

Simple Comparisons of Forage Quality vs. Stage of Growth— *Small Grains, Sorghum/Sudan, Alfalfa*

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Southern High Plains

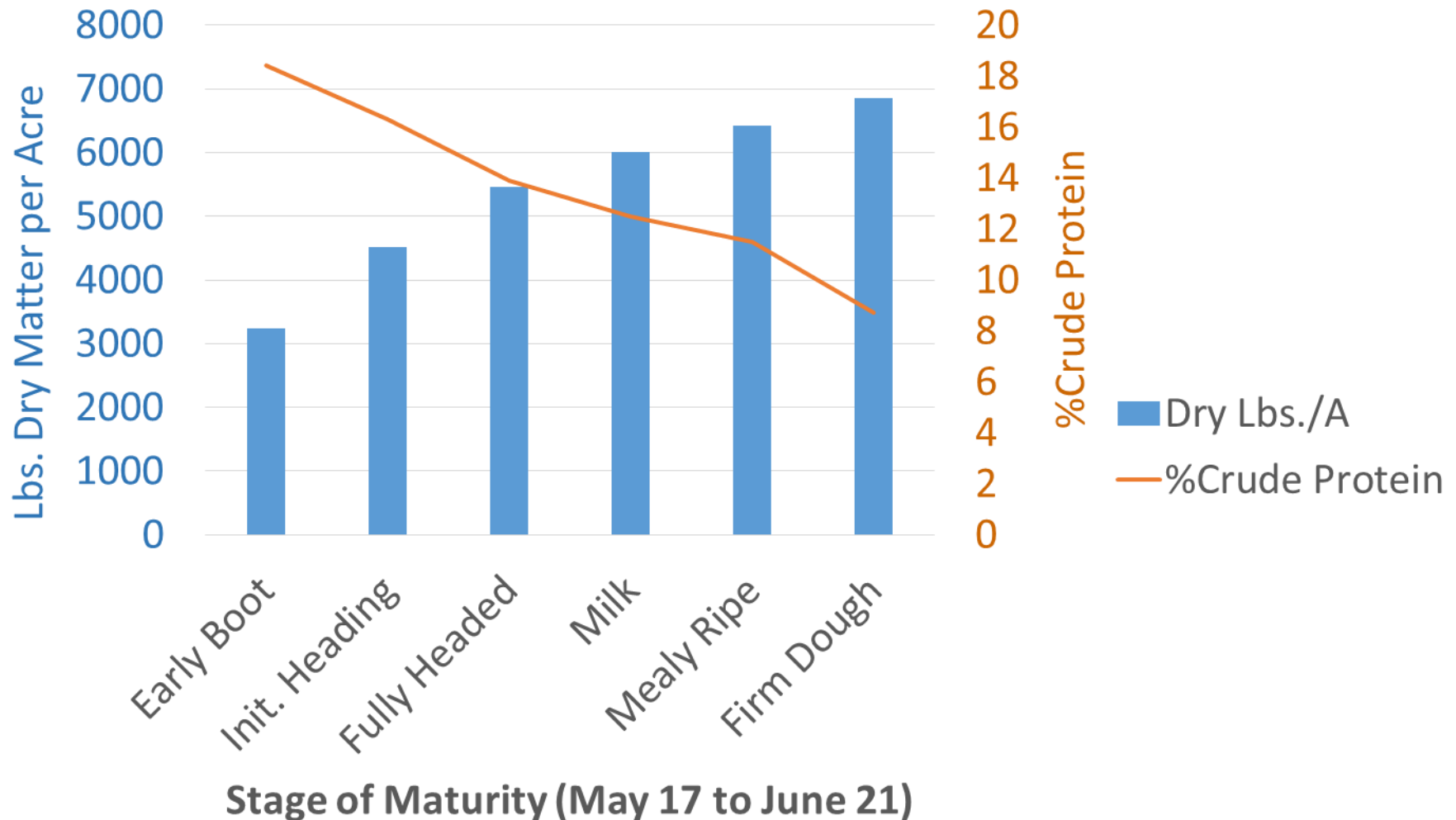
Lubbock Co. Oat Trial

One-time Hay Harvest, var. *Troy*

<u>Growth Stage</u>	<u>Harvest Date</u>	<u>Dry Hay Lbs./A</u>	<u>% Crude Protein</u>	<u>Lbs. CP per acre</u>
Early Boot	May 17	3,240	18.4	596
Init. Heading	May 24	4,510	16.3	735
Fully Headed	May 31	5,465	13.9	760
Milk	June 7	6,010	12.5	751
Mealy Ripe	June 14	6,420	11.5	738
Firm Dough	June 21	6,845	8.7	596

Troy oat was harvested for six Fridays in a row among extra plots. Yield was Taken for three plots at each date, individual each sample analyzed for crude protein. When you consider your tonnage and forage quality goals, and your use or your market, which scenario is best for you?

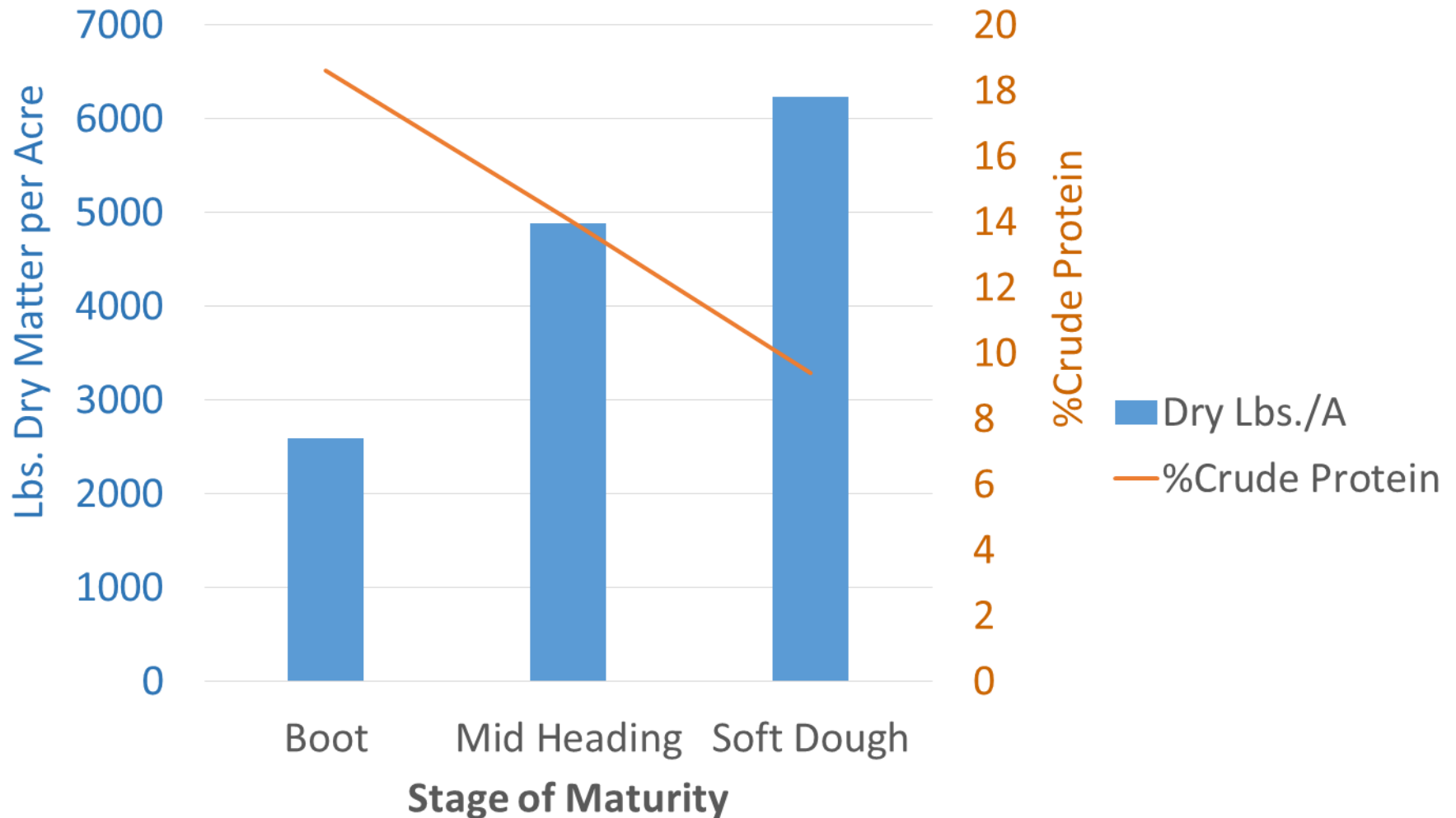
Lubbock Co. Oat Trial One-Time Hay Harvest, var. *Troy* (cut every Friday)



Wheat Hay—Castro Co.

<u>Growth Stage</u>	<u>Dry lbs./A</u>	<u>%CP</u>
Boot	2,590	18.6
Mid-heading	4,890	14.1
Soft Dough	6,230	9.4

Wheat Hay—Castro Co.



The “Trap” of Beardless Wheat (1)

- When I (Trostle) came to West Texas in 1999, I had never heard of ‘beardless wheat’ (I am from the Kansas, “The Wheat State,” and a Kansas State Univ. agronomy graduate)
- West Texas farmers and cattlemen talked as if beardless wheat was superior small grains forage

The “Trap” of Beardless Wheat (2)

- My data for small grains forage clipping trials indicated beardless wheats had no more forage production (as a group) than did regular bearded wheats
- But you can graze or bale these beardless wheats longer than bearded wheat: little worry about the awns (‘beards’) causing a problem with animal health (getting stuck in their throat, etc.)
- Hence the ‘Trap’ of beardless wheat: *What is it?*

The “Trap” of Beardless Wheat (3)

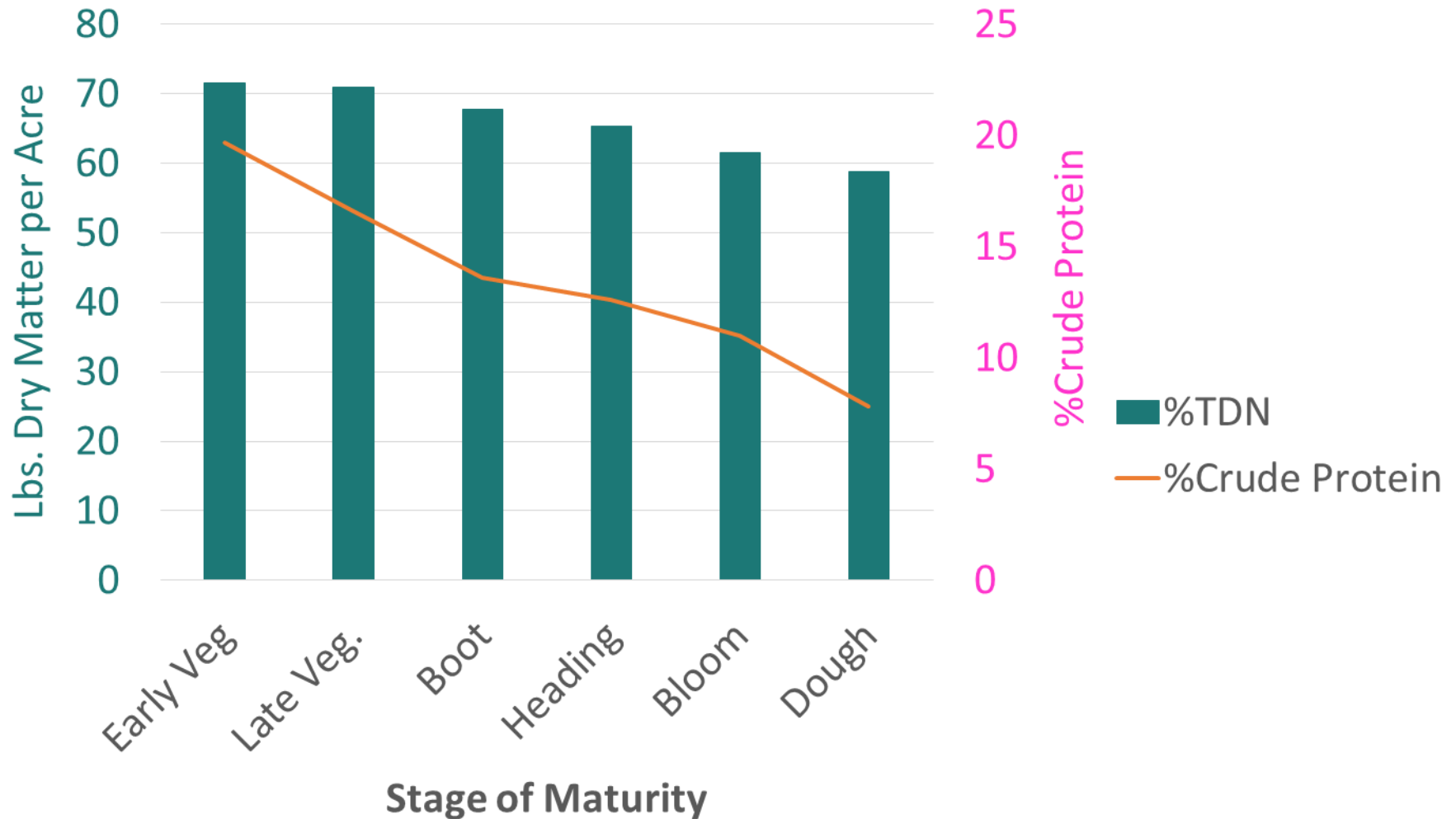
- Beardless wheat—if being beardless matters and is what you are shooting for—means lower quality forage
- By extending the grazing or haying season you have perhaps unwittingly accepted lower quality forage
- Is this what you wanted? Were you aware of the issue?
 - Yes, you get more tons of hay, but this might be counterproductive.

Sorghum/Sudan Hay Forage

Stage of Maturity vs. Forage Quality

Stage of Maturity	% TDN	% Crude Protein
Early Veg.	71.5	19.7
Late Veg.	70.9	16.6
Boot	67.7	13.6
Heading	65.3	12.6
Bloom	61.5	11.0
Dough	58.8	7.8

Sorghum/Sudangrass Growth Stage & Forage Quality



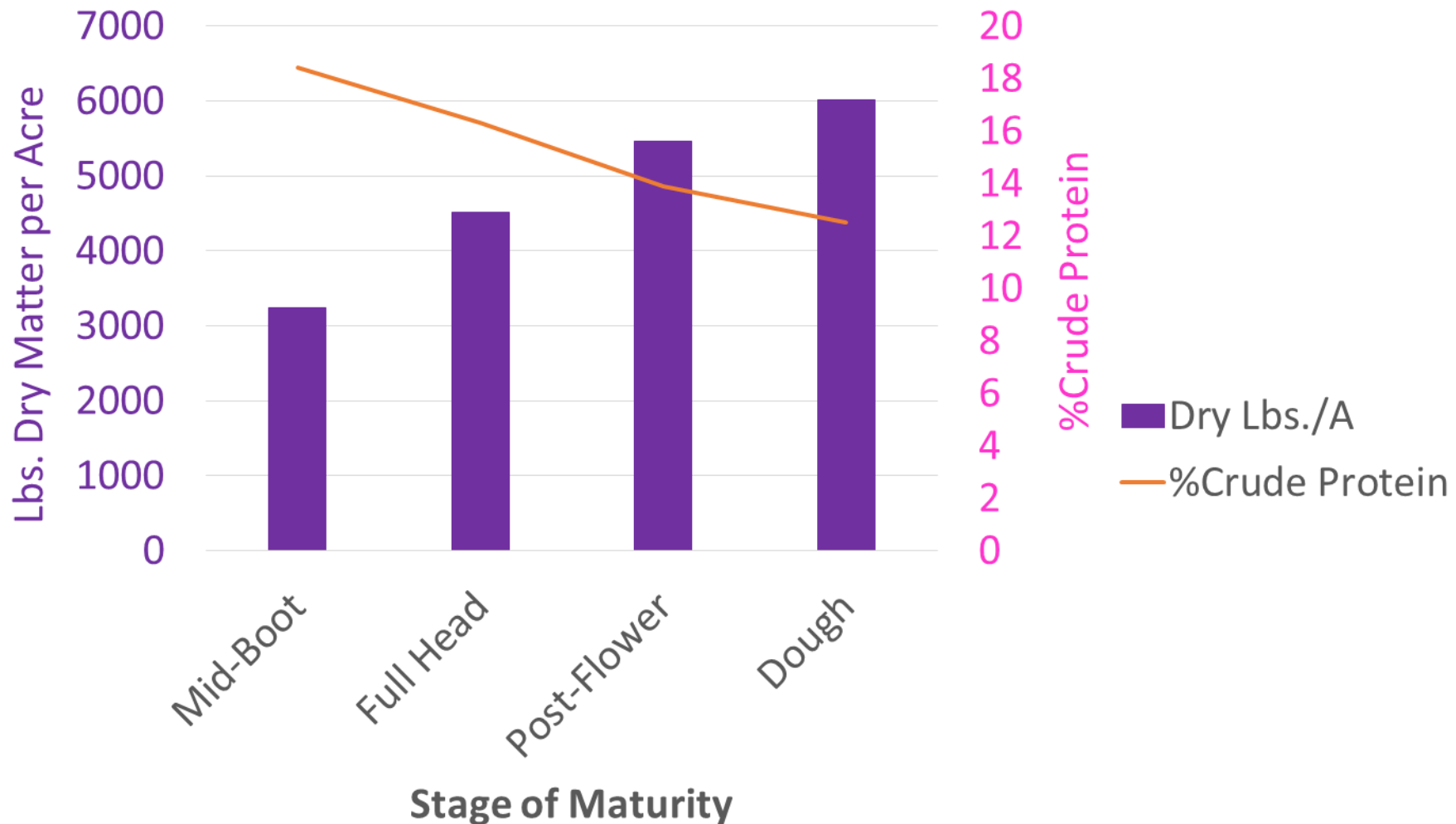
Sorghum/Sudan for Forage Hay

Swisher Co., 2-week intervals

Stage of Maturity	Wet tons per Acre	% Crude Protein
<u>Begin:</u>	<u>August 13th</u>	
Mid-boot	10.0	15.1
Full head	12.9	13.0
Post-flower	15.7	10.6
Dough	18.2	8.8

Sorghum/Sudan for Forage Hay

Swisher Co. (2-week intervals beginning Aug. 13)



General Grass & Legume Changes in Forage Constituents with Maturity

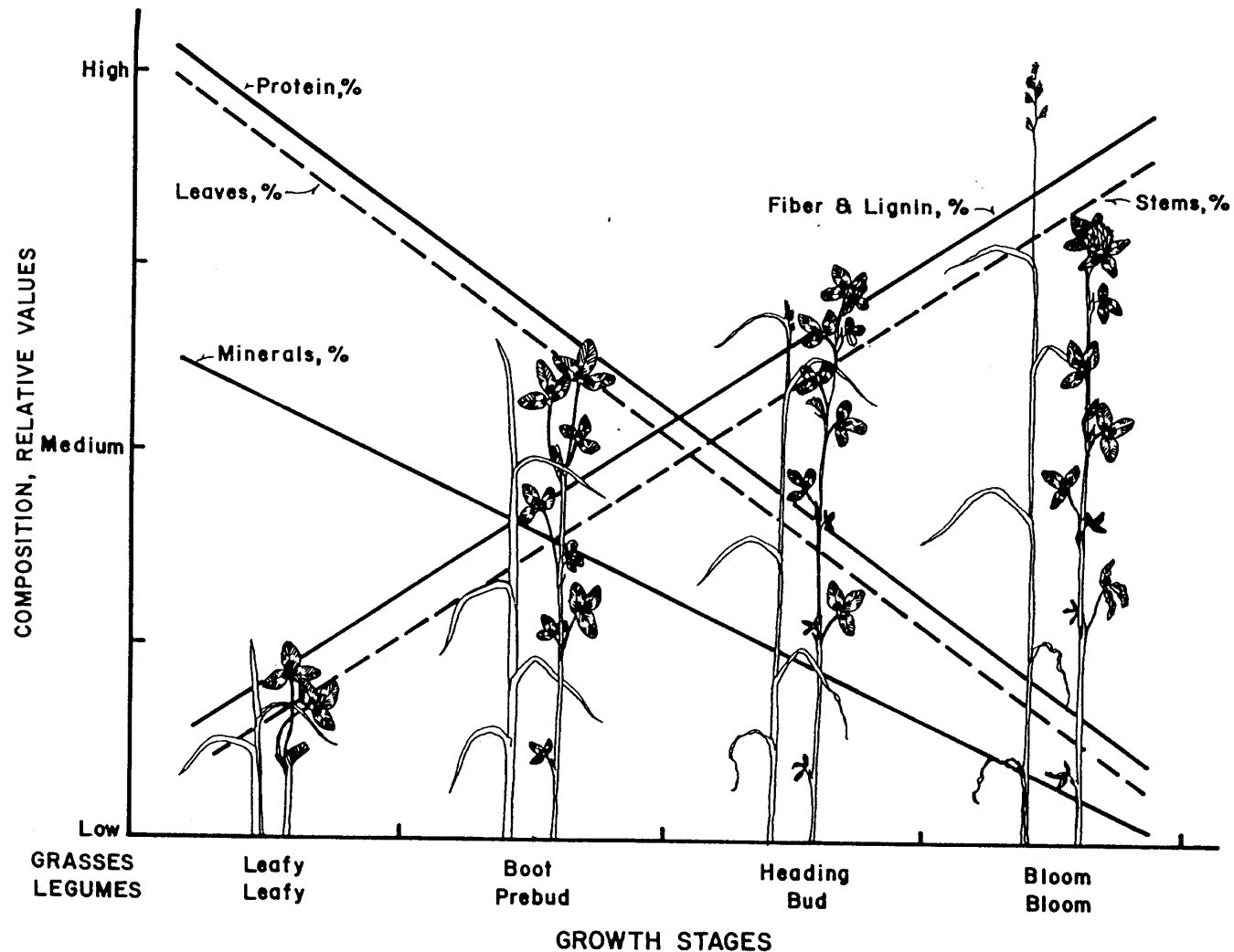
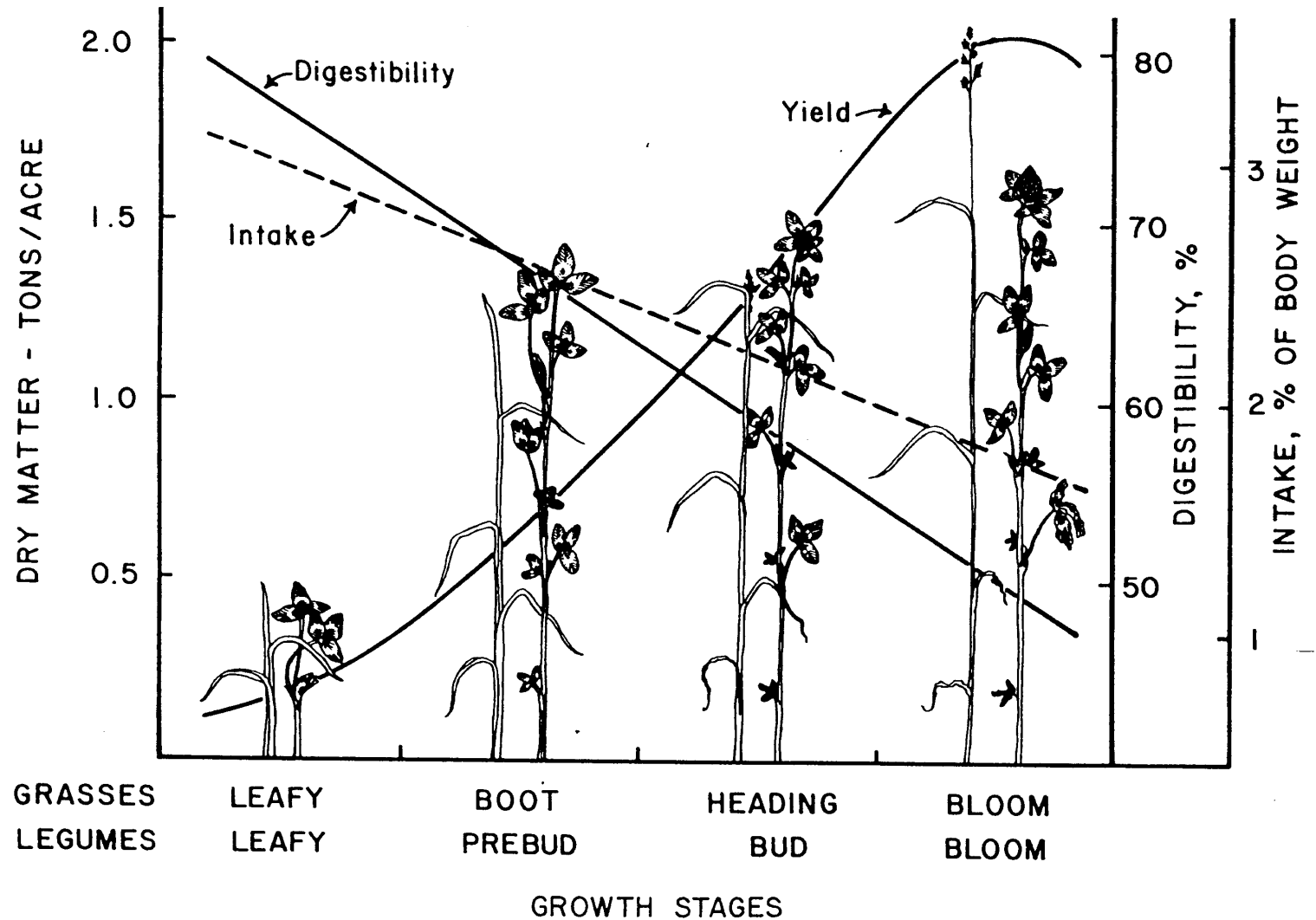
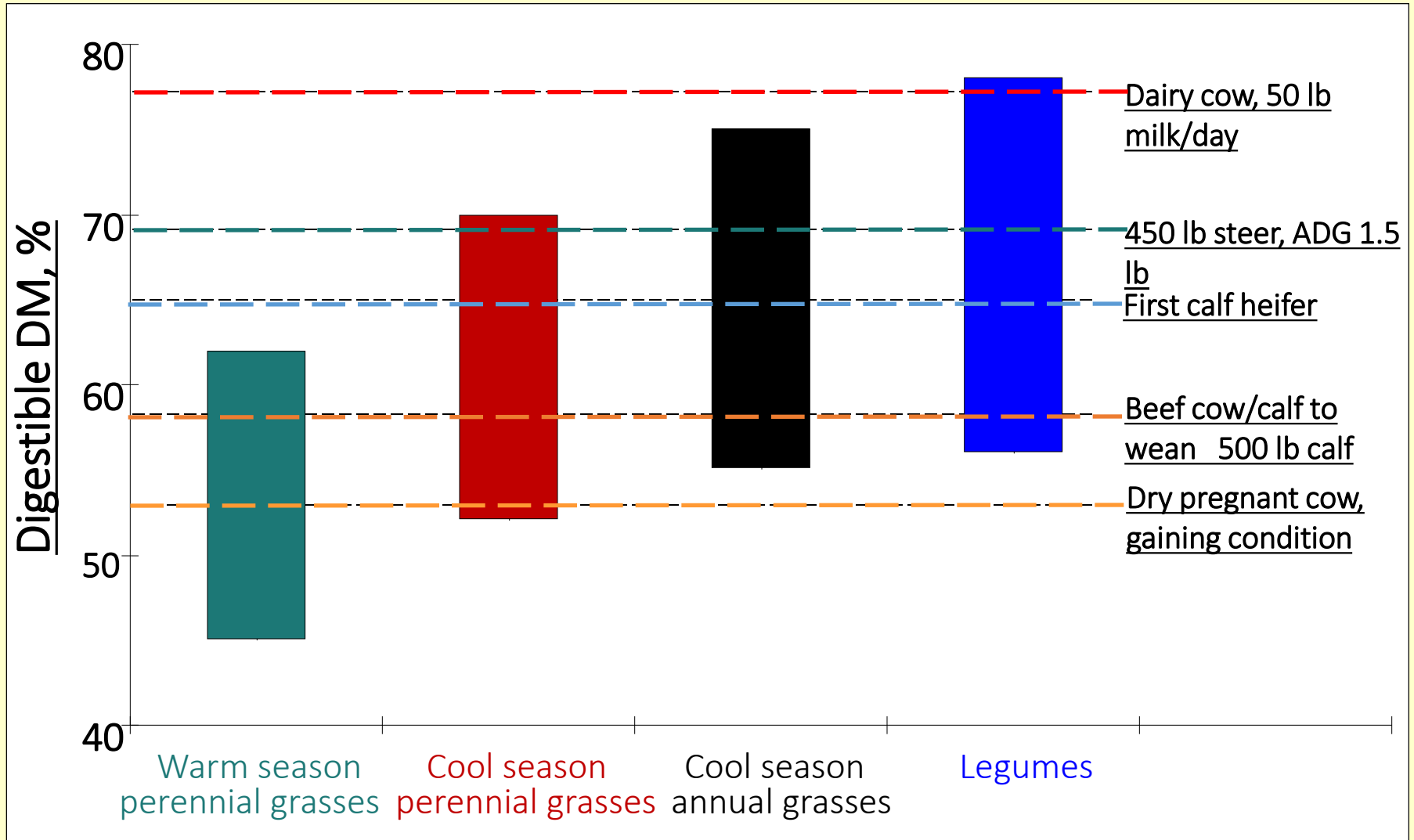


Figure 4. When perennial grasses or legumes grow from leafy to bloom growth stages, protein and mineral contents decline dramatically with leafiness. Concurrently, stemminess and cell wall materials increase rapidly as canopies grow to a stemmy bloom stage.

Legume/grass Digestibility with Growth Stage & Yield



Forage Digestibility vs. Livestock Requirement








Adapted from: H. Lippke and M.E. Riewe. TX Agric. Exp. Stn. Res. Mono. RM6C: 169-206.

Effect of Maturity on Forage Quality

Forage	CP ¹ %	ADF ¹ %	NDF ¹ %	NE _L ¹ Mcal/kg	NE _M ¹ Mcal/kg	NE _G ¹ Mcal/kg	TDN ¹ %
Alfalfa							
Bud	20	29	40	1.42	1.41	0.83	63
Full Bloom	15	37	50	1.23	1.14	0.58	55
Sorghum/Sudan							
Vegetative	17	29	55	1.60	1.63	1.03	70
Headed	8	42	68	1.30	1.18	0.62	56
Corn Silage							
Few Ears	8.5	30	53	1.40	1.38	0.80	62
Well Eared	8.0	28	51	1.60	1.63	1.03	70

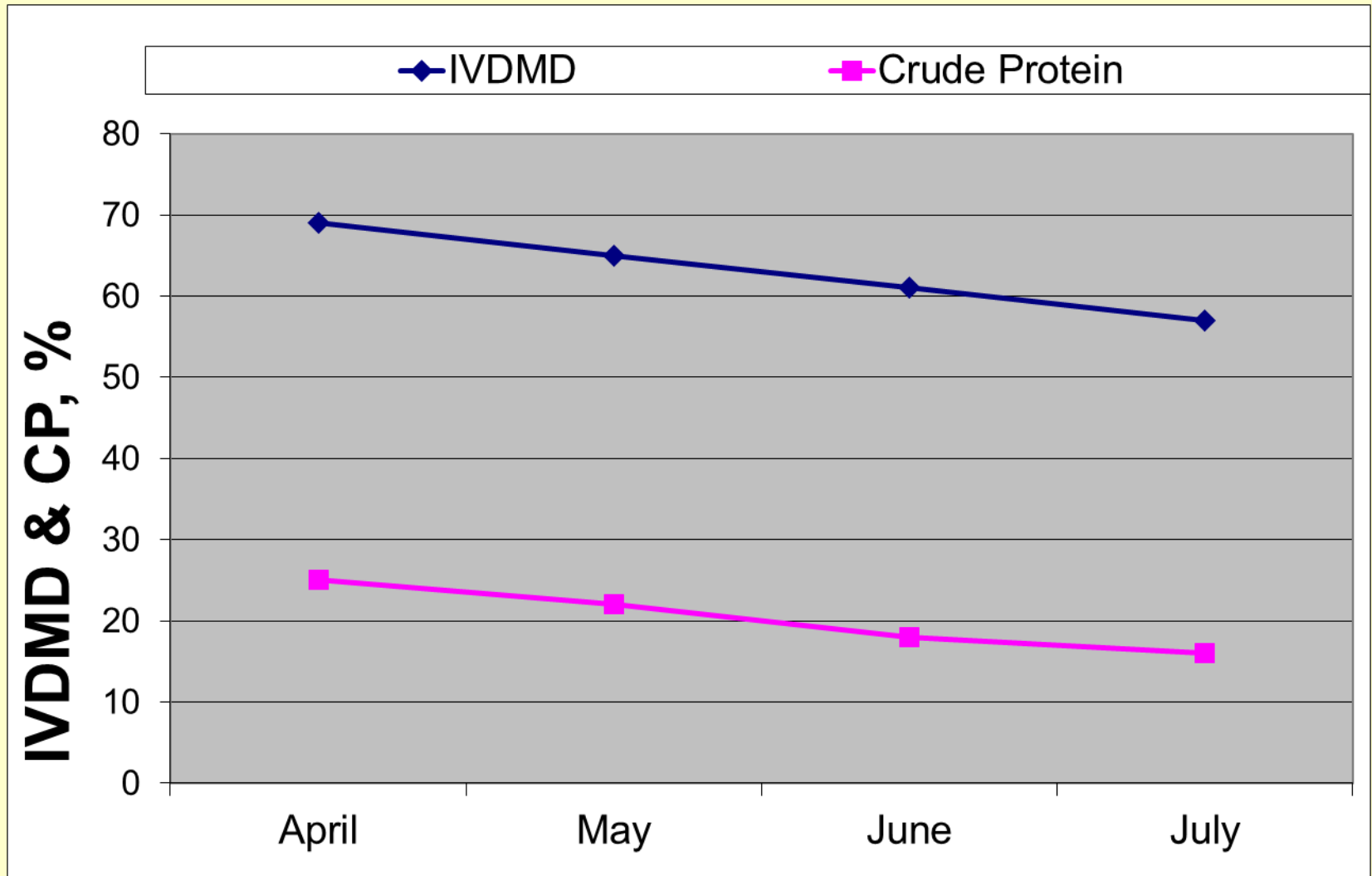
¹CP = crude protein, ADF = acid detergent fiber, NDF = neutral detergent fiber, NE_L = net energy of lactation, NE_M = net energy of maintenance, NE_G = net energy of gain, TDN = total digestible nutrients. Source: Nutrient Requirements of Dairy Cattle, 1989.

Effect of Maturity on Alfalfa Quality

Maturity	CP %	TDN %	ADF %
Pre-bud	 21.7	 65	 28
Bud	19.9	62	31
1/10 Bloom	17.2	58	34
1/2 Bloom	16.0	56	38
Full Bloom	15.0	54	40
Mature	 13.6	 52	42

Source: Nutrient Requirements of Dairy Cattle. 1978. National Academy of Science, Pub. 1349. *CP* = crude protein, *ADF* = acid detergent fiber, *TDN* = total digestible nutrients.

Seasonal Changes in Alfalfa Nutritive Value



Adapted from: C.S. Hoveland et al. J. Prod. Agric. 1:343-346. *IVDMD = Invitro Dry Matter Digestibility.*