Stocker Cattle: Options Under Adverse Conditions

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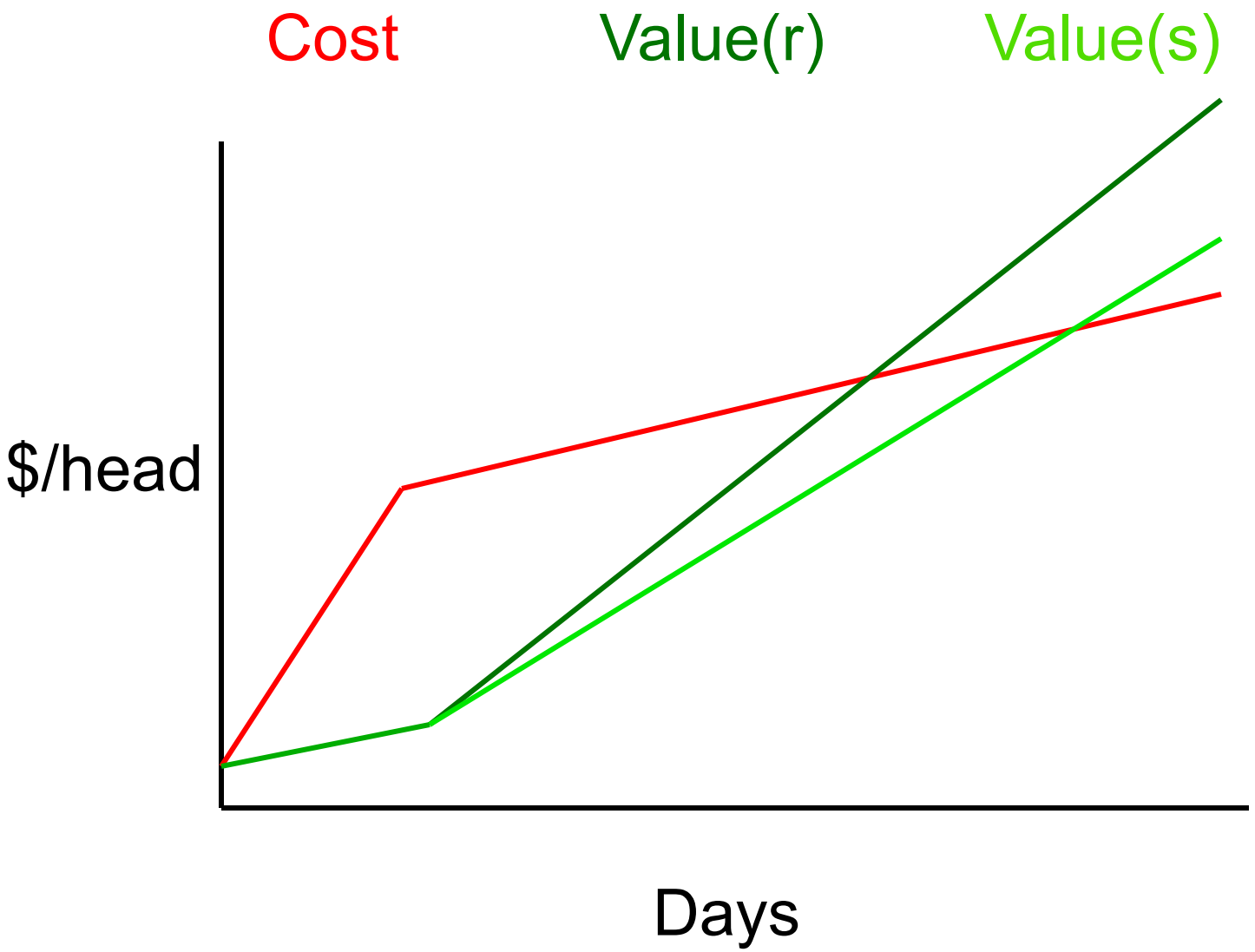
Adverse Conditions ???

Production conditions that may hinder value accumulation (slow cost recovery) and hence reduce profit potential

Cost accumulation vs Value accumulation



Dilute production costs with weight gain

More gain dilutes production costs over more pounds of weight

Total gain is a function of time as well as rate of gain

- More time (days) = more weight
- More rapid gains (lb/day) = shorter cost recovery and dilution of daily costs

Dilute maintenance costs with nutrient intake

In order to gain weight and dilute costs,
daily nutrient consumption must exceed
the metabolic cost of maintenance

As nutrient consumption increases,
cost of maintenance is diluted and more
rapid gains are achieved

Adverse Conditions ???

Adverse conditions that limit nutrient consumption and/or utilization -

may be "preexisting" –
harsher production environments,
forage resources with relatively low nutritional value and/or productivity

may develop during the ownership period -
forage quality or availability

Extend grazing and ownership

Extending length of ownership and grazing allows more gain

May be option in low gain environments

- Sequential use of forage types across seasons

- Diversifying forage species within a grazing unit
  Instersseding, sod-drilling annuals

- Production risks associated with forage management

Extend grazing and ownership

Extending length of ownership and grazing allows more gain

- Utilize supplements to support gains through periods of lower gain potential
  Cost of added gain vs value of added gain??

- Move calves to a confinement facility

Alter grazing period

Develop a system that avoids grazing during times of low forage value or climatic stressors

Capitalize on periods of better forage conditions and avoid periods that are less desirable

- Allocate grazing to shorter period of time when gain potential is greater

  Watch stocking density!

Enhance quality of available forage

Warm-season perennial grasses - class of forages that have the lower nutritional value

- Diversify forage species
  - Interseed legumes into pastures
  - Forage management risk

- Timely fertilization

Manage forage availability

Forage production (lb/ac) – combined result of growing conditions, soil fertility, and forage type/species

Forage availability (lb forage/hd/time) - combined result of forage production and stocking rate (hd/ac/time)

Manage forage availability

Forage production (lb/ac) –
combined result of growing conditions, soil fertility, and forage type/species

Forage availability (lb forage/hd/time) -
combined result of forage production and stocking rate (hd/ac/time)

Forage availability - further evaluated as amount of forage in the total forage mass that is more or less desirable

Manage forage availability

Cattle graze selectively –

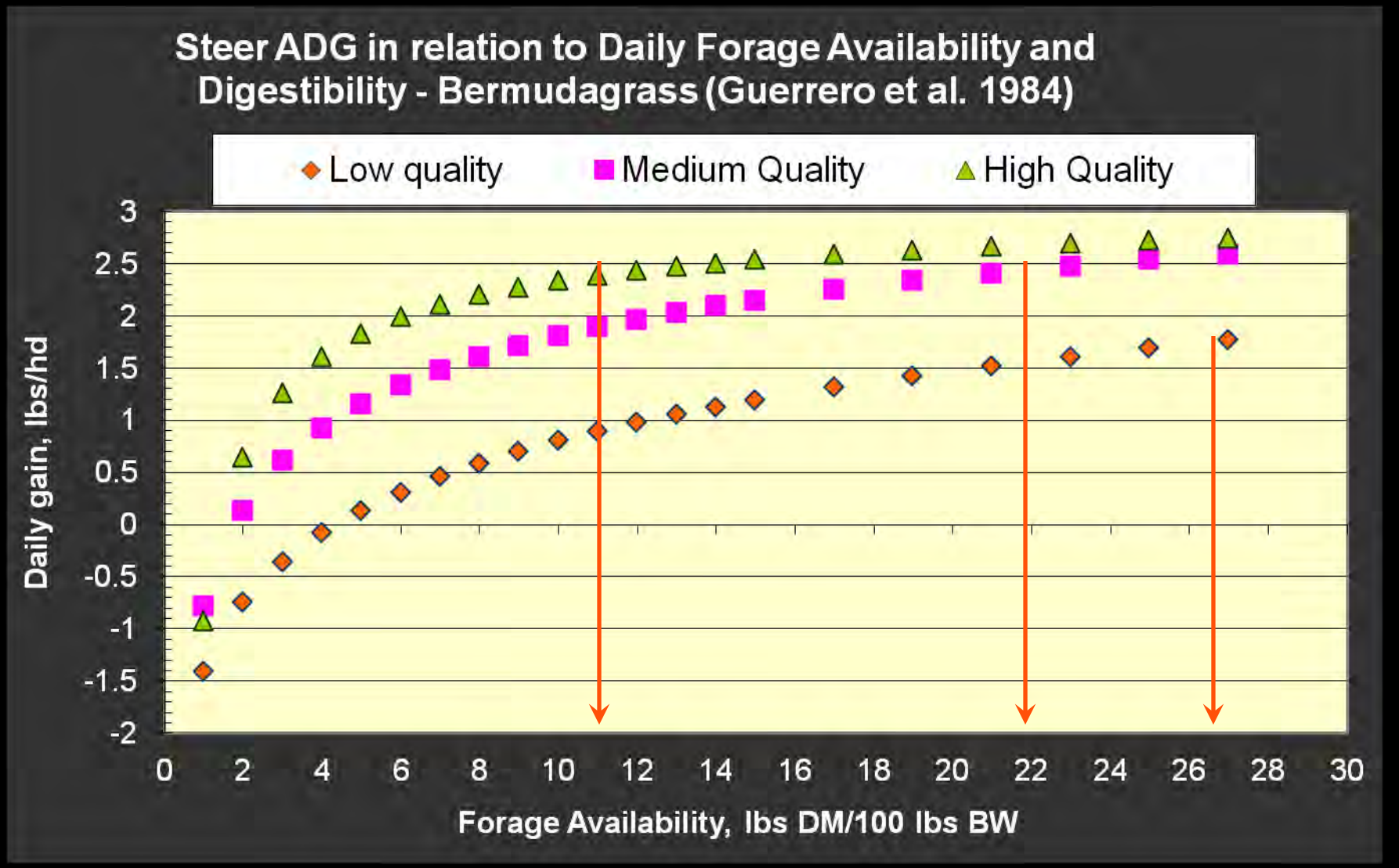
discriminate among species of plants, plants within a species, parts of plants, and age of plant parts

As stocking rate increases, availability of

desirable components becomes more limited,

nutrient intake and performance is more difficult to sustain

Daily gain over 84 d on summer annual pasture as affected by stocking rate


Steer ADG in relation to Daily Forage Availability and Digestibility - Bermudagrass (Guerrero et al. 1984)
Low quality
Medium Quality
High Quality
Daily gain, lbs/hd
3
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
Forage Availability, lbs DM/100 lbs BW

Manage forage availability

Adjusting stocking rates is the means of managing forage availability and sustaining performance.

Adjusting stocking can be a challenging adjustment to commit to and carry through

Decisions on the type and number of calves to purchase/retain are usually made and "sunk" costs are accrued before the grazing season

Manage forage availability

Adjusting stocking rates is the means of managing forage availability and sustaining performance

Conditions that limit forage production require lower stocking rates to ensure forage intake

Adjusting stocking can be a challenging adjustment to commit to and carry through

Decisions on the type and number of calves to purchase/retain are usually made and sunk costs accrued before the grazing season

Supplemental feeding

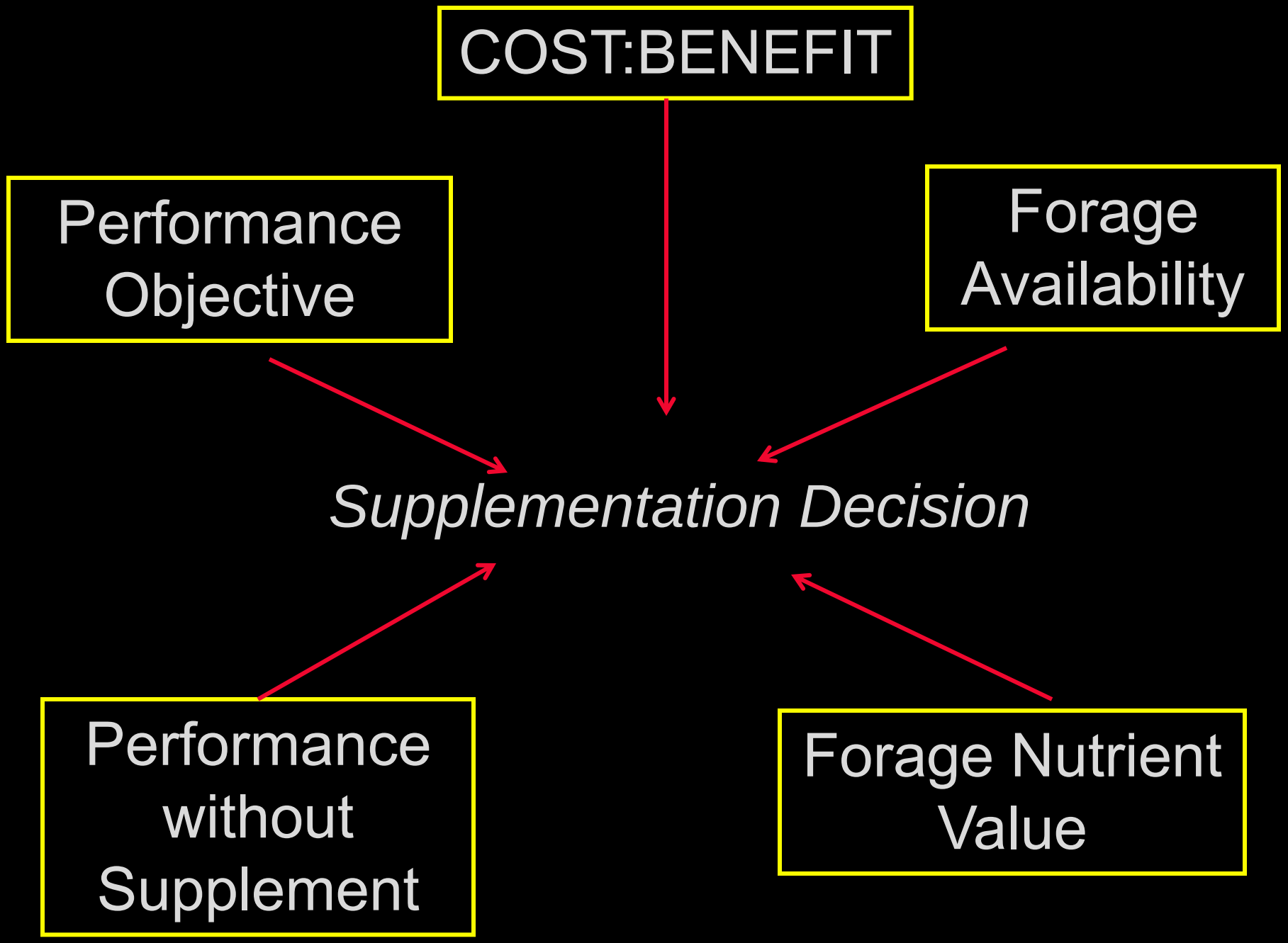
A risk management tool

Must be able to evaluate and discern
- type of supplement required
- amount of supplement to be offered
- cost:benefit

Supplementation Decision

What are potential benefits of supplementation?

- Additional weight at market
- Reduced period of ownership
  - Opportunity costs
  - Capital turnover
- Forage allocation


COST:BENEFIT
Performance Objective
Forage Availability
Supplementation Decision
Performance without Supplement
Forage Nutrient Value

Value/lb of added gain ($/lb added wt)

To cattle owner

Purchase	400 lb steer	$1.80/lb	$720.00
Sell	700 lb steer	$1.45/lb	$1015.00
Net	300 lb gain		$295.00
Value of added gain			
	$295.00/300 lb gain		$0.9833

Steer Price, Total Value and Value of Gain
April 2011 - Mar 2012, Oklahoma 7-Market Ave.
(D. Peel, 2012)

Weight (lbs)	Average Price ($/cwt.)	Total Value ($/head)	Value of Gain 425 lb. Beg. Weight ($/lb.)	Value of Gain 525 lb. Beg. Weight ($/lb.)	Value of Gain 625 lb. Beg. Weight ($/lb.)
425	173.09	735.63			
475	163.47	776.48			
525	158.76	883.49			
575	154.37	887.63	1.01		
625	150.09	938.06	1.01		
675	145.57	982.60	0.99	0.66	
725	143.31	1039.00	1.01	0.78	
775	140.00	1085.00	1.00	0.81	0.98
825	136.61	1127.03	0.98	0.81	0.95
875	133.23	1165.76			0.91

Supplementation Decision

Supplement conversion efficiency =

lbs supplement/lbs gain added by supplement

EX. 1 kg supplement adds 0.30 kg/d gain
= 1 kg suppl./0.30 kg gain

= 3.3 kg suppl/1 lb gain added

Supplementation Decision

Supplement conversion efficiency

Conversion efficiency varies

2.0:1

6.0:1

10:1

Infinity

As conversion efficiency increases, the economic feasibility declines

Stocker cattle response to supplemental protein on bermudagrass

	No Suppl.	Suppl.	Efficiency
Oklahoma,	**.95 lb/d**	**1.25 lb/d**	**3.3**
1 lb SBM, 440 lb steers, Aug 16 - Oct 16			
Mississippi,	**1.48 lb/d**	**1.70 lb/d**	**6.2**
.25% BW SBM, 545 lb steers, July 20 - Oct 24			

If VOG = $1/added lb, BE supplementation costs:

Oklahoma	$1 / 3.3 = $0.303/lb	= $606/ton
Mississippi	$1 / 6.2 = $0.1613/lb	= $323/ton

Supplementation Decision

Performance objective

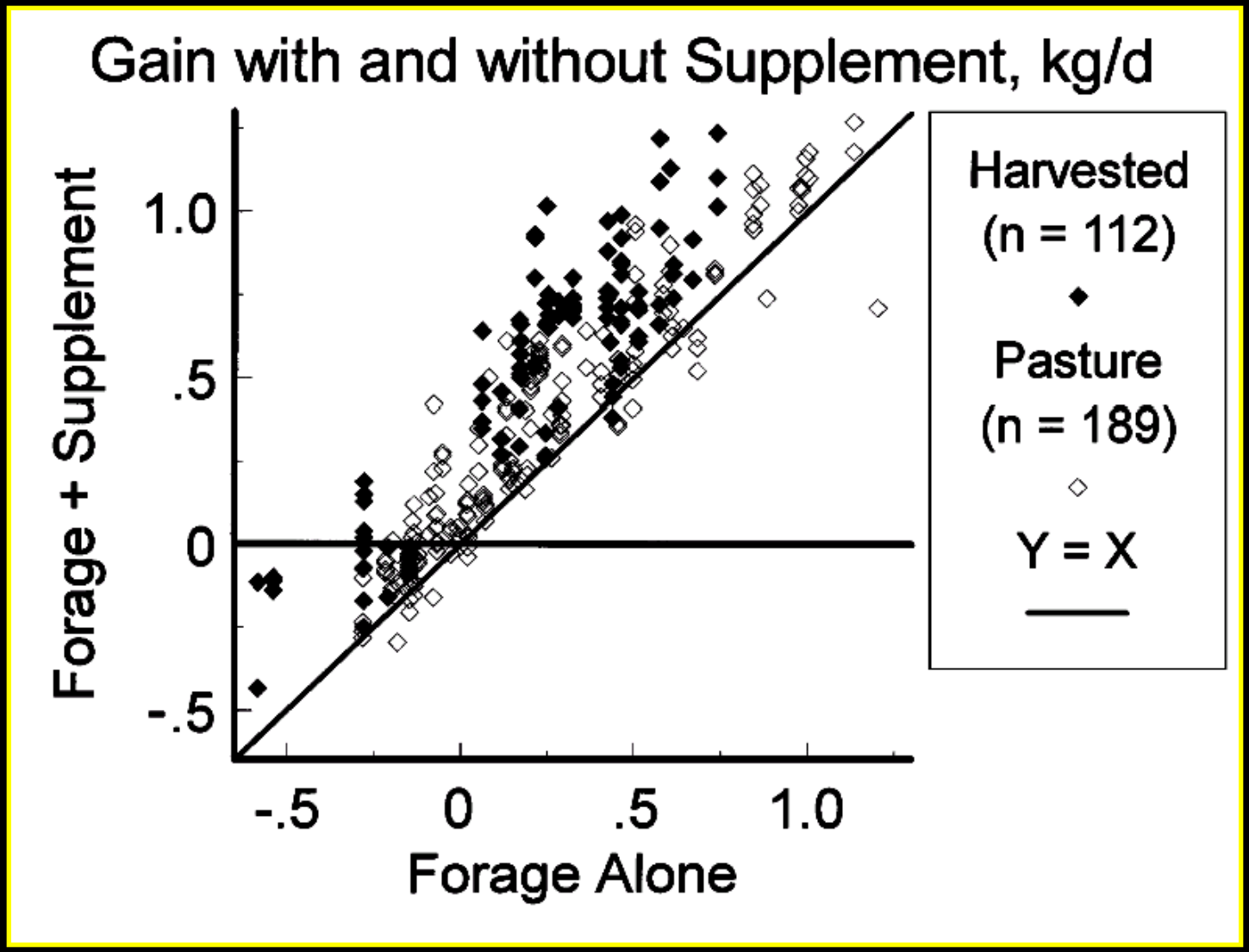
- Increase rate of gain
- Increase stocking rate and maintain rate of gain
- Minimize weight loss during winter or dry season

Supplementation Decision

Performance without supplement

Baseline for comparison
Can we do better?

Daily gain of cattle fed the same forage with or without supplement



(Moore et al., 1999)

Supplementation Decision

Forage nutritive value

Prioritize supplemental nutrients
Identify type of supplement

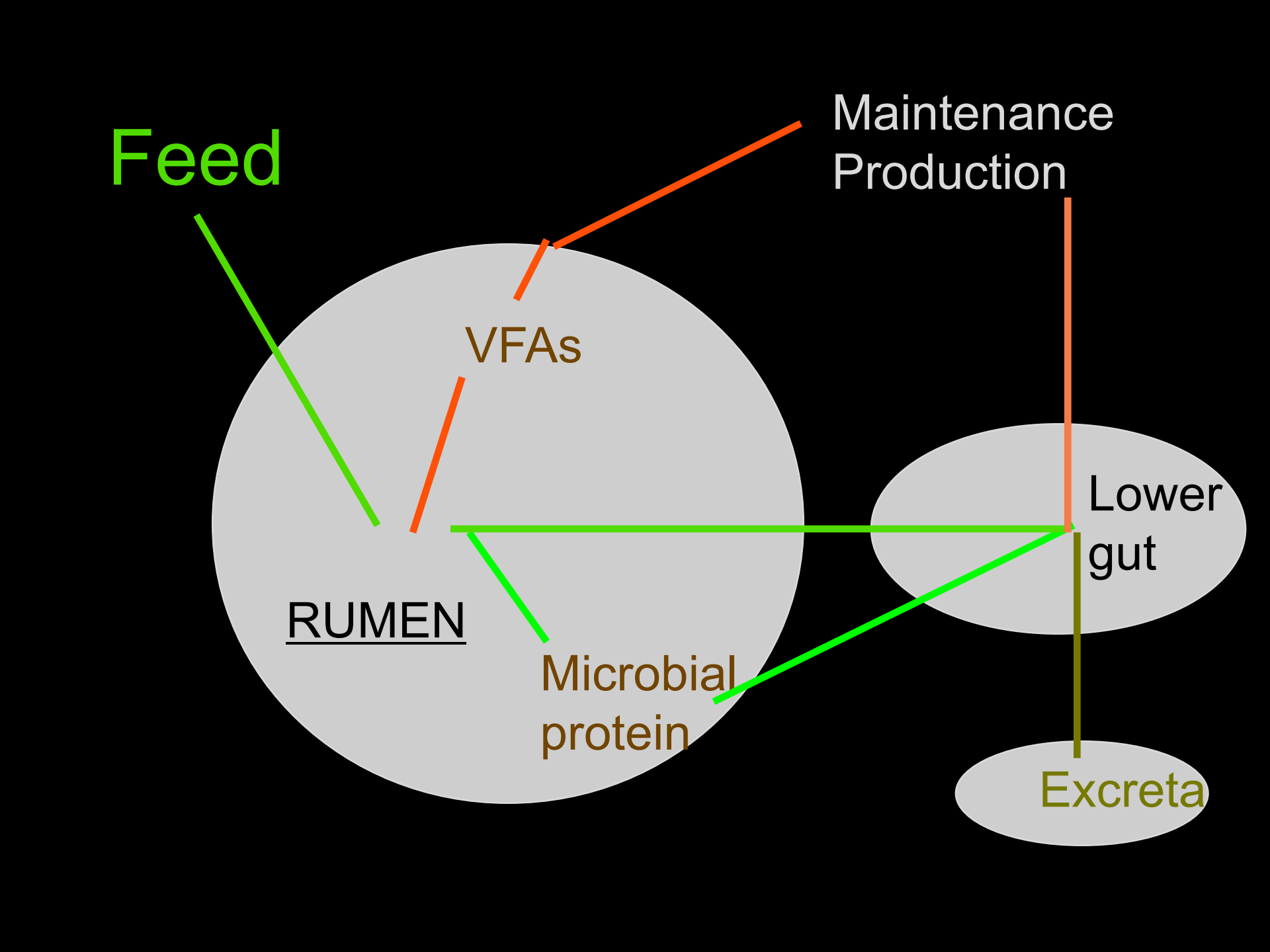
Forage Availability

Limiting or not?

Supplementation Decision

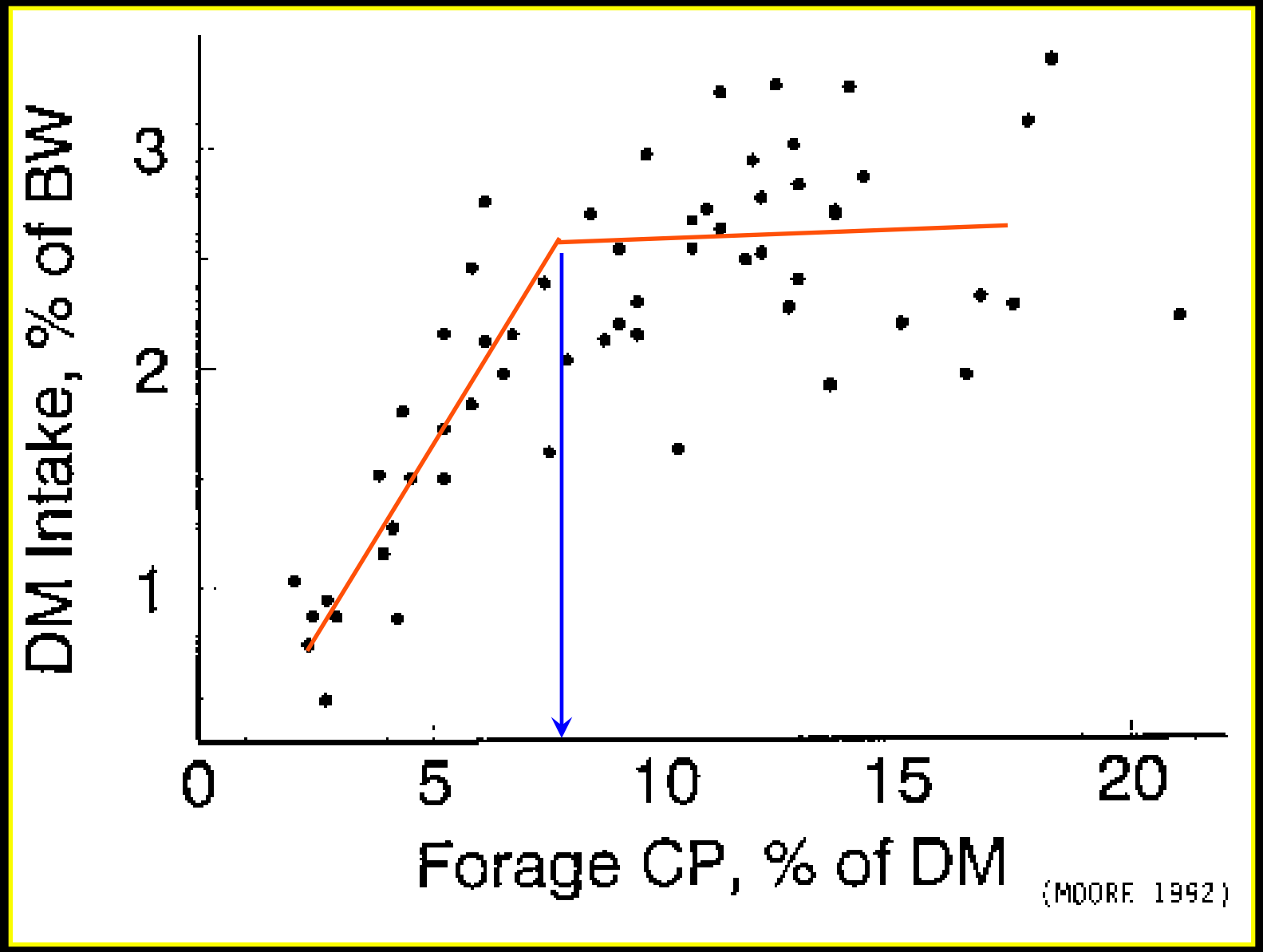
- Forage Availability
  - What is present and how much?
  - Is daily intake limited?

- Forage Nutrient Value
  - Protein and energy concentrations
  - Prioritize supplemental nutrients
  - Identify type of supplement


Feed
Maintenance
Production
VFAs
Lower
gut
RUMEN
Microbial
protein
Excreta

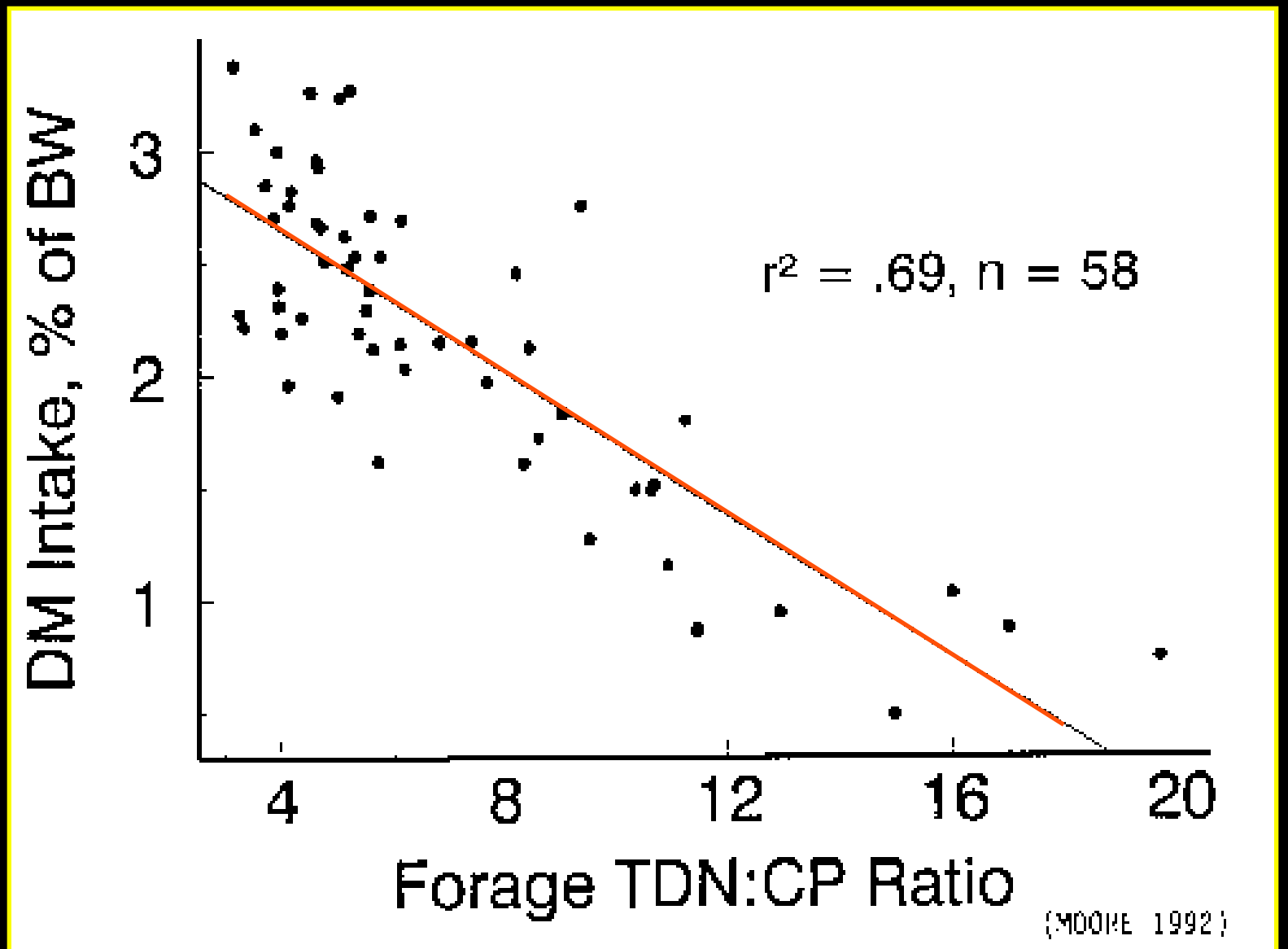
Forage intake and diet crude protein

- Energy intake is the primary factor limiting cattle performance
- In many instances, energy intake is limited by protein content of the diet
- 7-8% crude protein in forage is a threshold commonly associated with depressed intake
- Feeding protein supplements with these forages will improve intake and digestion(?)


DM Intake, % of BW
1
2
3
0
5
10
15
20
Forage CP, % of DM
(MOORE 1992)

Energy and Nitrogen Balance

- Ratio Total Digestible Nutrients (TDN) and crude protein (CP) content of the forage
- Forage intake negatively related to TDN:CP ratio
- Threshold value of between 6-8:1


DM Intake, % of BW
3
2
1
r^2 = .69, n = 58
4
8
12
16
20
Forage TDN:CP Ratio
(MOORE 1992)

TDN:CP ratio

CP\TDN	45	50	55	65	70
4	11.2	12.5	13.8	16.3	17.5
6	7.5	8.3	9.2	10.8	11.7
8	5.6	6.3	6.9	8.1	8.8
10	4.5	5.0	5.5	6.5	7.0
12	3.8	4.2	4.6	5.4	5.8
14	3.2	3.6	3.9	4.6	5.0

Supplementation and Forage Intake

Protein status is highest priority for supplemental nutrients next to minerals

If forage CP is less than 7%, or if TDN:CP ratio is greater than 7:1,

forage intake and utilization will be depressed

Substitution

vs

Supplementation

Substitution

- Subsitution varies with level of feeding little effect at less than .25-.30% body weight
- Rule-of-thumb
  1 lb. of energy dense feed reduces forage intake .5 to 1 lb.
- Effect increases with forage quality
- Hay feeding has similar effect

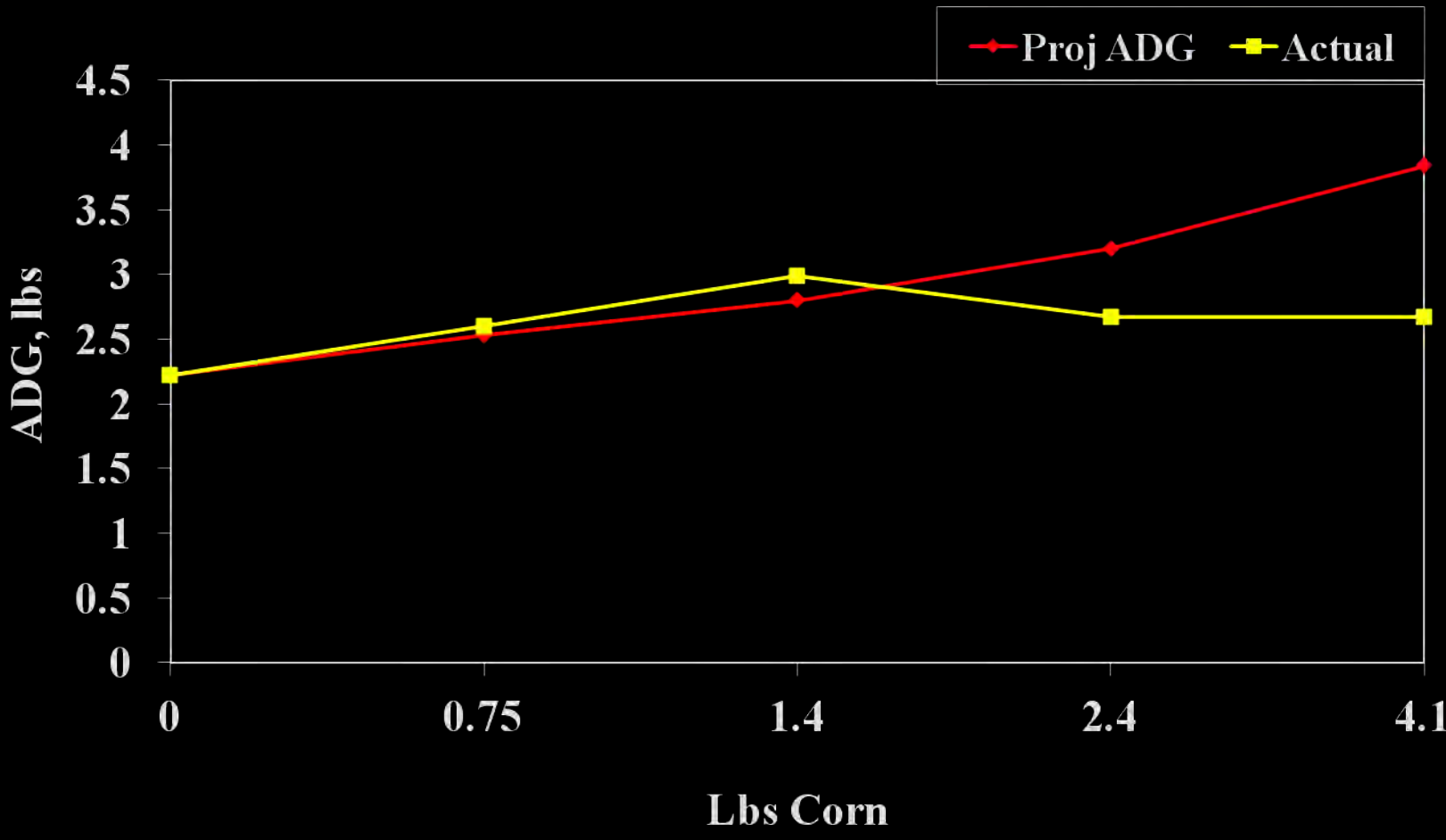
Forage intake in relation to low protein energy concentrate intake

Supplementation Decision

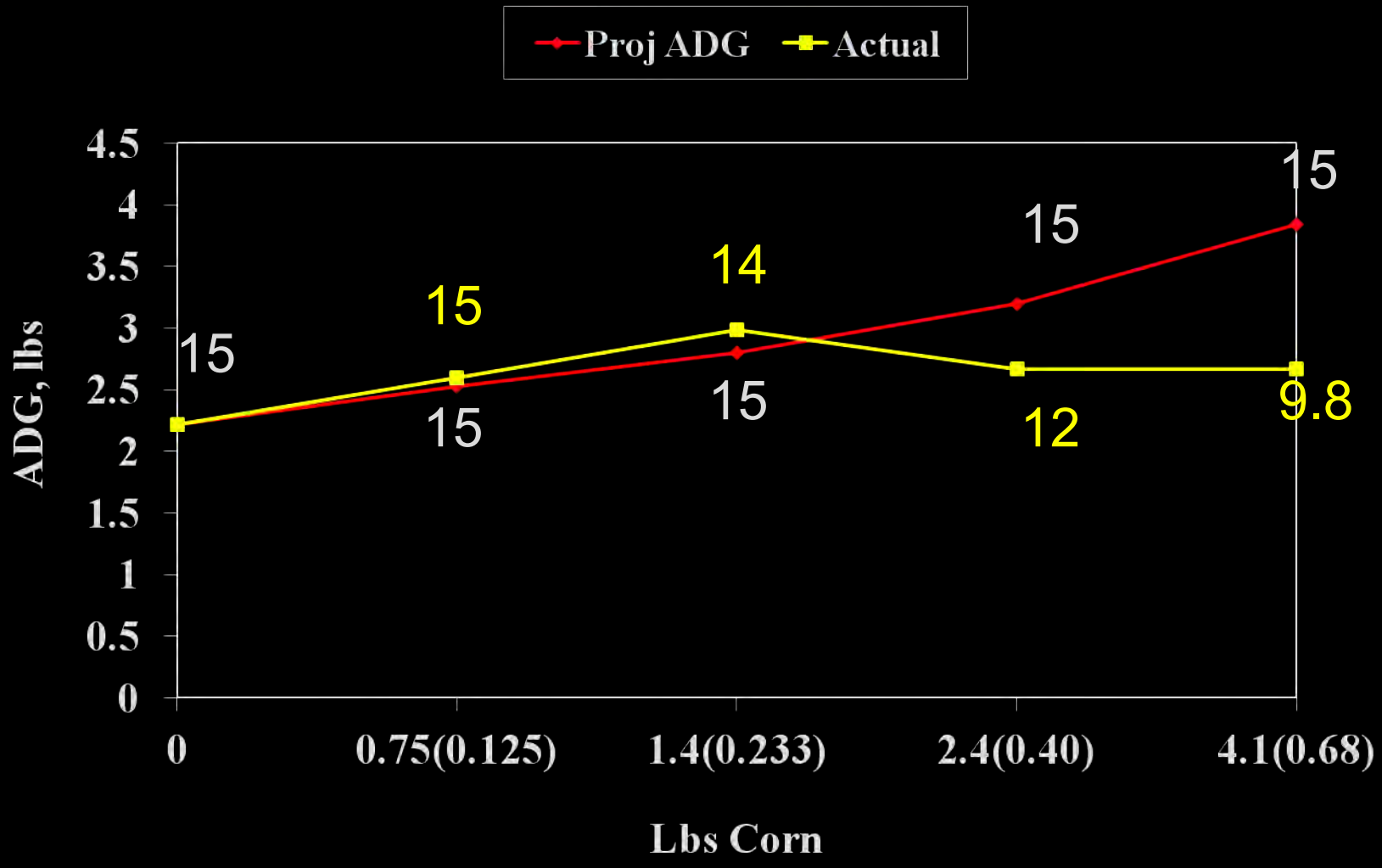
- The first increment of supplement (1-2 lb/d) usually is usually the most efficient

  As level of supplement is incrementally increased,
  the marginal response to the supplement is reduced
  and efficiency is reduced

Projected vs Actual gain (adapted from Rouquette, 1995)
Assume 15 lbs forage DM intake with no depression, 67% Forage TDN



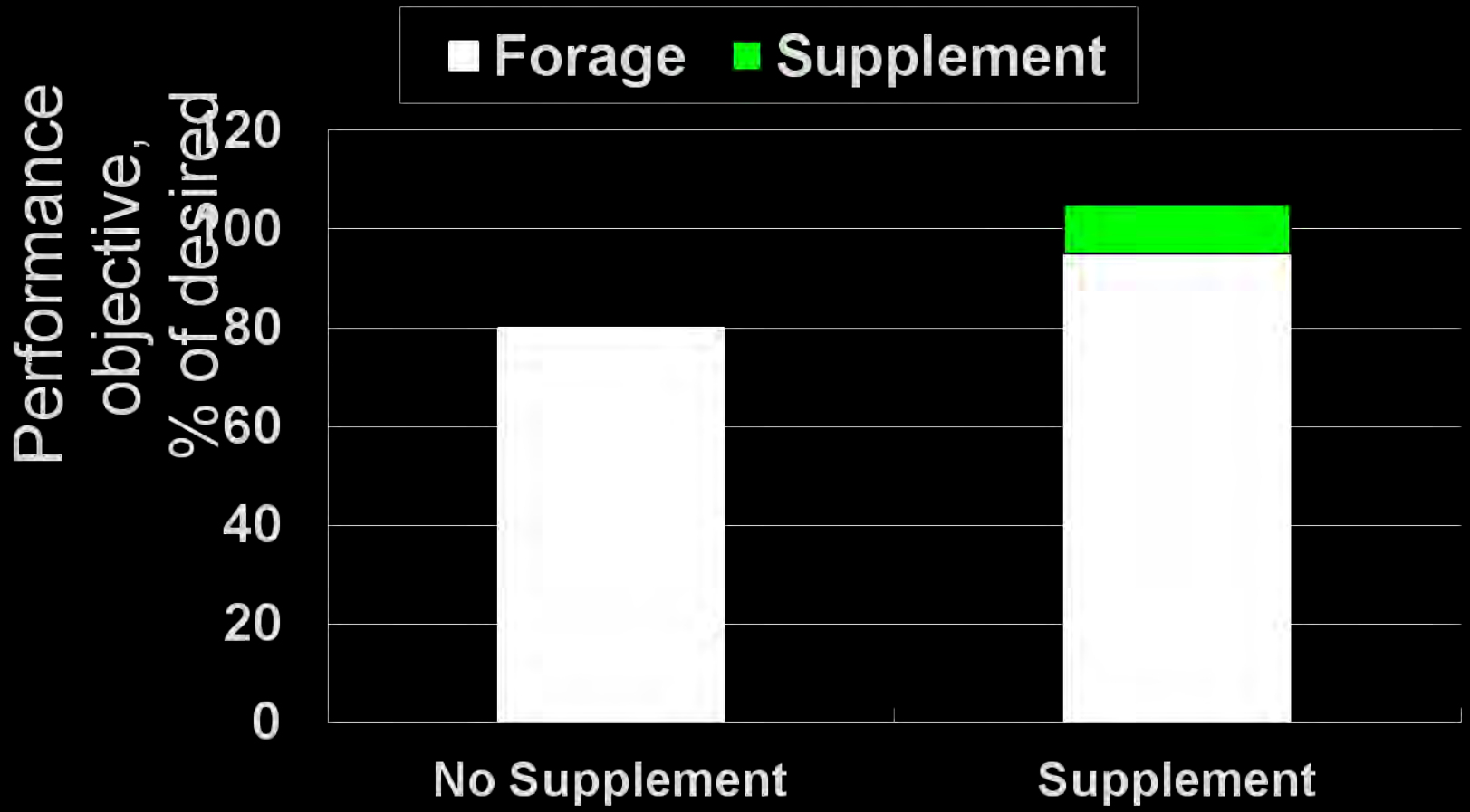
Estimated forage intake depression to reconcile projected and actual gain. Assumes 15 lbs forage DM intake base, 67% TDN



Situation 1

- Problem: Performance is lower than desired
- Forage Availability: Adequate, not limiting intake
- Forage Quality: Protein is low, or DOM:CP is high
- Forage Intake: Lower than potential because of protein status
- Objective: Improve performance by increasing utilization of standing forage

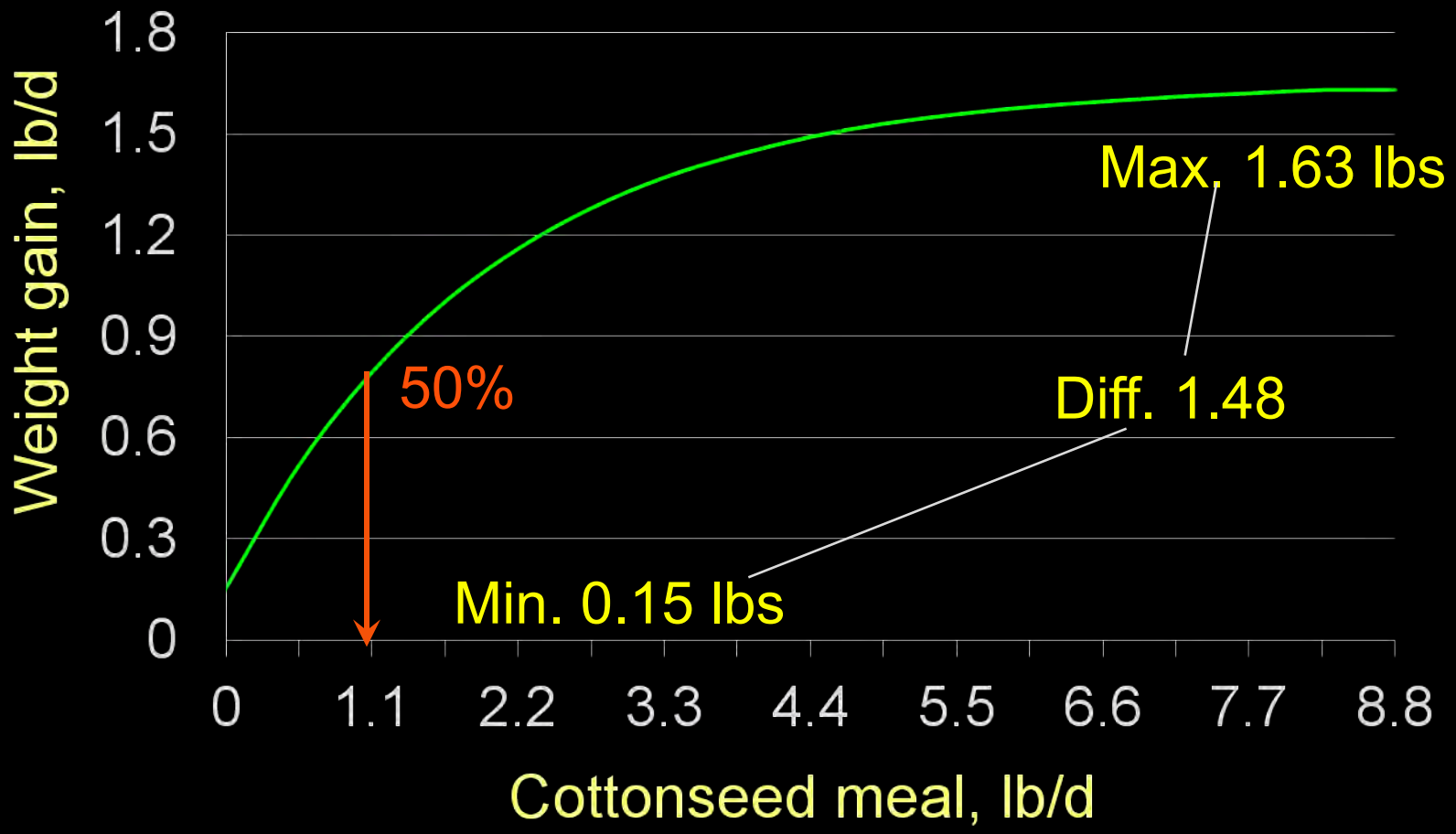
Improving energy status with limited supplement (Situation 1)



Situation 1 (cont'd)

- Strategy: Feed a small amount of supplement to stimulate intake and digestion
- Supplement type: High protein content
  - Preferably all natural protein, limited NPN is acceptable
  - Preferably 60-65% rumen degradable protein
- Feeding rate: 0.1 to 0.3% body weight/day
- Conversion efficiency: 1.5-3.0 lb supplement per pound of added gain in summer

Predicted liveweight response by cattle fed cottonseed meal with low quality forage (Hennessy, 1996)

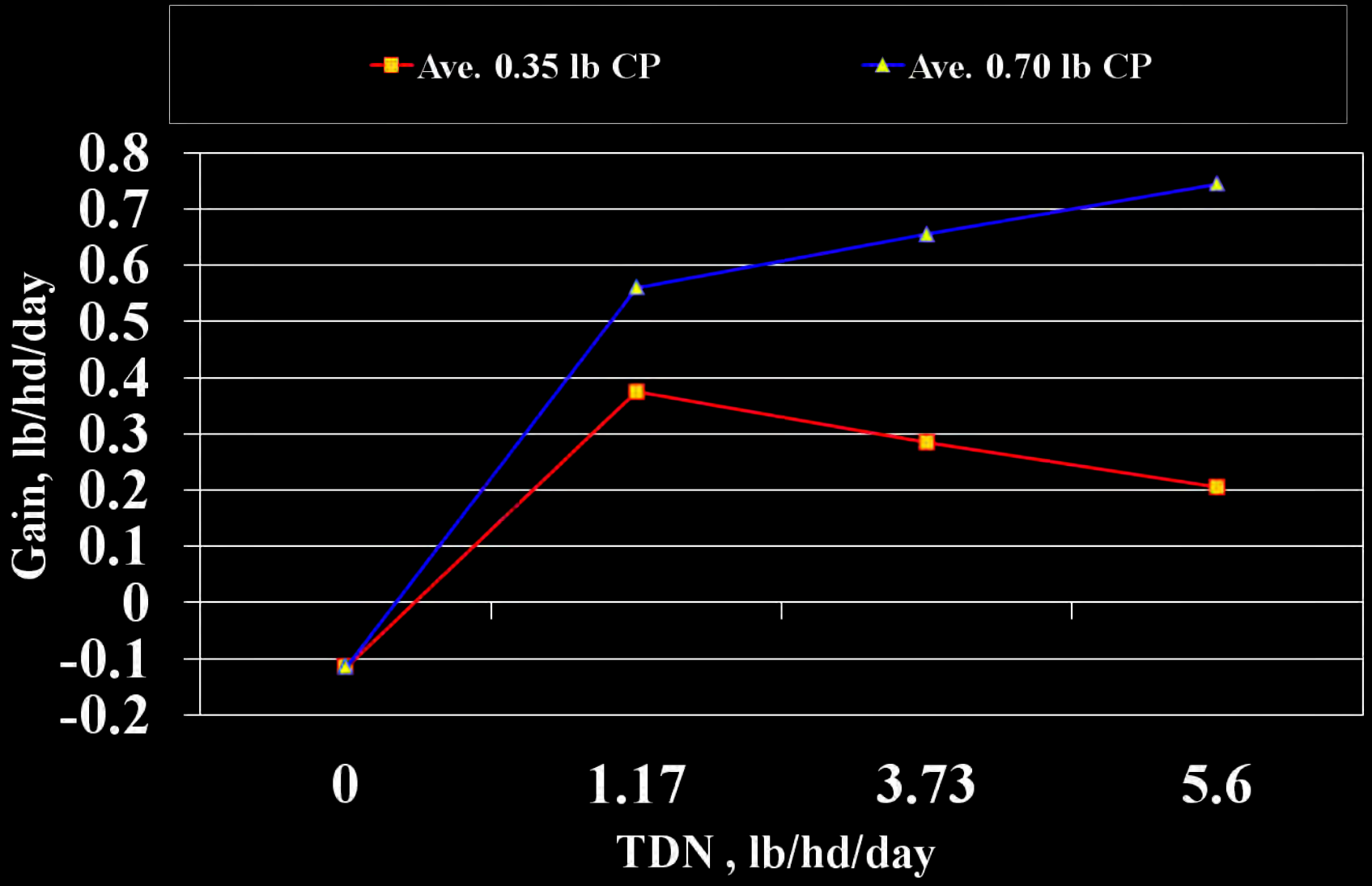


Situation 2

- Problem: Performance is lower than desired
- Forage Availiability: May or may not be limiting intake
- Forage Quality: May or may not be limiting
- Forage Intake: Lower than required to provide nutrient intake to meet production objectives
- Objective: Improve performance by supplying additional nutrients without reducing utilization of standing forage

Improving energy status with supplement (Situation 2)

Yearling steer gain response to combinations of supplemental CP and energy - Ft. Robinson, NE (adapted from Clanton 1982)



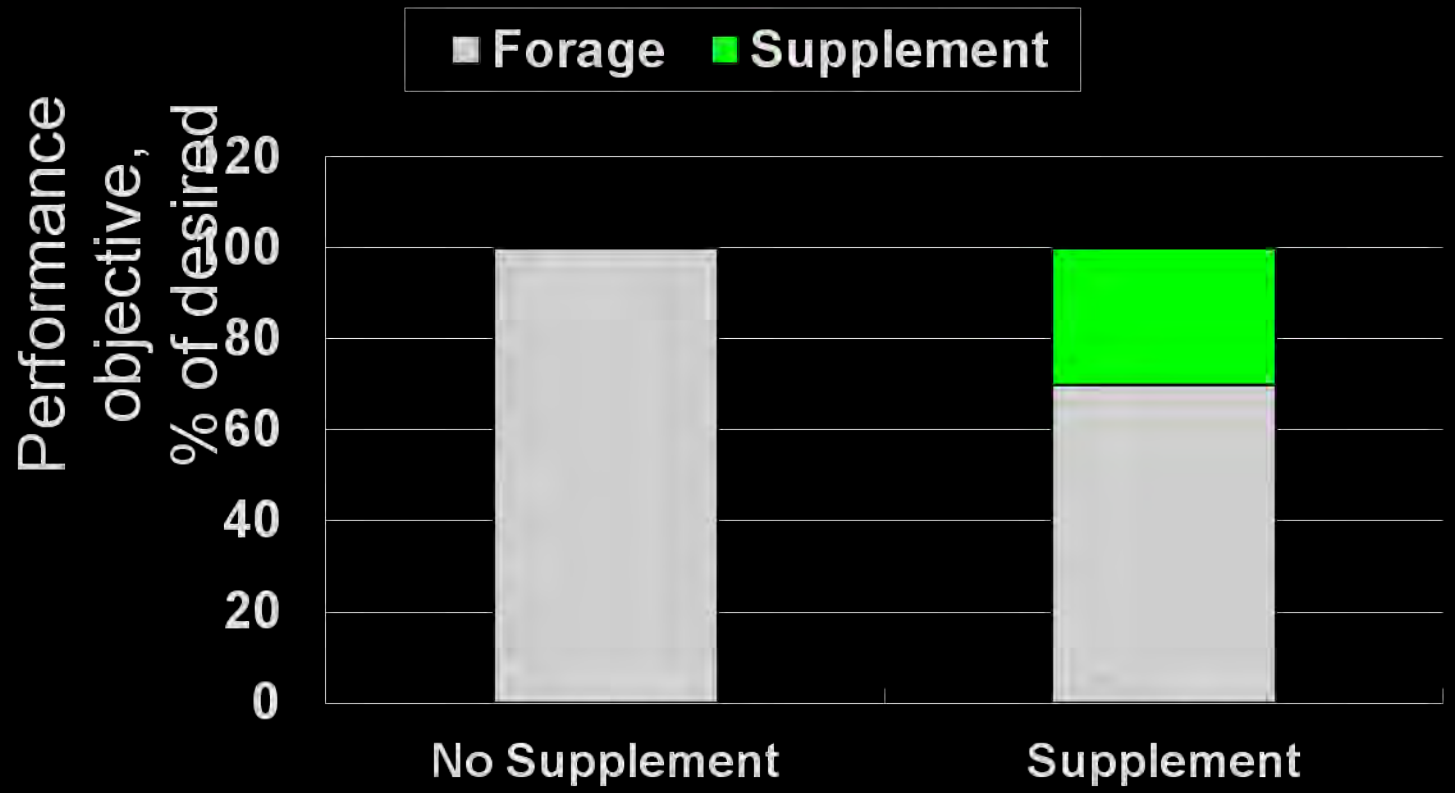
Situation 2 (cont'd)

- Strategy: Feed a supplement to sustain (and possibly stimulate) forage intake but increase total energy intake
- Supplement type: 20-30% crude protein
  Preferably all natural protein
  Preferably 60-65% rumen degradable protein
- Feeding rate: 0.3 to 0.5% body weight/day
- Conversion efficiency: 5 to 10 lbs supplement per pound of added gain in summer or small grains pastures

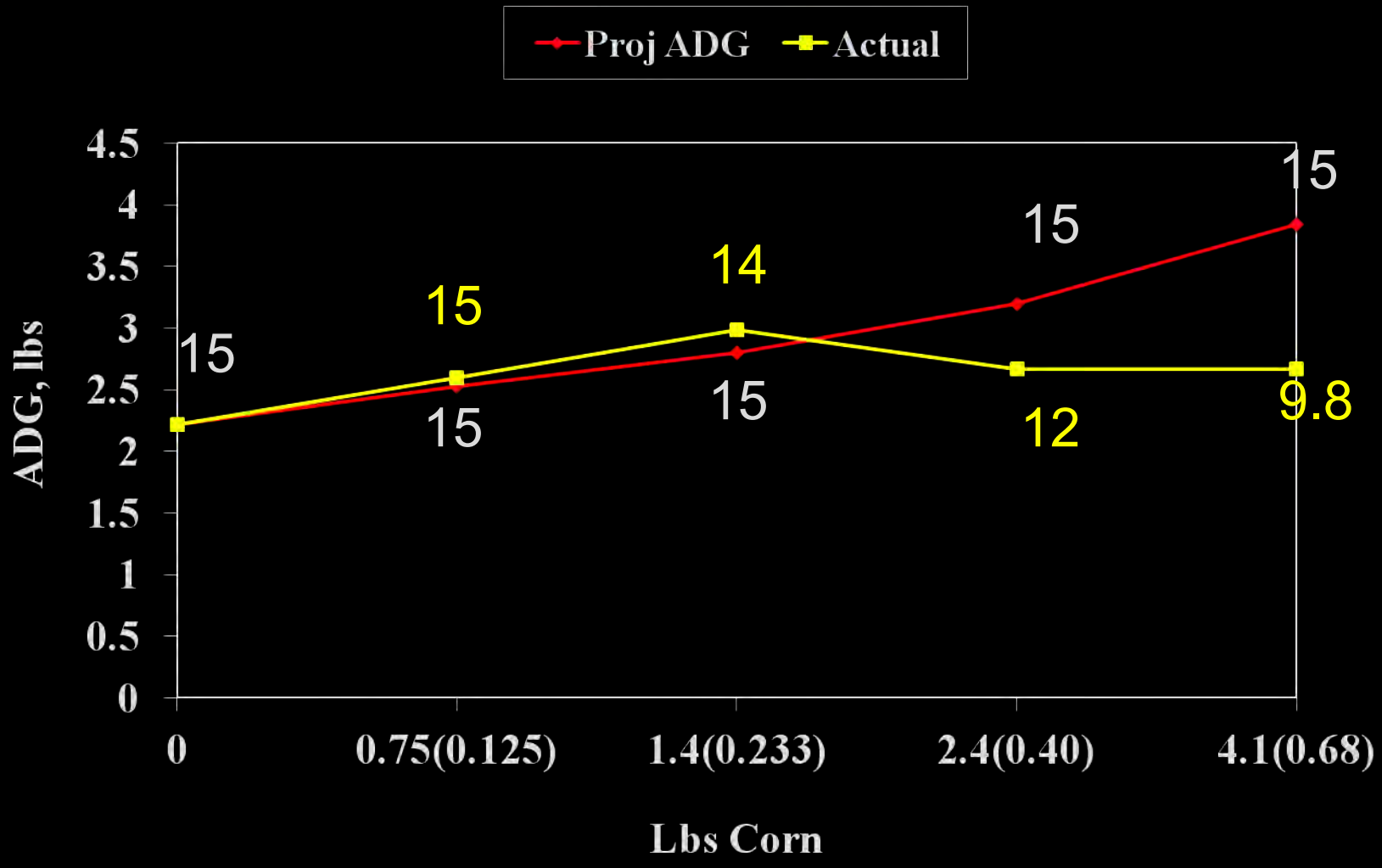
Situation 3

- Problem: Performance is currently meeting production objectives, but anticipate limited forage availability in the future
- Forage Availiability: Currently adequate and not limiting intake
- Forage Quality: May be high or may be low
- Forage Intake: Currently adequate but will be limited in the future
- Objective: Maintain current level of performance but extend forage supply into the future

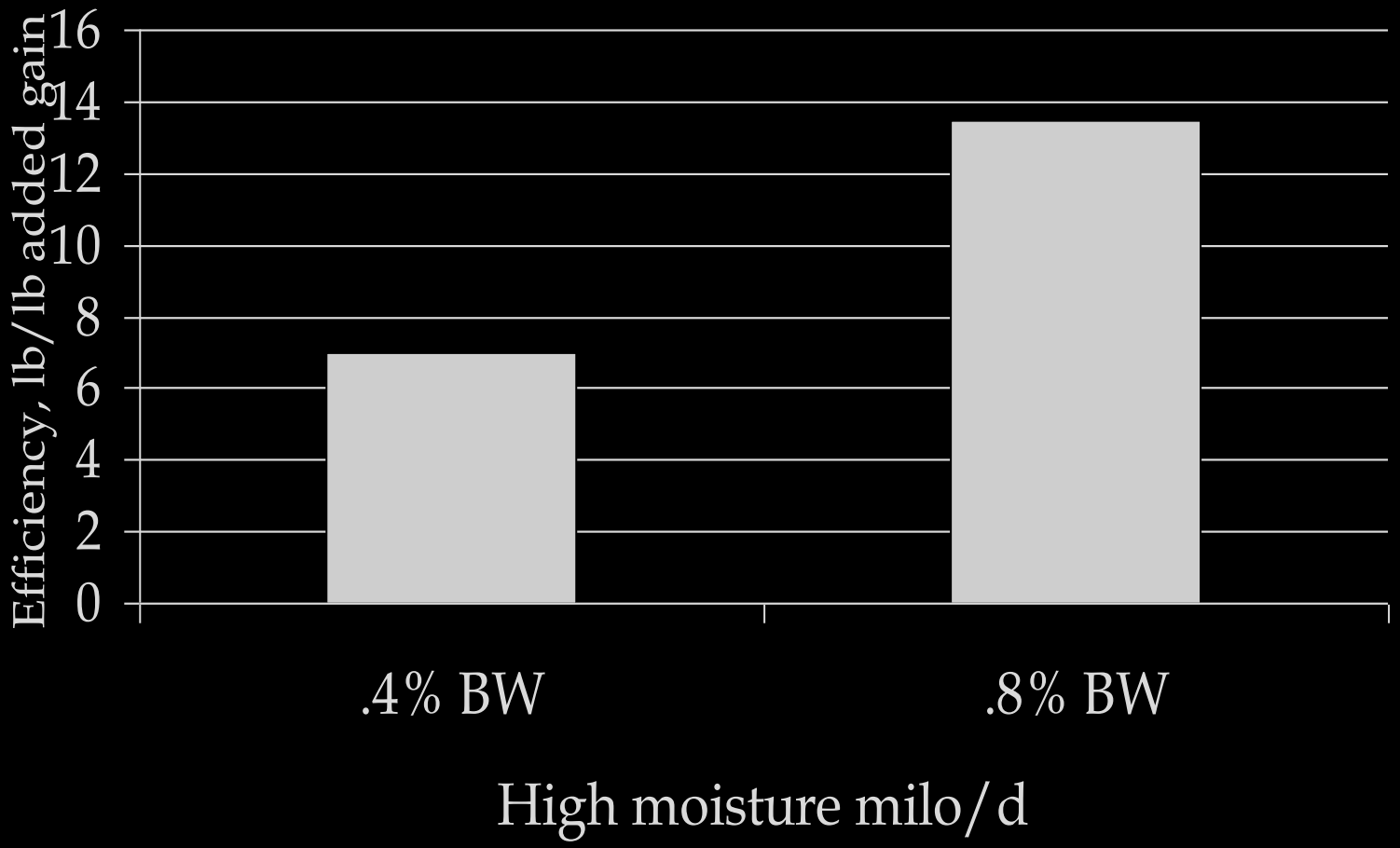
Maintaining energy status and reducing forage intake with supplement (Situation 3)



Estimated forage intake depression to reconcile projected and actual gain. Assumes 15 lbs forage DM intake base, 67% TDN



Efficiency of supplementing milo on rye pasture (Schmidt et al. 1998)



Situation 3 (cont'd)

- Strategy: Feed a supplement that will depress forage intake but maintain total energy intake
- Supplement type: 10-18% crude protein
  Grain and grain by-products
- Feeding rate: 0.7 to 1.0% body weight/day
- Feeding frequency: Daily
- Conversion efficiency: Usually in excess of 10 lbs supplement per pound of added gain
  Higher stocking rates increase efficiency to 5 to 10 lbs supplement per lb added gain/acre

Adverse Conditions ???

Production conditions that may hinder value accumulation (slow cost recovery) and hence reduce profit potential

Managing grazing season, forage composition, forage allocation, and providing supplemental feeds are production risk management tools