supplied			1.57	0.26
Requirements			1.52	0.22

SUMMARY

- Increasing plane of nutrition 2-3 weeks before breeding can improve lamb and kid crop
- Grains or improved pasture can be used for providing higher plane of nutrition
- Body condition score is essential management practice for assessing adequacy of feeding program
- Analyzing forages is key to effective diet formulation

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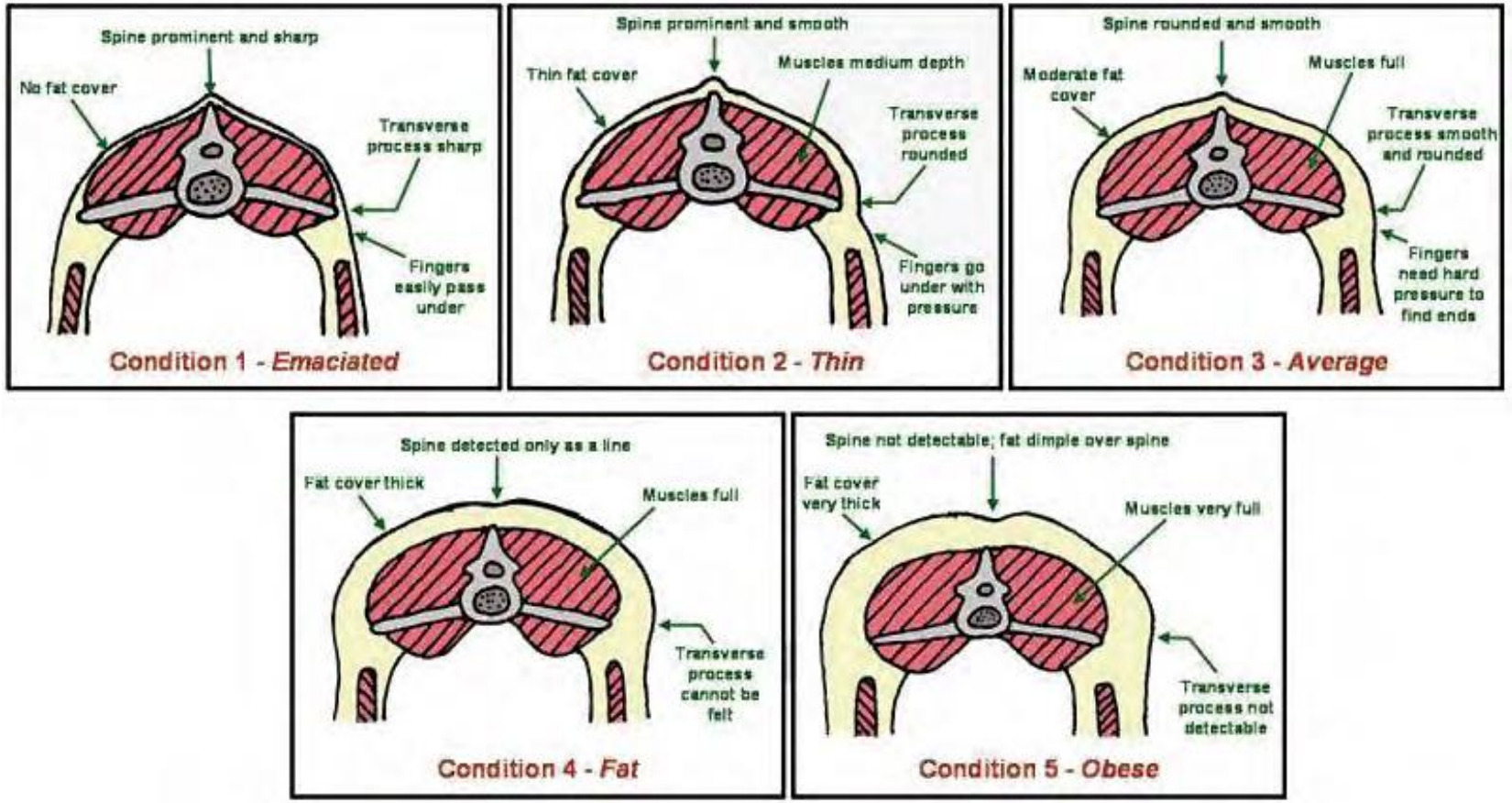
Body condition scoring

- Evaluate adequacy of previous feed supply
- Determine future feed requirements
- Accessing the health status of individual animals

BODY CONDITION SCORING



1 BCS = ~ 13 % change in BW

Adapted from "Body Condition Scoring of Sheep" by J.M. Thompson and H. Meyer (Oregon State University).

Body Condition Score

1 or 1.5

3 or 3.5

4 or 5.5

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https://ucanr.edu/sites/Livestock/files/291615.pdf

BODY CONDITION SCORE

Ewes and does: Never 1 or 5 (Always 2 to 4)

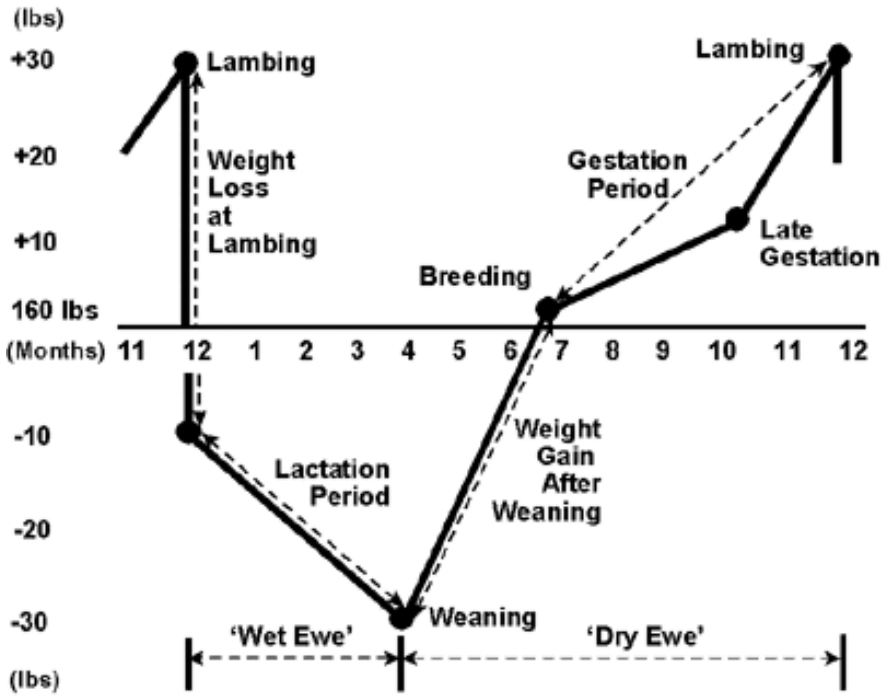
- **Breeding-** BCS= 3.0-3.5
- **Lambing-** BCS = 2.5-3.0
- **Weaning-** BCS = 2 (at minimum)
- **Dry period-** BCS = 3.0-3.5

Rams and Bucks:

- Pre-breeding: 3-4

Low BCS (2 or less) during late gestation and lambing:

- Pregnancy toxemia (2+ lambs/kids)



RAM NUTRITION

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