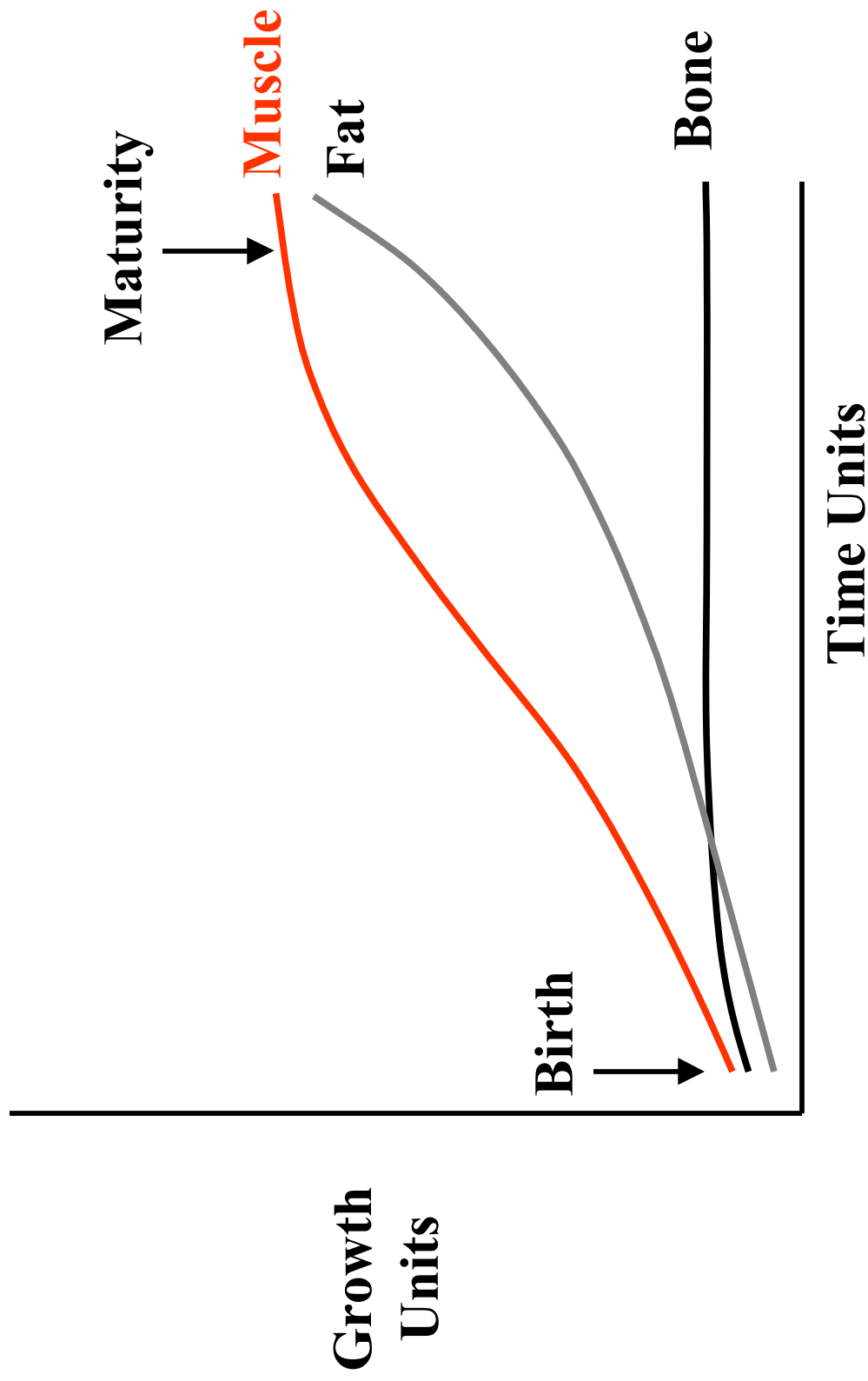


Growth

Growth:

- Growth is an increase in mass
 - Tissues
 - Bone
 - Internal organs
 - Muscle
 - Fat
- True Growth??

Normal Postnatal Growth Curves of Bone, Muscle, and Fat^a



^a Adapted from Boggs, et al, 1998

Bone

Muscle

Fat

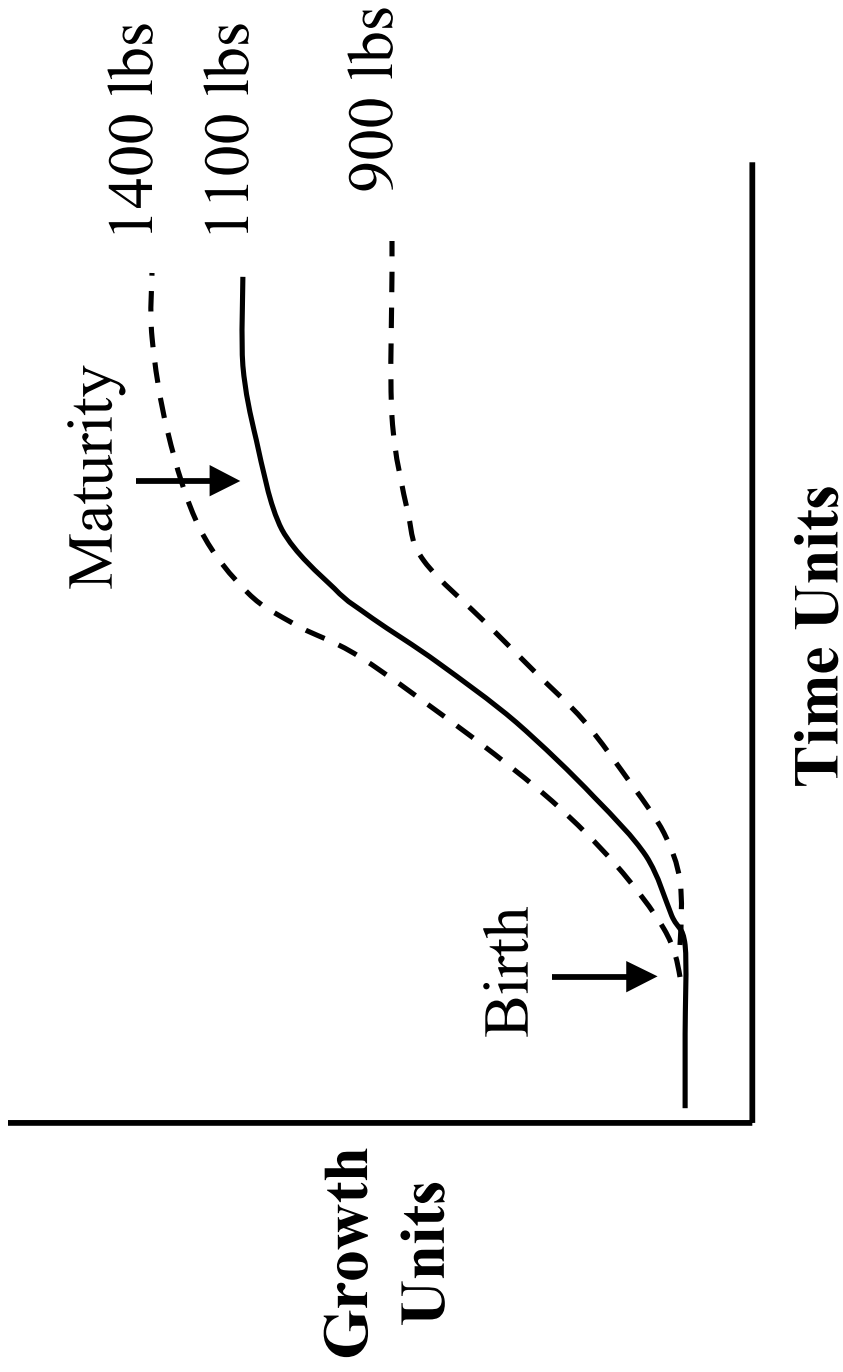
Energy



Growth:

- Growth is an increase in mass
 - Tissues
 - Bone
 - Internal organs
 - Muscle
 - Fat
- True Growth?
 - Everything except Fat

Normal Growth Curve of Cattle^a



^a Adapted from Berg & Butterfield, 1976



Age:

1) Physiological Age

Development of the animal relative to maturity

1) Chronological Age

Actual Age in days

Fat Tissue Depots:

- 1) Subcutaneous Fat ~ Backfat
- 2) Internal Fat ~ KPH
- 3) Intermuscular Fat ~ Seam fat
- 4) Intramuscular Fat ~ Marbling

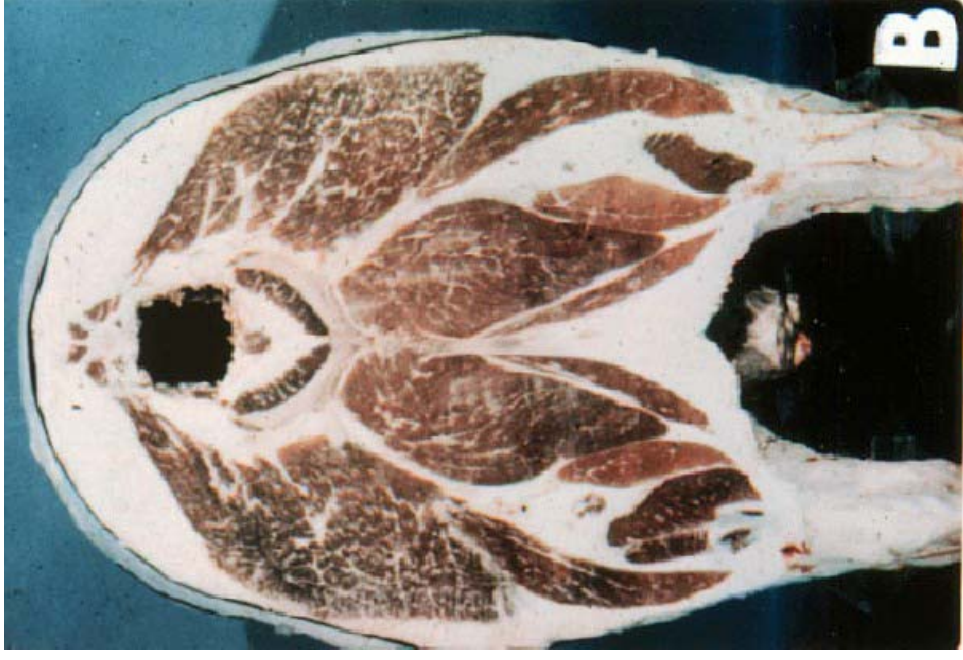
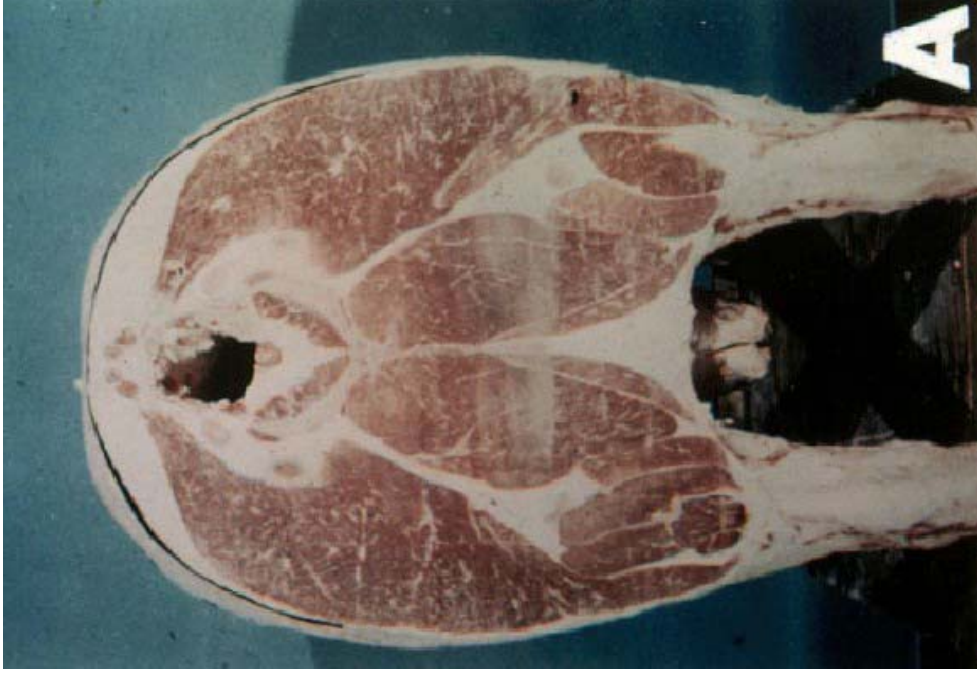
Fat Tissue Depots:

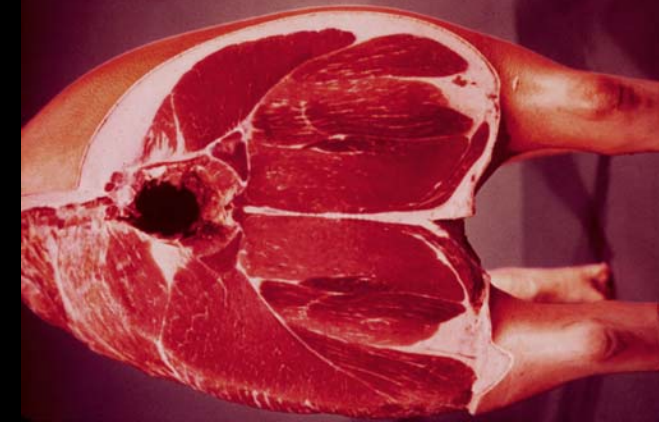
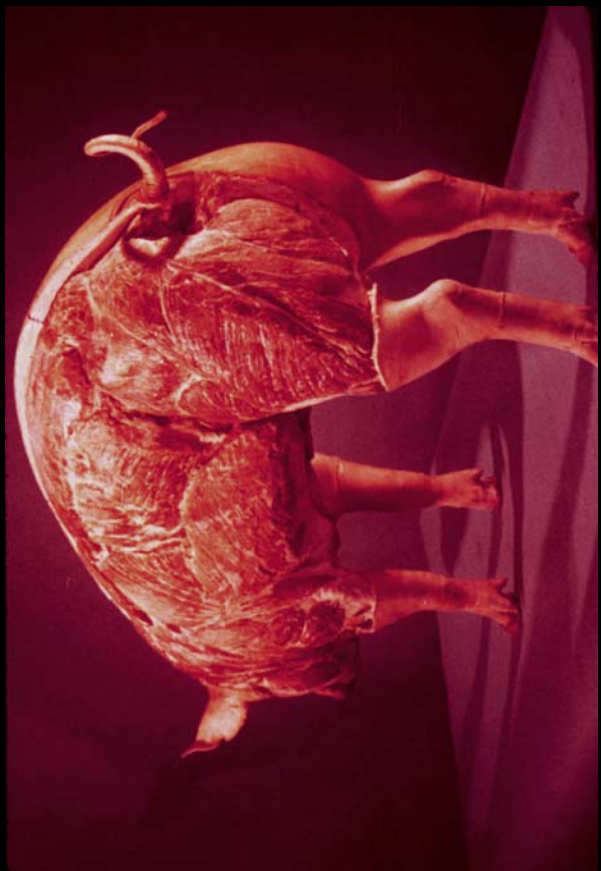
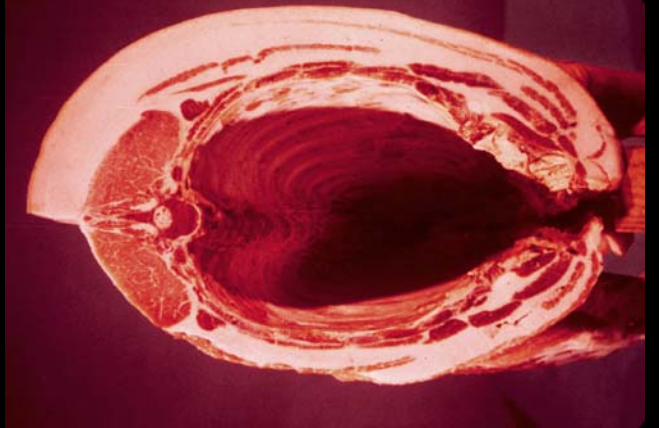
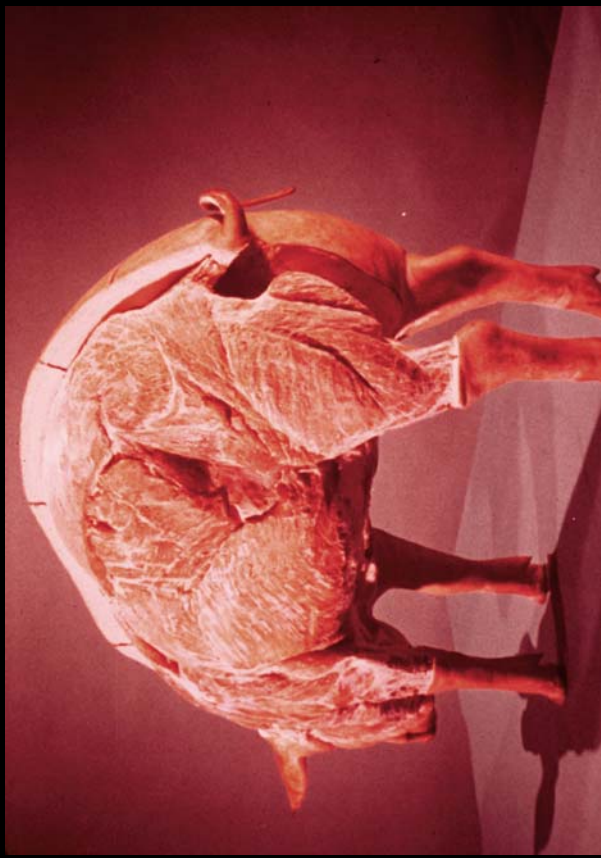
- 1) Subcutaneous Fat ~ Backfat
“Biggest indicator of Lean to Fat”
- 2) Internal Fat ~ KPH
- 3) Intermuscular Fat ~ Seam fat
- 4) Intramuscular Fat ~ Marbling
Sheep ~

Visual Indicators of Finish

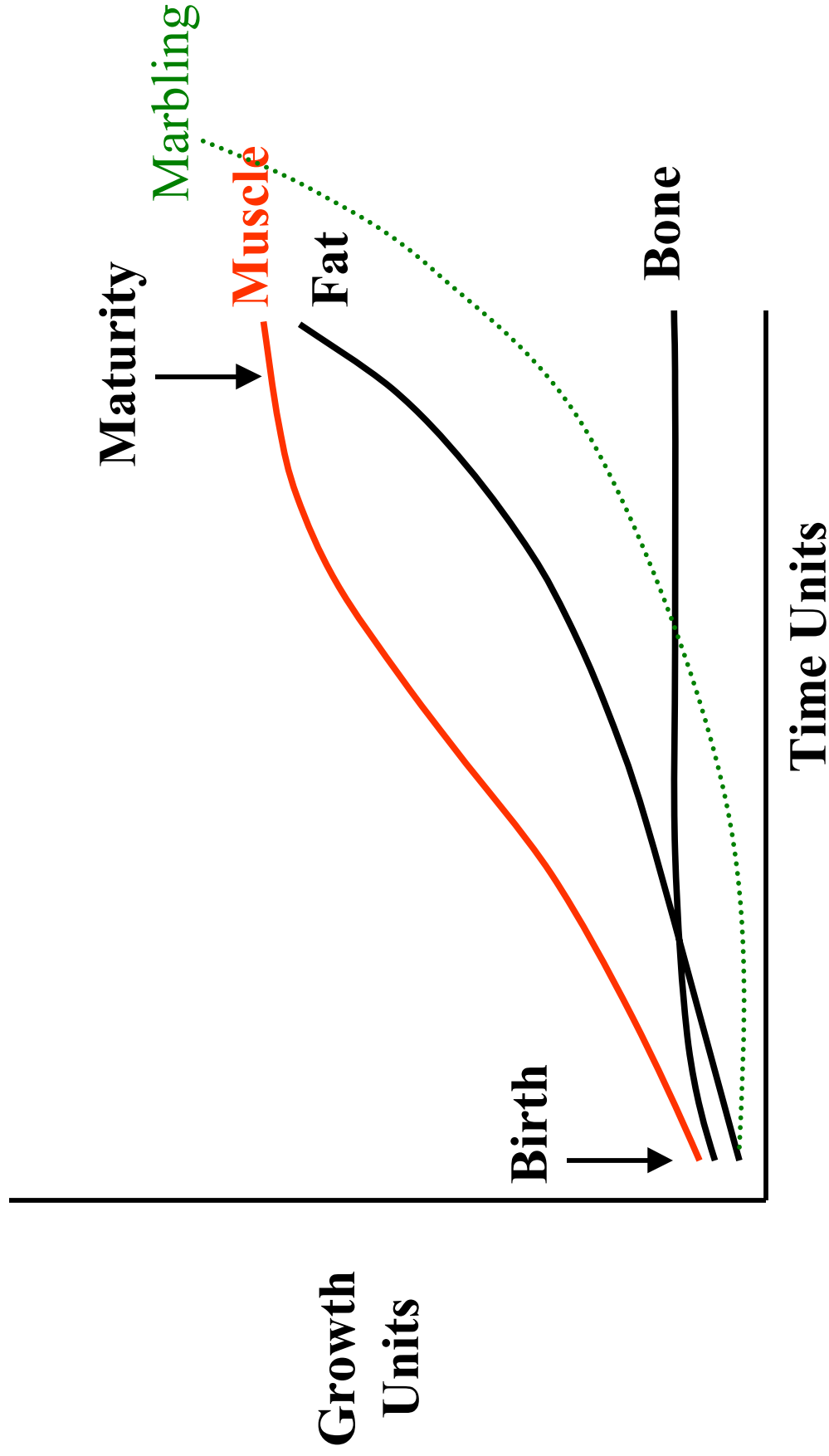


Visual Indicators of Finish



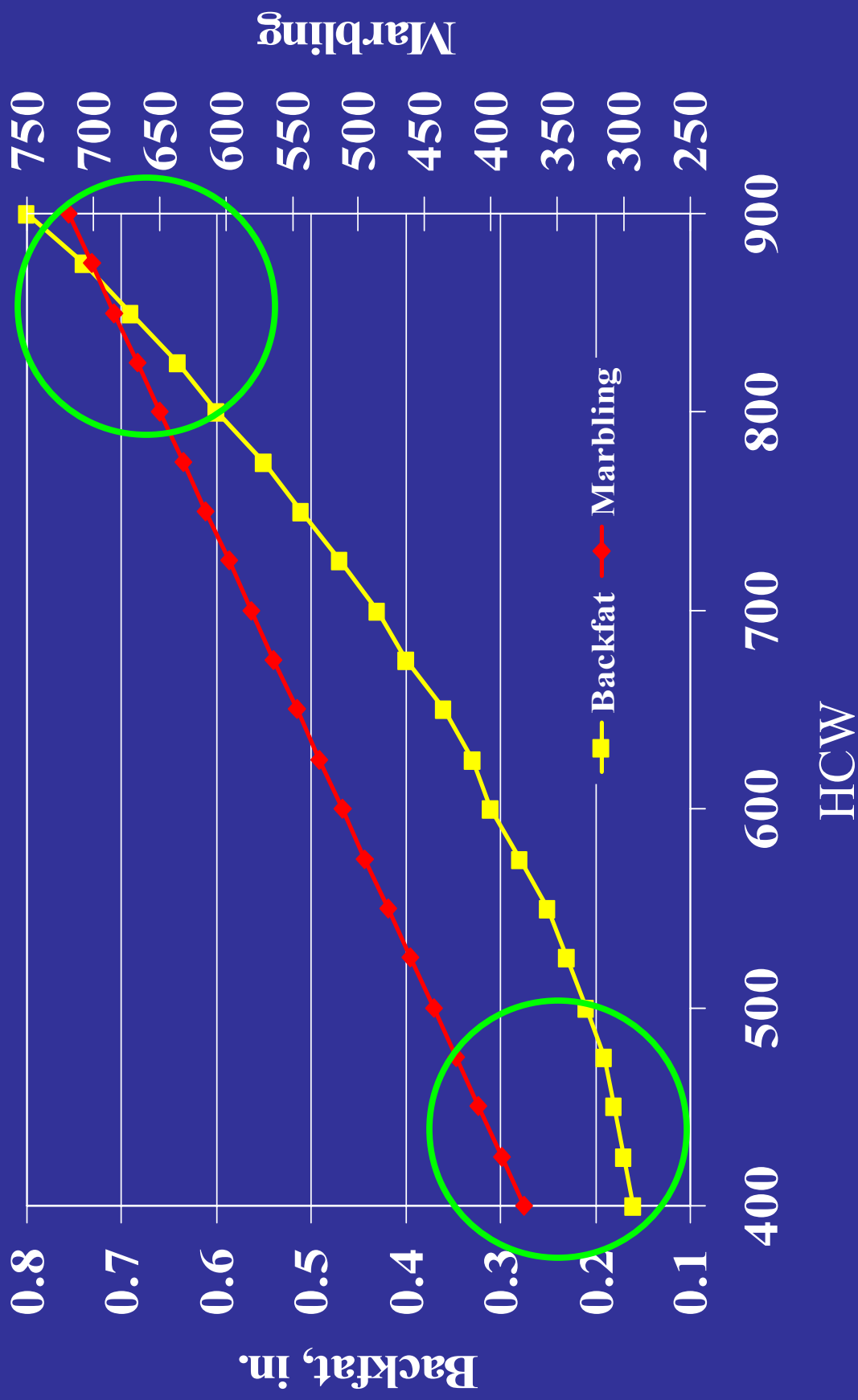


Normal Postnatal Growth Curves of Bone, Muscle, and Fat^a



^a Adapted from Boggs, et al, 1998

Backfat and Marbling Regressed Against Hot Carcass Weight



Types of Growth:

1) Hyperplasia

Increase in cell number

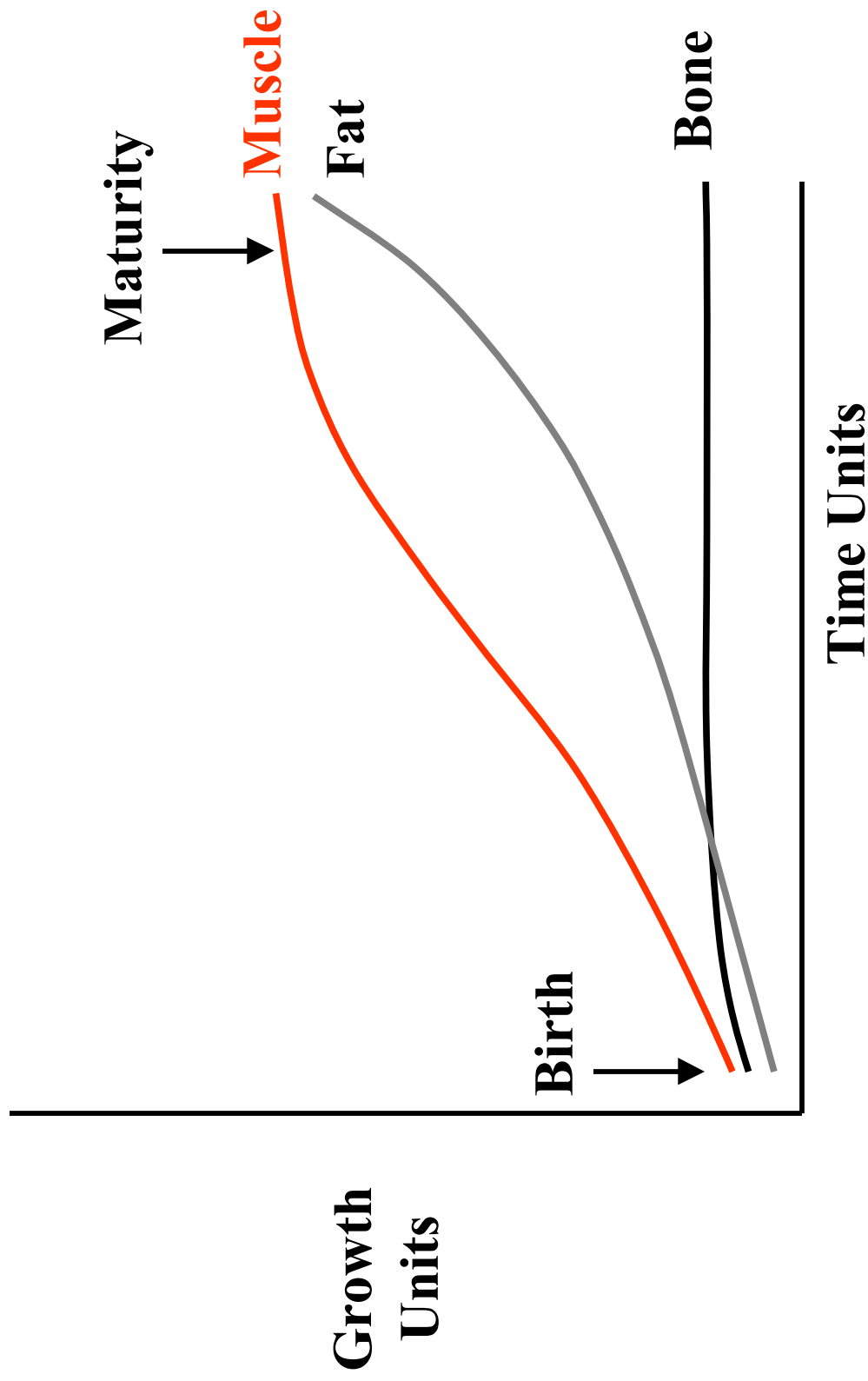
Occurs during Prenatal growth

Research indicates that cell number is set

2) Hypertrophy

Increase in cell size after birth

Normal Postnatal Growth Curves of Bone, Muscle, and Fat^a



^a Adapted from Boggs, et al, 1998

Benefits to altering growth:

- 1) Increase in the amount of product to sell
- 2) Change composition of saleable product

Methods to alter growth:

1) Natural

2) Administered

Methods to alter growth:

1) Natural

A) Breed Selection / Genetics

Methods to alter growth:

1) Natural

A) Genetics

British vs European/Continental Breeds

British ~ “Maternal”

Continental ~ “Growth and Carcass” “Terminal”

Methods to alter growth:

1) Natural

A) Genetics

British vs European/Continental Breeds

British ~

“Maternal”

Earlier rate of maturity

Less muscle more muscle

Continental ~

“Growth and Carcass” “Terminal”

Later rate of maturity

More muscle less fat

Methods to alter growth:

1) Natural

A) Genetics

British vs European/Continental Breeds

British ~

“Maternal”

Earlier rate of maturity

Less muscle more muscle



**F1 Progeny
Heterosis**

Continental ~

“Growth and Carcass” “Terminal”

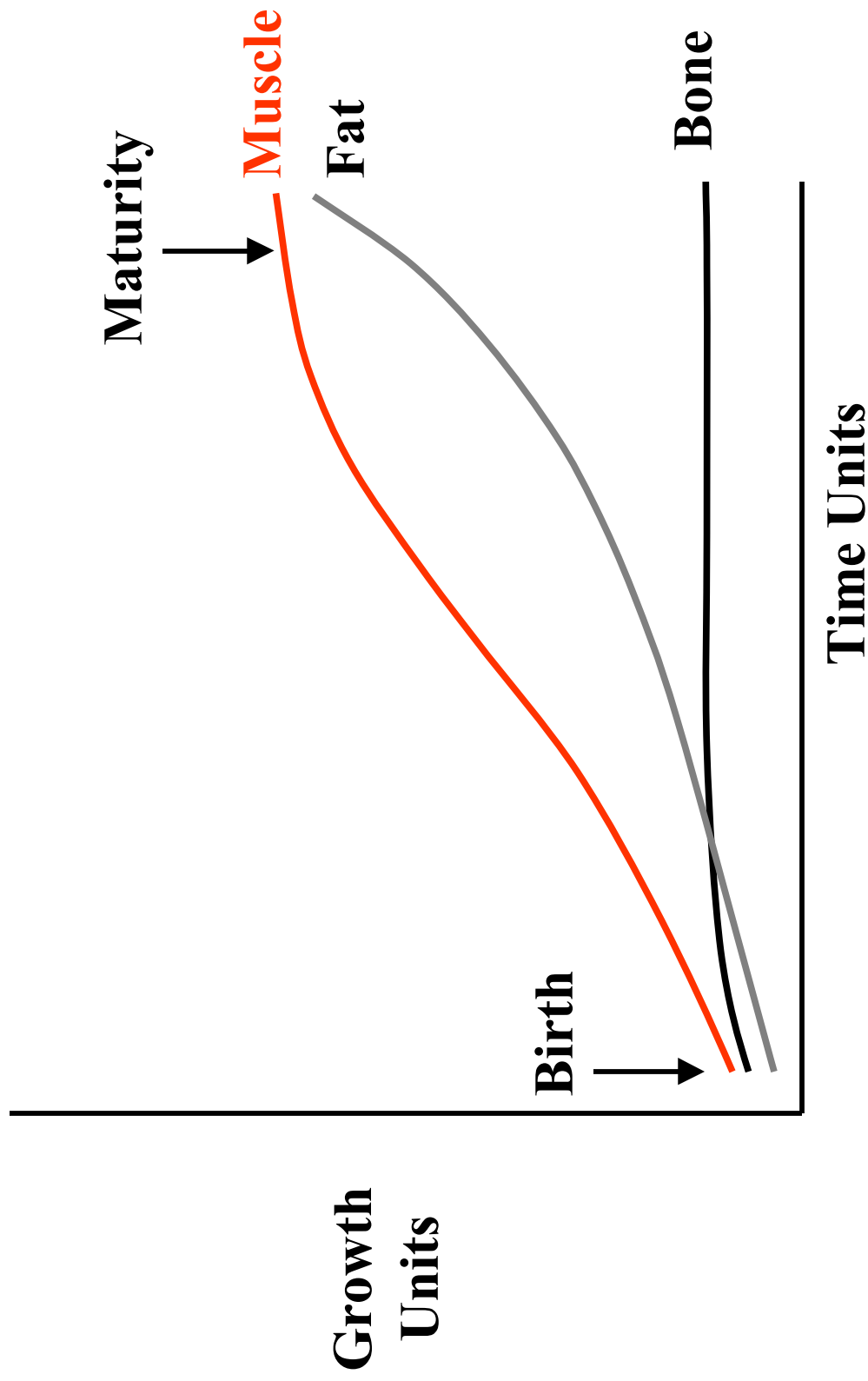
Later rate of maturity

More muscle less fat

Factors Affecting Growth:

- 1) Natural
 - B) Grass Cattle ~ growing them
 - Compensatory Growth

Normal Postnatal Growth Curves of Bone, Muscle, and Fat^a



^a Adapted from Boggs, et al, 1998

Bone

Muscle

Fat

Energy



Methods to alter growth:

2) Administered ~ Growth Promoting Agents

A) Implants

- Made of naturally occurring hormones
 - Estrogen, Progesterone
- Synthetics Trenbolone Acetate (TBA)

Methods to alter growth:

2) Administered ~ Growth Promoting Agents

A) Implants

B) Beta Agonists

What Implants do:

- 1) Improved Feed Efficiency
- 2) Increased Average Daily Gain
- 3) Increased Dry Matter Intake
- 4) Increase in Body Mass

Bone

Muscle

Fat

Small framed

Energy



ADG

Bone

Muscle

Fat

Small frame

Energy →

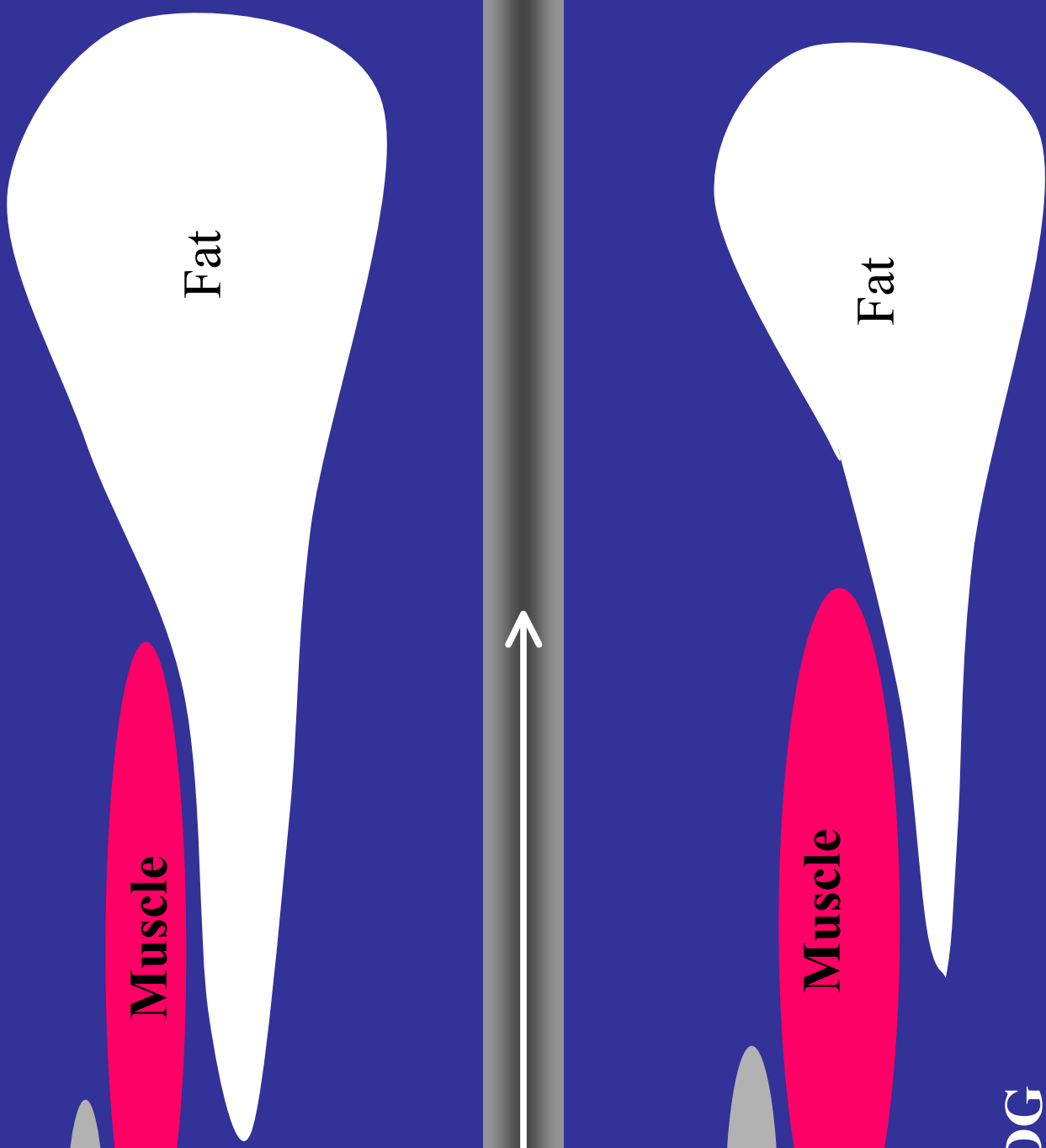
Bone

Muscle

Fat

Large frame
or
Implanted

ADG



ADG 1.5

Bone

Muscle

Fat

Small frame

Energy



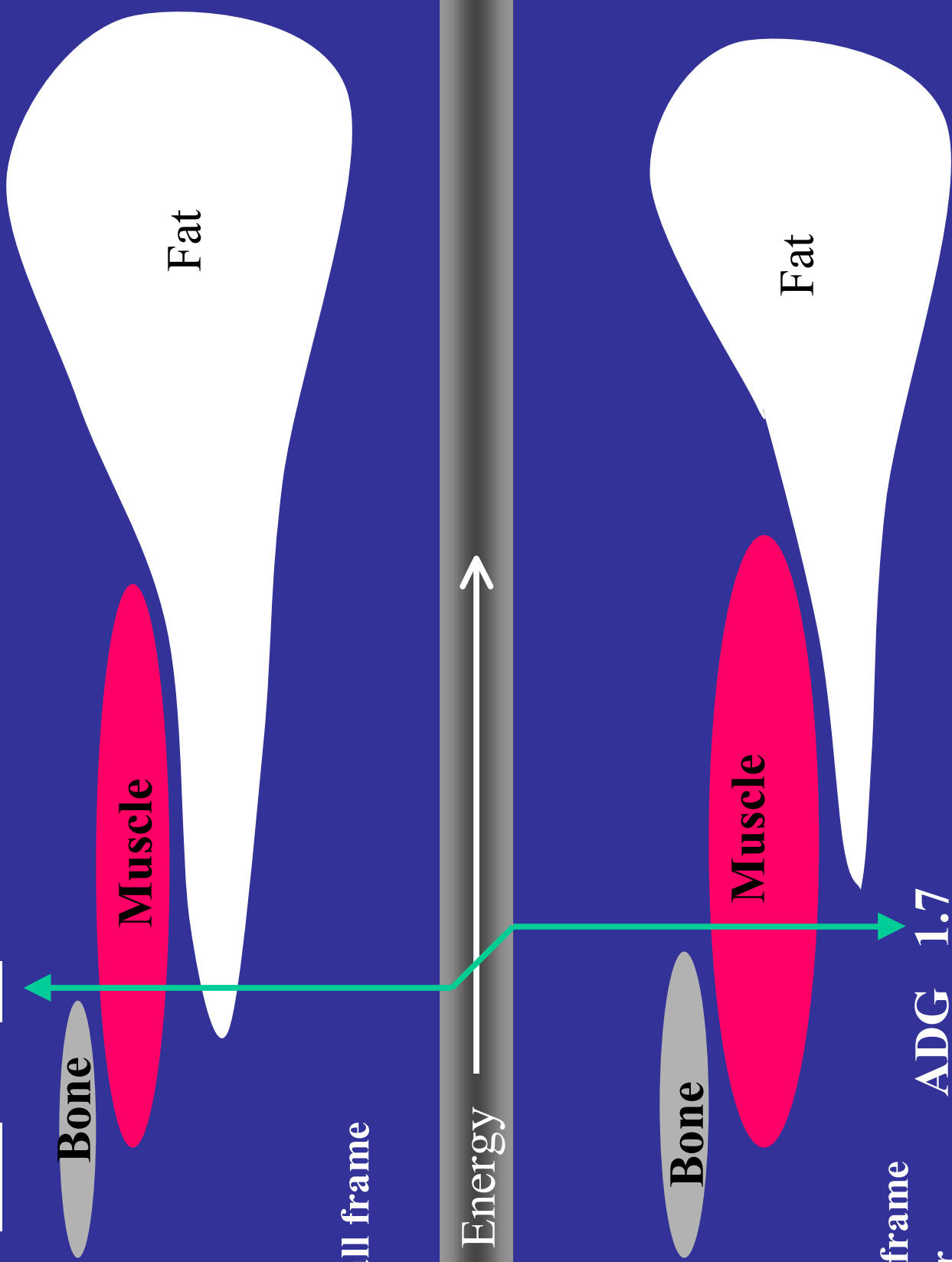
Bone

Muscle

Fat

Large frame
or
Implanted

ADG 1.7



ADG 1.5

2.5

Bone

Muscle

Fat

Small frame

Energy



Bone

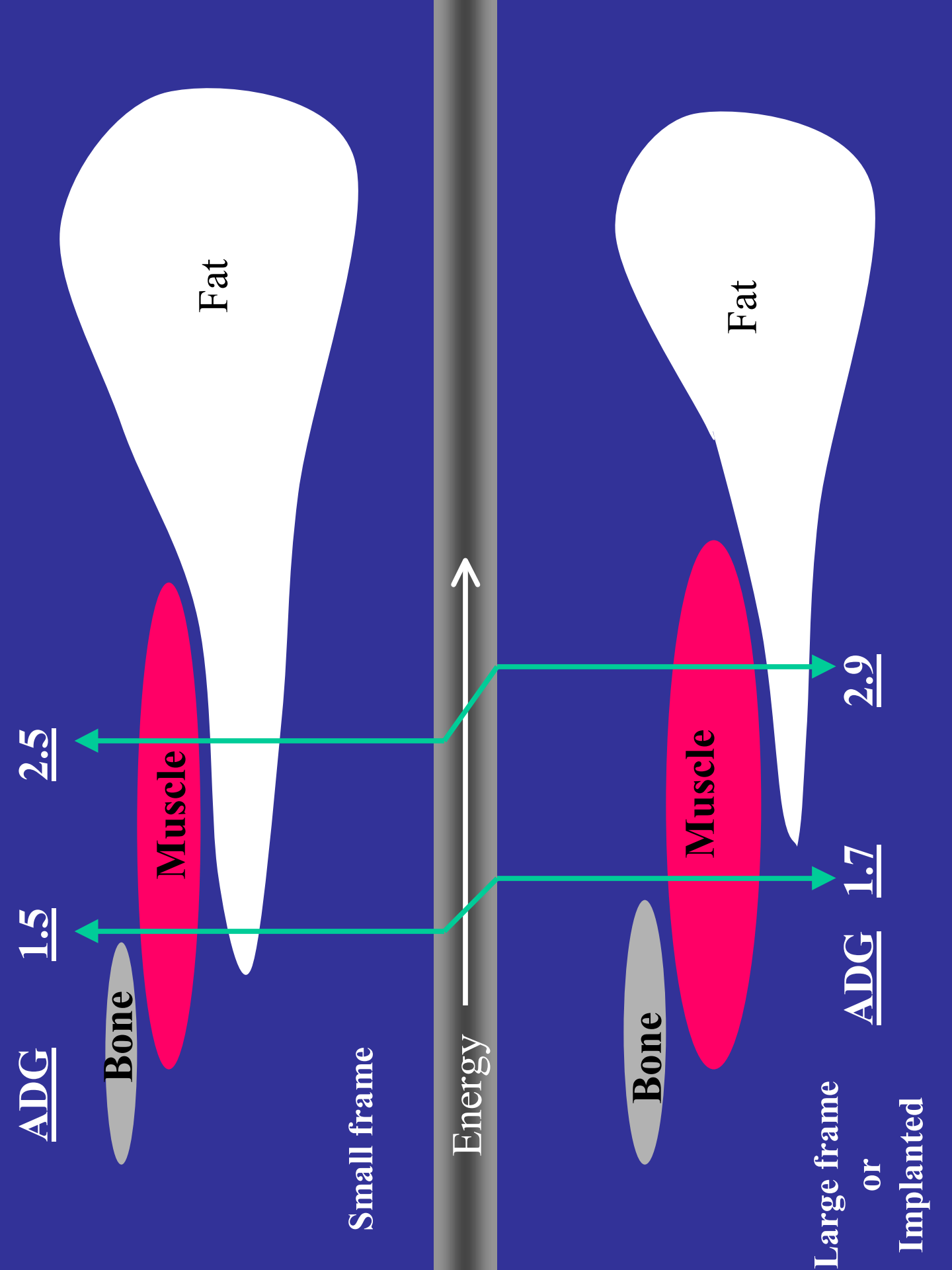
Muscle

Fat

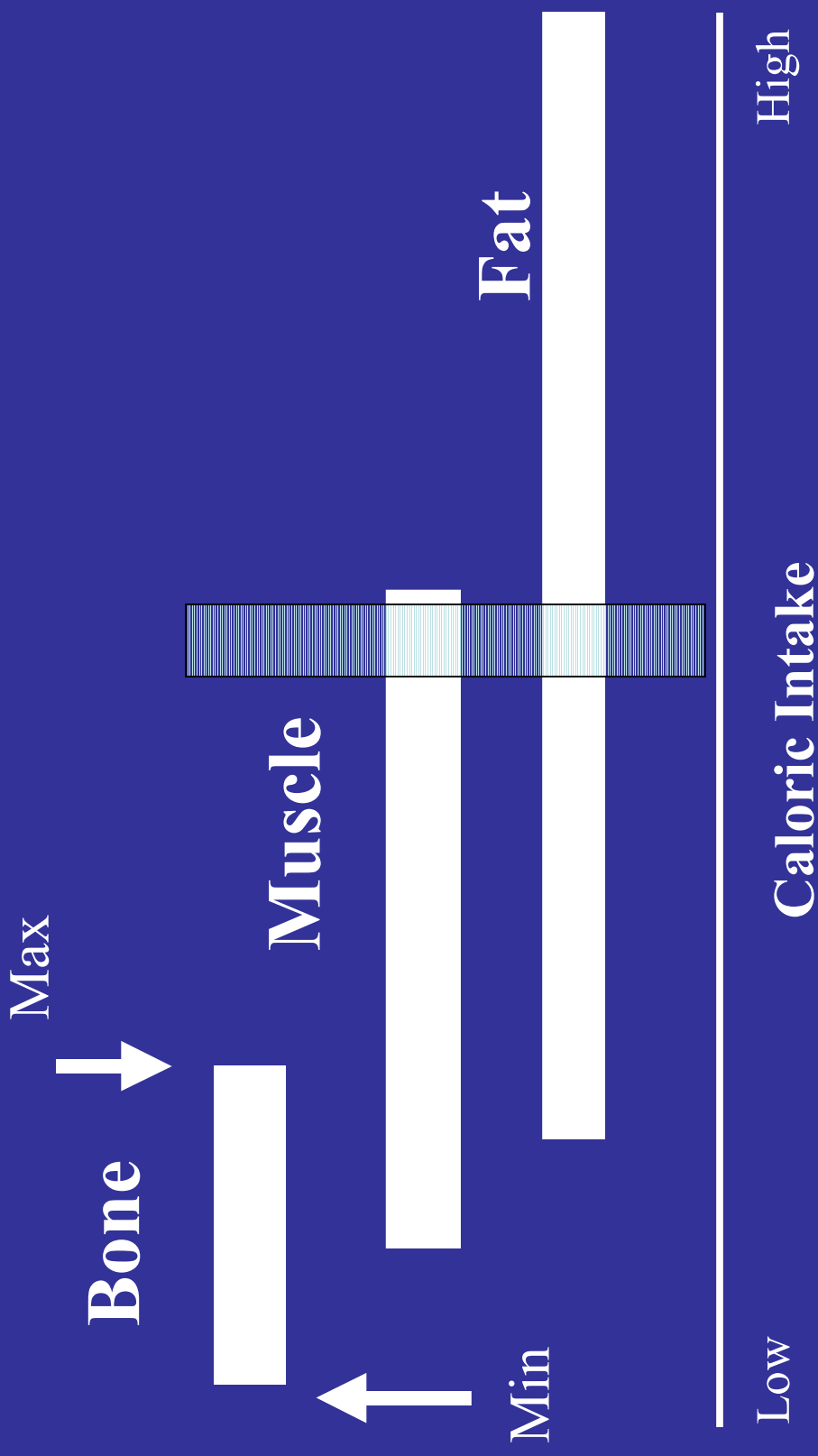
Large frame
or
Implanted

ADG 1.7

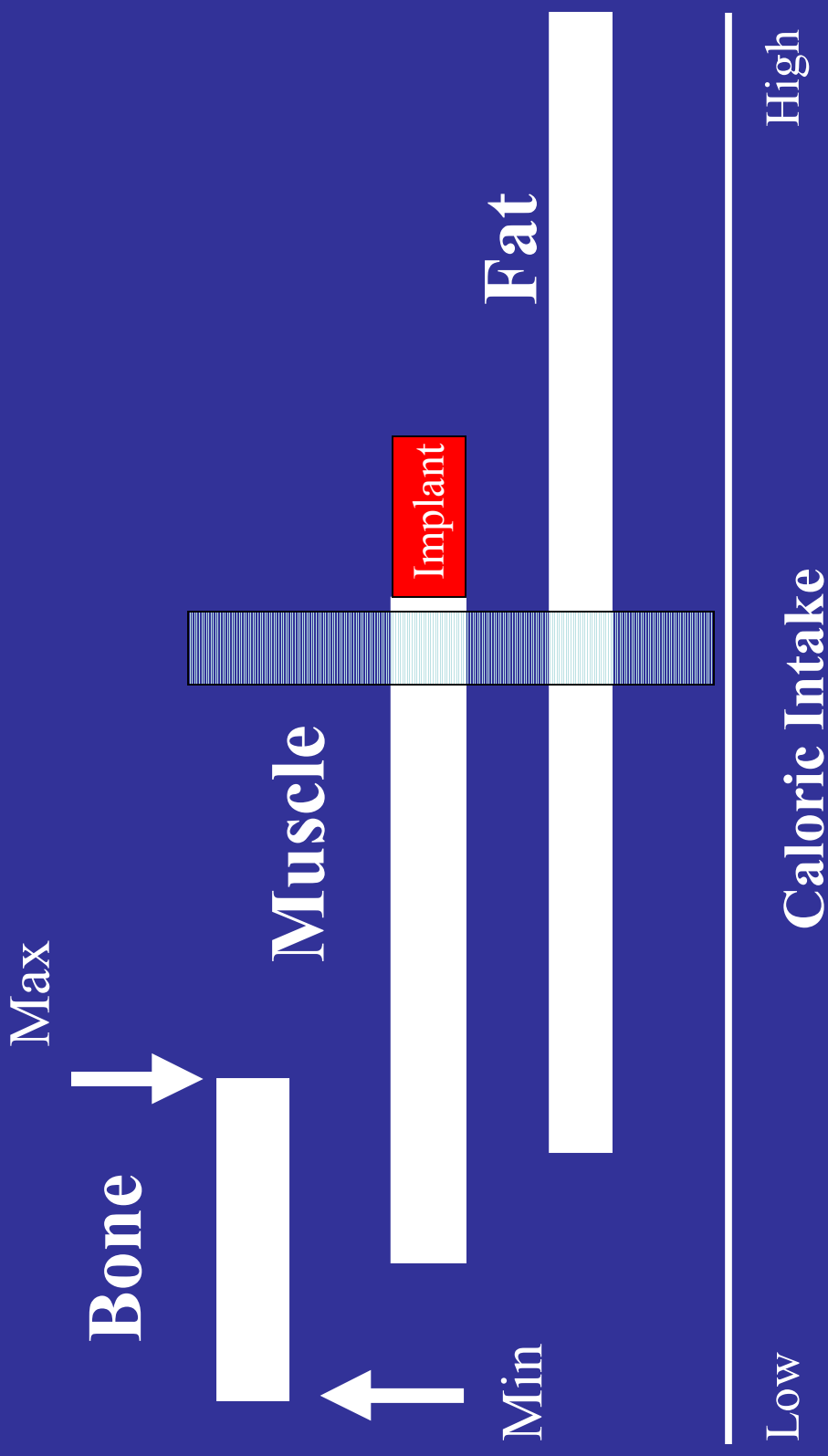
2.9



What Does An Implant Do?



What Does An Implant Do?



Implant Experiment

- 182 Angus and Limousin-Angus steers
 - 680 lbs
- Randomly allocated to three treatments
 - Control – non-implanted (NI)
 - Implant at 680 lb (EI) - d, 0 revalor - S
 - Implant at 850 lb (DI) - d, 57 revalor - S
- All steers were fed a 90% concentrate diet.

Performance Data

0 – 56d

	NI	EI	DI	SEM
Initial BW	679	681	681	2.2
BW	884 ^a	915 ^b	884 ^a	4.7
ADG	3.7 ^a	4.2 ^b	3.8 ^a	.09
DMI	16.3	16.3	16.3	.03
G/F	.23 ^a	.26 ^b	.23 ^a	.005

a,b (P<.05)

Performance Data Cumulative (140 d)

	NI	EI	DI	SEM
Final BW	1188 ^a	1213 ^b	1215 ^b	8.6
ADG	3.6 ^a	3.8 ^{ab}	3.8 ^b	.06
DMI	21.3	20.9	20.8	.15
G/F	.18 ^a	.19 ^b	.19 ^b	.003

a,b (P<.05)

Carcass Characteristics Final Harvest (n = 159)

	NI	EI	DI	SEM
HCW, lb.	<u>752^a</u>	<u>776^b</u>	<u>780^b</u>	8.4
Dressing %	<u>60.9^a</u>	<u>61.6^b</u>	<u>61.7^b</u>	.22
REA, in ² .	<u>11.9^a</u>	<u>12.5^b</u>	<u>12.8^b</u>	.15
Ribfat, in	.53	.51	.49	.02
KPH, %	2.2	2.2	2.1	.10
Yield Grade	3.3 ^a	3.2 ^{ab}	3.0 ^b	.08

a,b (P<.05)

*maturity, A⁰= 100

+ marbling score, small⁰ = 500

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Yield Grade	3.3 ^a	3.2 ^{ab}	3.0 ^b	.08
Maturity*	151 ^a	161 ^b	156 ^b	1.8
Marbling ⁺	<u>565^a</u>	520^b	<u>536^{ab}</u>	11.3
IMF, %	<u>5.0^a</u>	4.1^b	<u>4.9^a</u>	.3

^{a,b} (P<.05)

*maturity, A⁰= 100

⁺ marbling score, small⁰ = 500

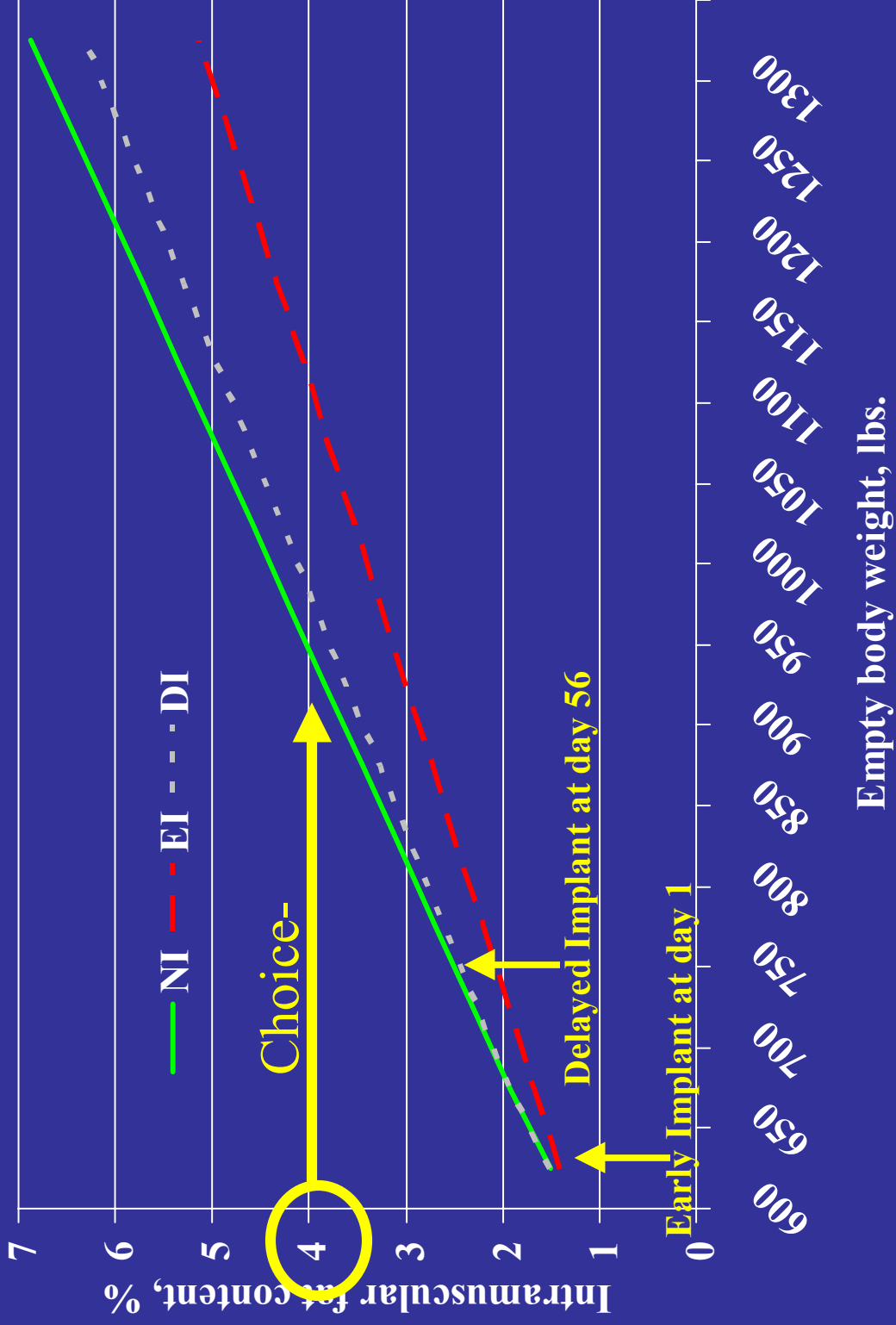
Quality Grade Distribution^a

	NI	EI	DI
		%	
Premium Choice*	24	8^a	23
Low Choice	45	53	40
Select	31	37	37
Standard	0	2	0

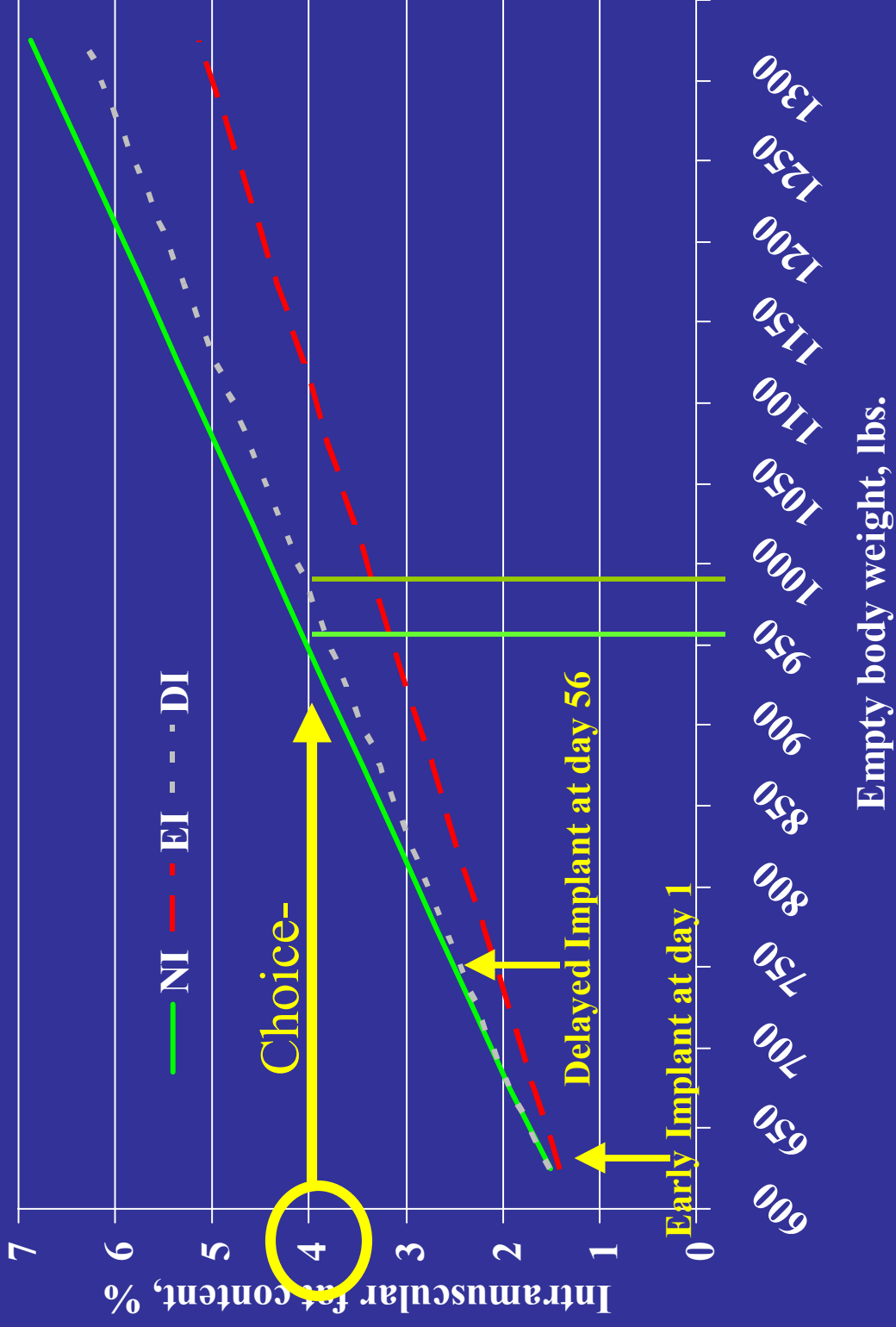
^a(P<.10) Chi square

*Modest⁰ & higher

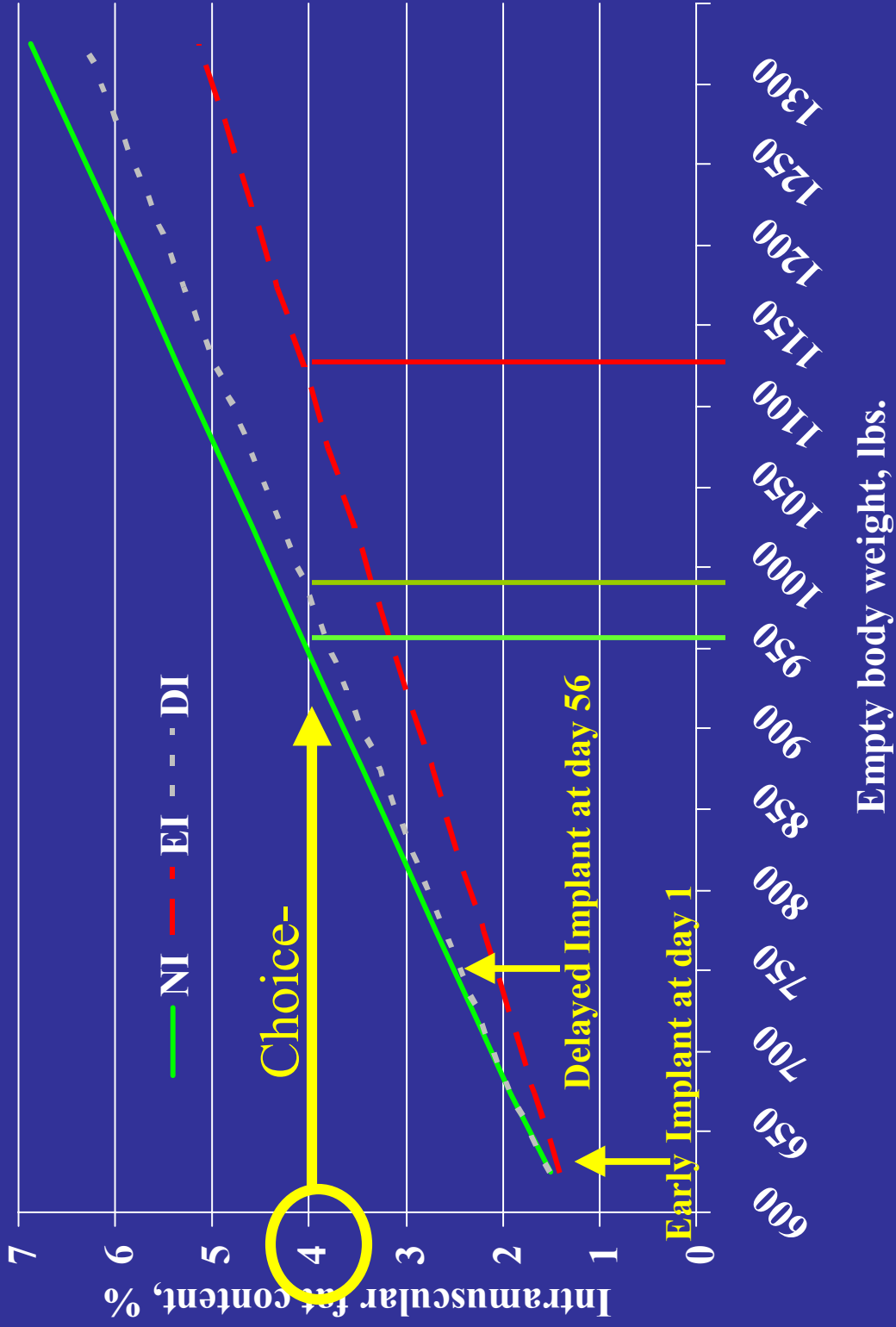
% 12th rib Lipid content x Empty Body Wt.



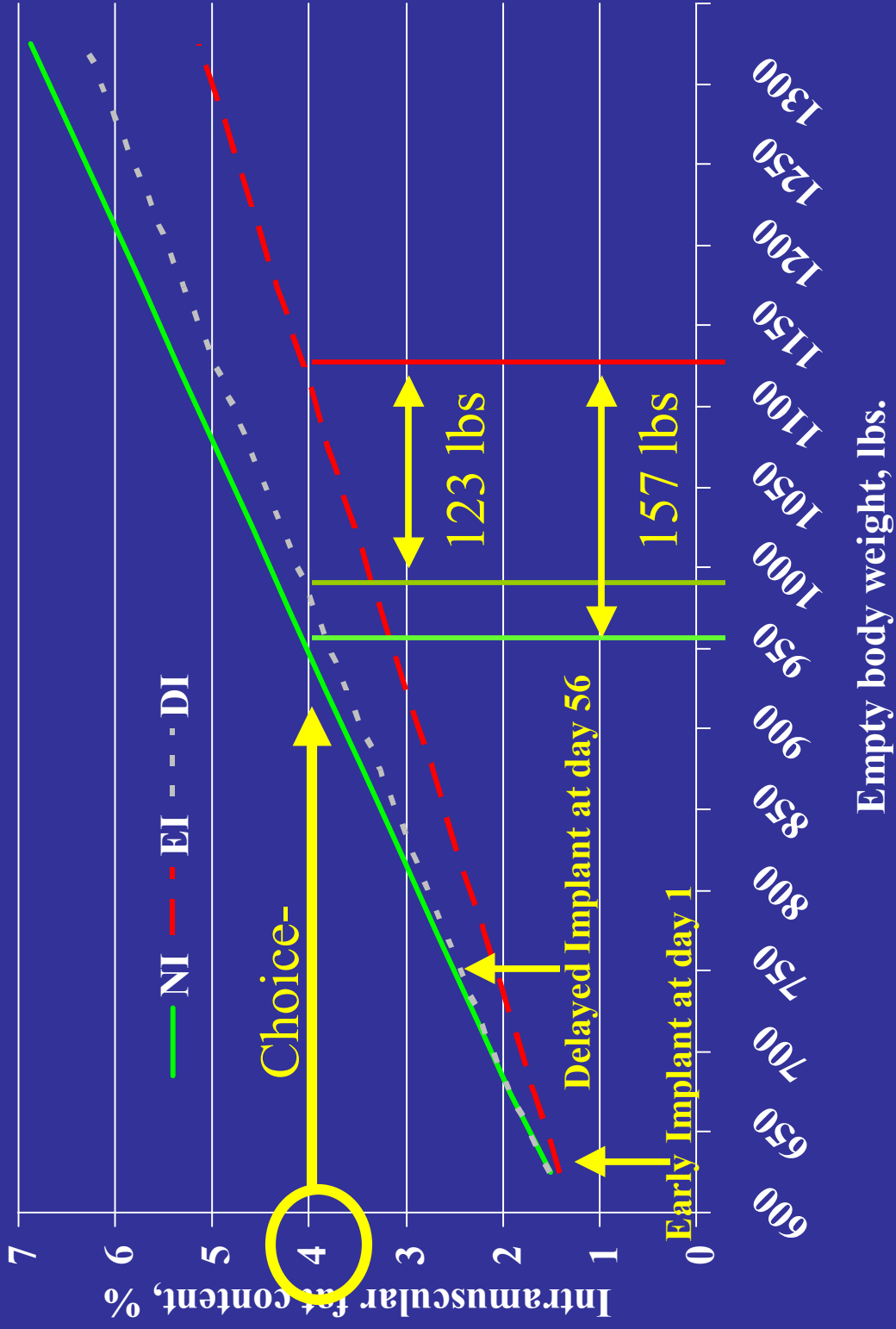
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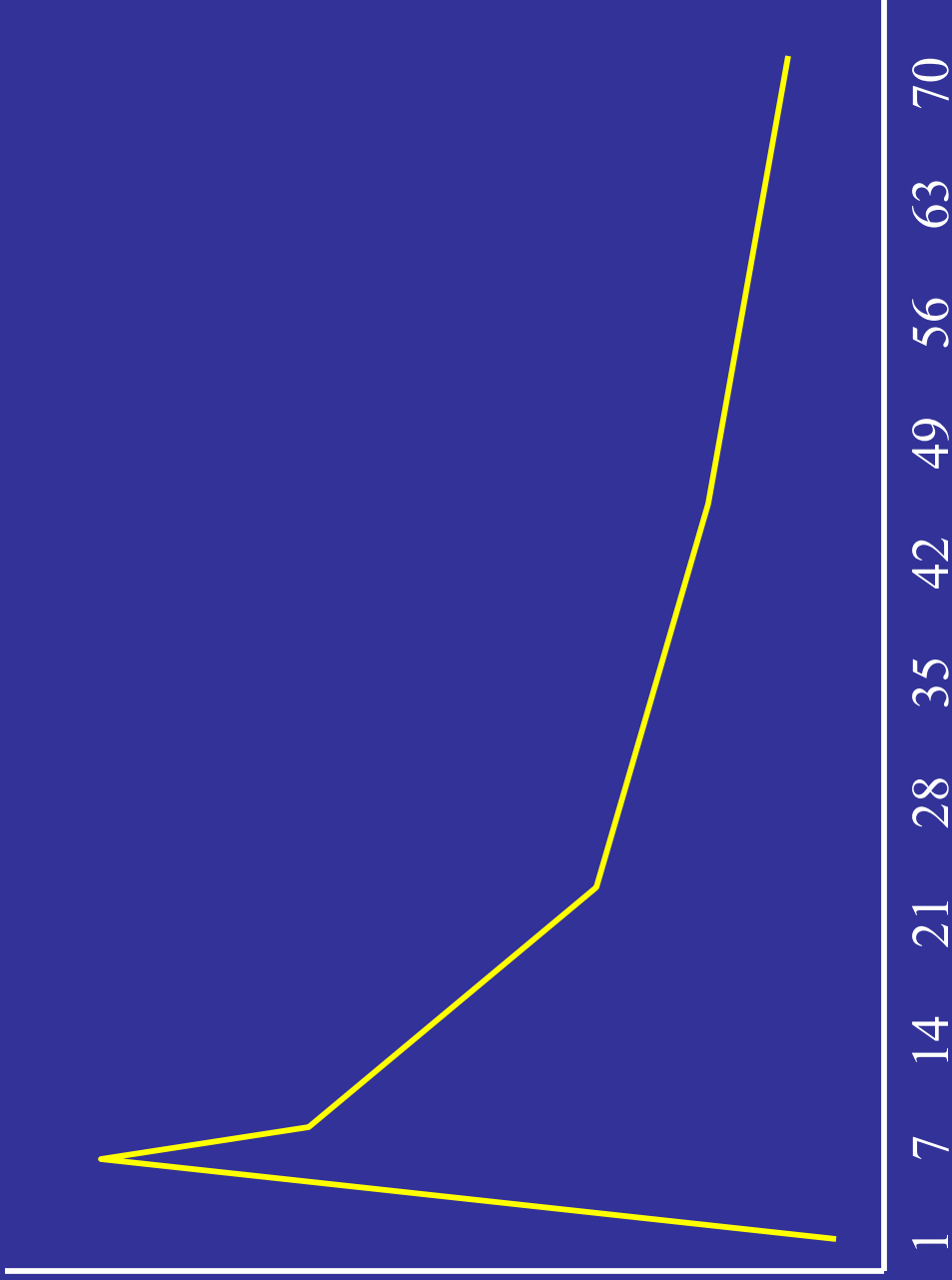
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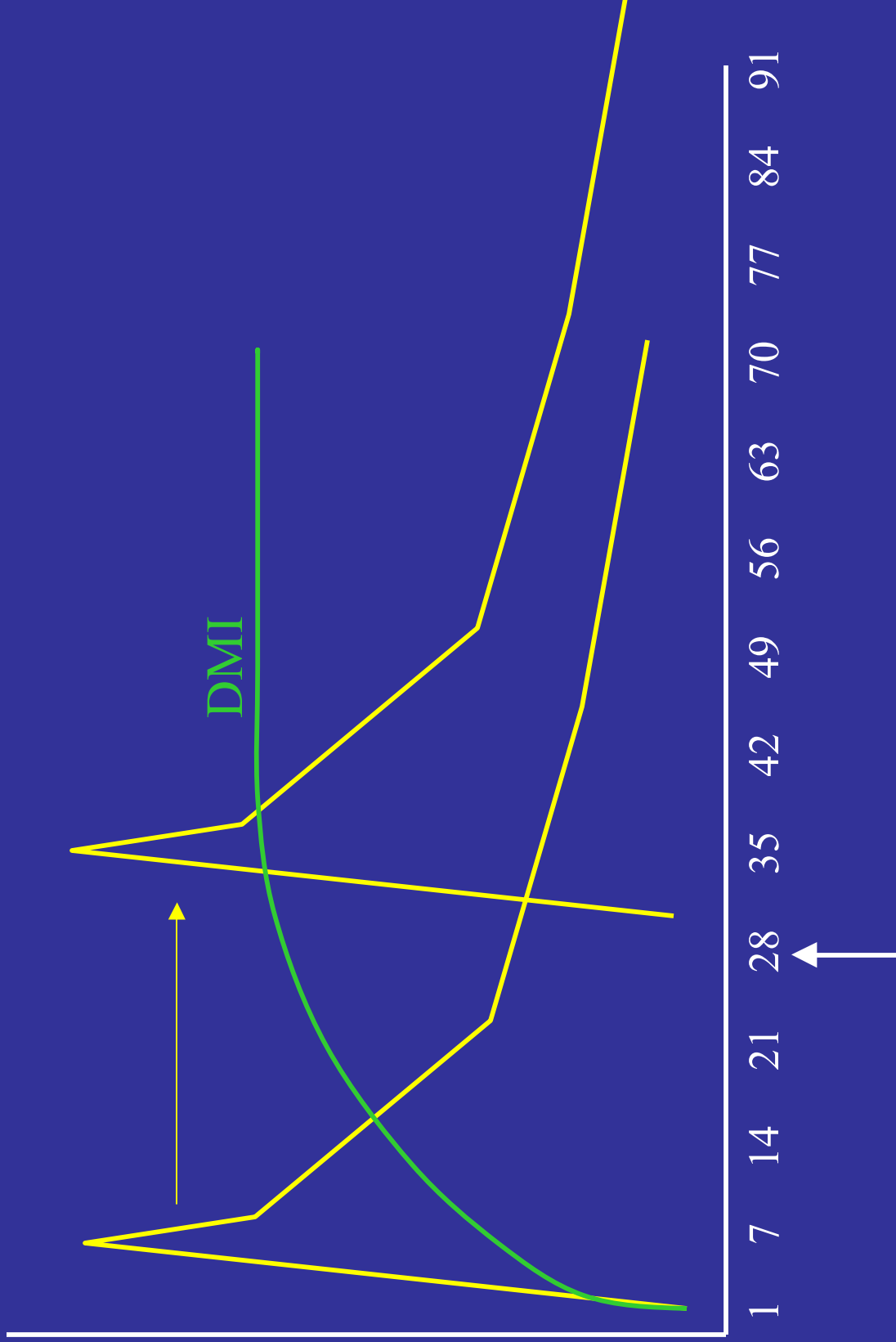
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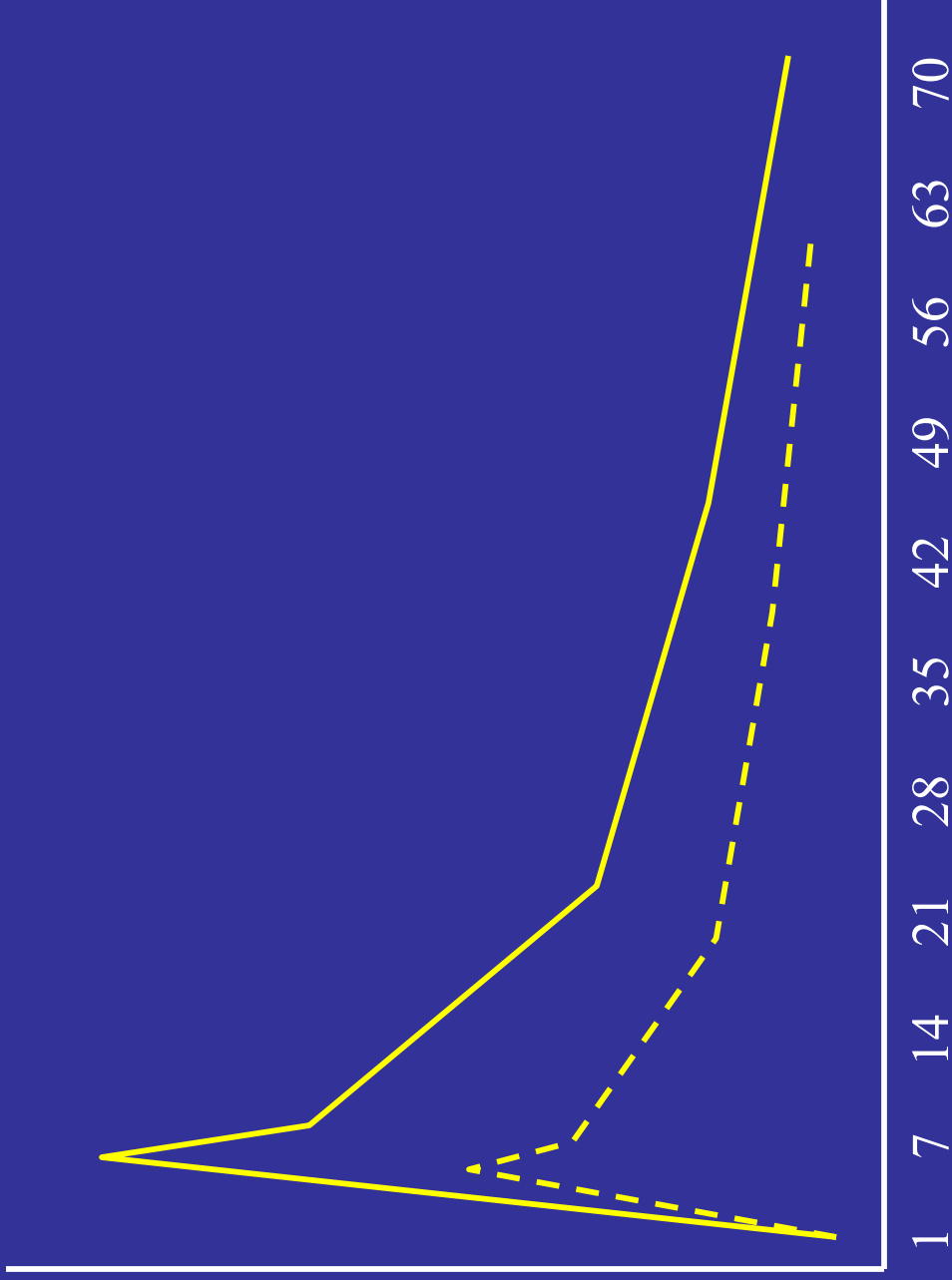
Factors to Consider



Factors to Consider



Factors to Consider



What Implants do:

- 1) Improved Feed Efficiency 15%
- 2) Increased Average Daily Gain 10%
- 3) Increased Dry Matter Intake 5-10%
- 4) Increase in Body Mass 15-20%

Efficiencies and increase in wt gain can result in 50 -150 dollars advantage over non-implanted

Carcass Characteristics Final Harvest (n = 159)

	NI	EI	DI	SEM
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Profit \$/hd	132	160	178	

^{a,b} (P<.05)

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				26%	

^{a,b} (P<.05)

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What Implants do:

Previous trial utilizing one implant in the finishing phase.....

Controls

Early Implant

Delayed implant

Key point is the choice select spread

How much weight can you put on to offset dock

Match Implant to:

1) Market

Match Implant to:

1) Market

2) Type of Cattle

Gain x Potency Rules of Thumb

<u>ADG</u>	<u>Potency</u>
< 1.75	None
1.75-2.25	Low
2.25-2.75	Moderate
2.75-3.25	Intermediate
> 3.25	Terminal

Gain x Potency Rules of Thumb

<u>ADG</u>	<u>Potency</u>
< 1.75	None
1.75-2.25	Low (none in large framed)
2.25-2.75	Moderate caloric intake match
2.75-3.25	Intermediate total days
> 3.25	Terminal Potential for re-implant

Match Implant to:

1) Market

2) Type of Cattle

3) Diet

Match Implant to:

1) Market

2) Type of Cattle

3) Diet

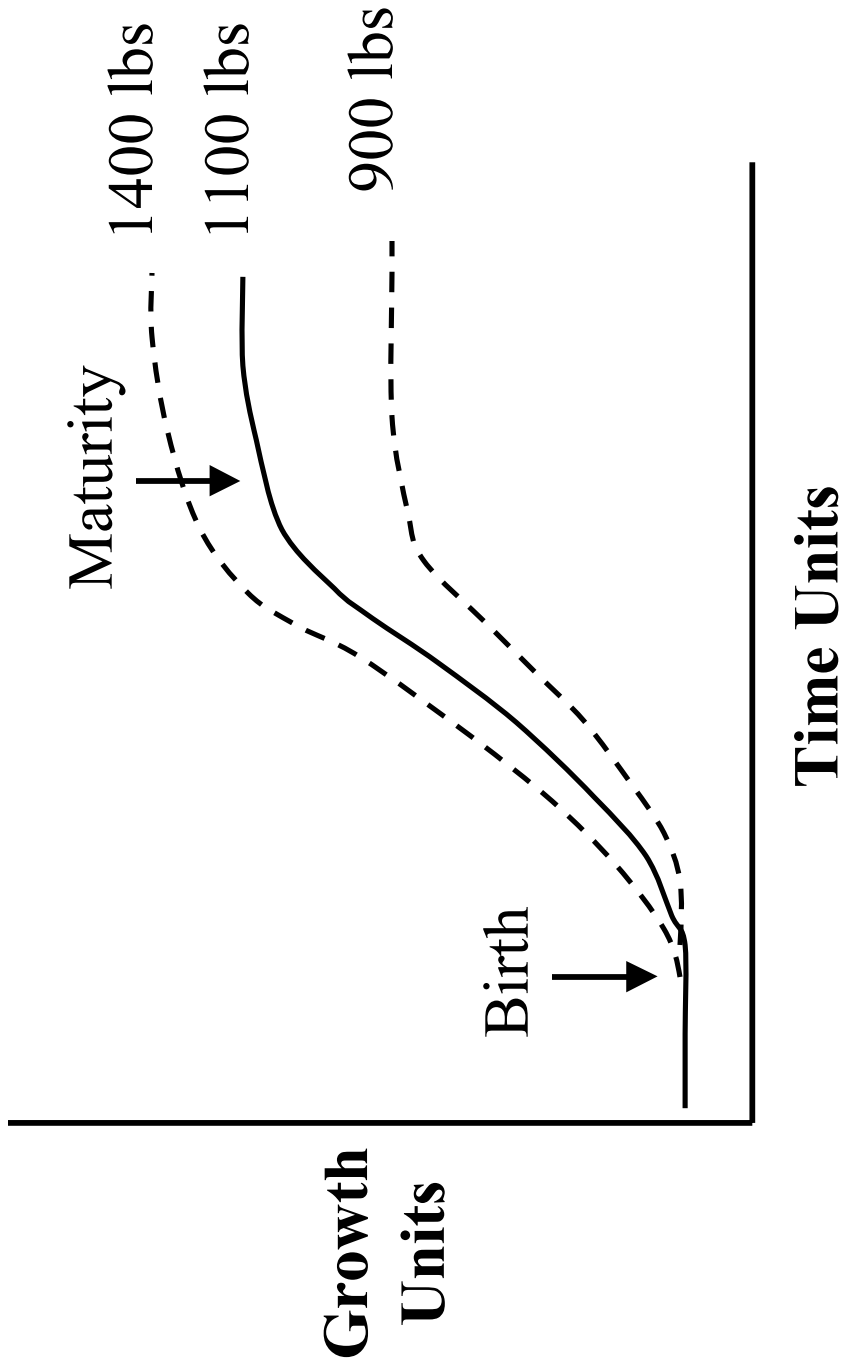
4) Number Given

Implant Administration

How many ???

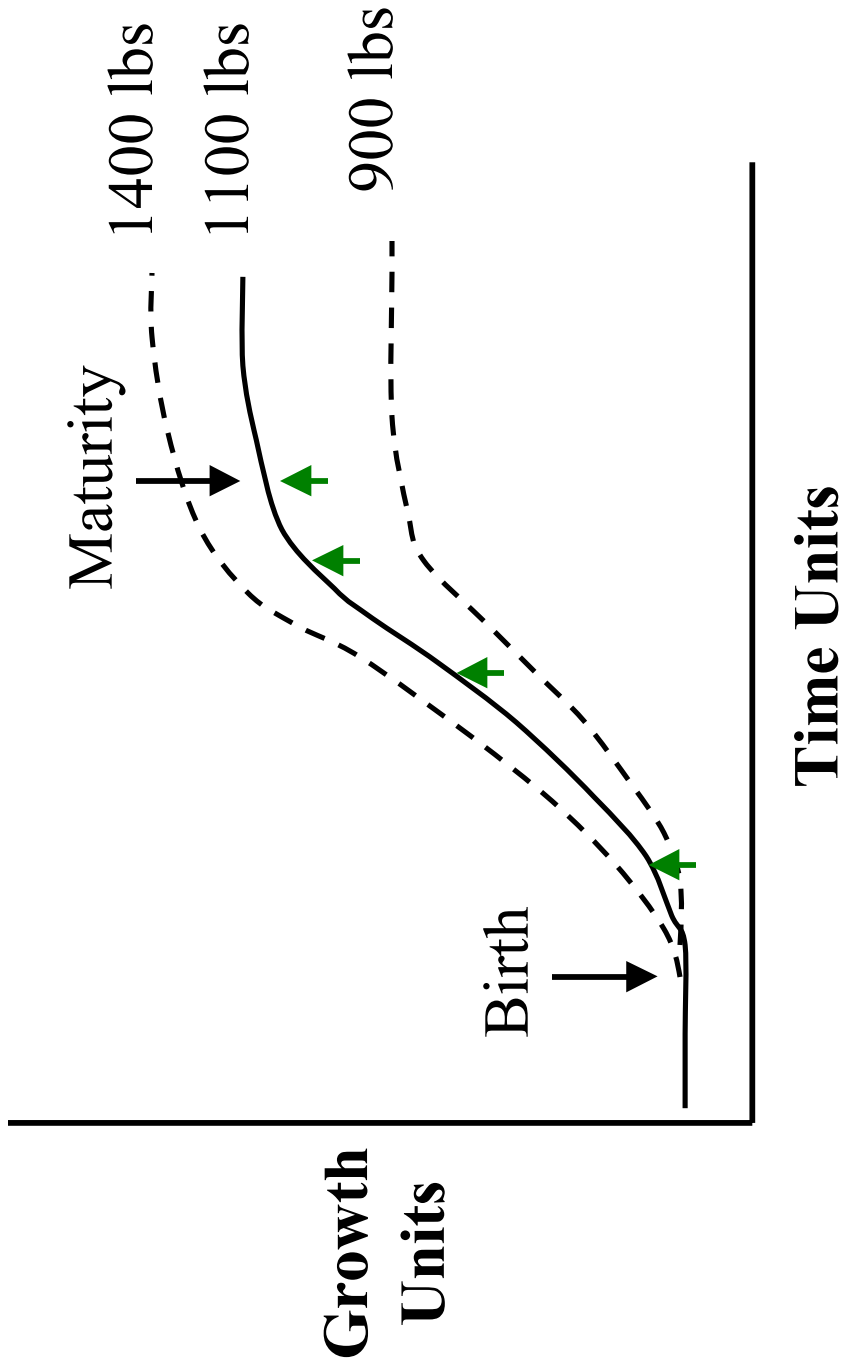
When???

Normal Growth Curve of Cattle^a



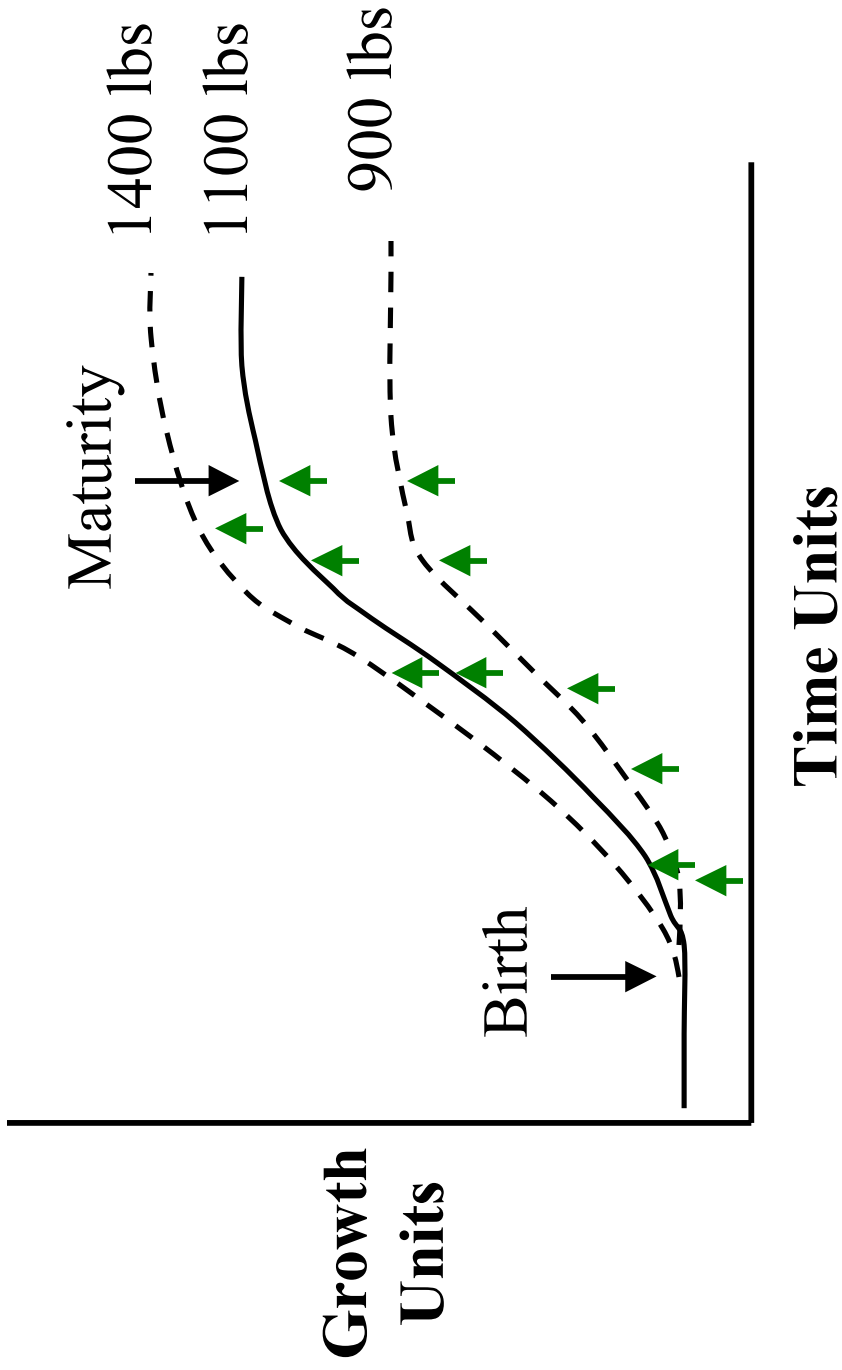
^a Adapted from Berg & Butterfield, 1976

Normal Growth Curve of Cattle^a



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Normal Growth Curve of Cattle^a



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Summary Points

- Proper implant strategies provide profit
- Greedy and improper use will hurt the next owner or yourself
- Proper and planned strategies can benefit all
- You can have implants and maintain “grade”

Remember:

- 1) Asking body to grow more
 - Increase in cell size (Hypertrophy)
 - Increase in cell number (Hyperplasia)
 - increase in satellite cells
- 2) No change in Protein accretion or degradation

Beta Agonists:

Considered a steroid

Clembuterol

Zilpaterol

Ractopomine

Alter metabolism ~

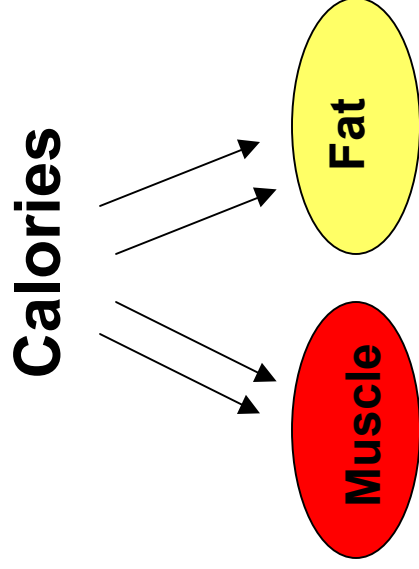
Increasing protein synthesis

Decrease protein degradation

Beta Agonists:

- Repartitioning Agents

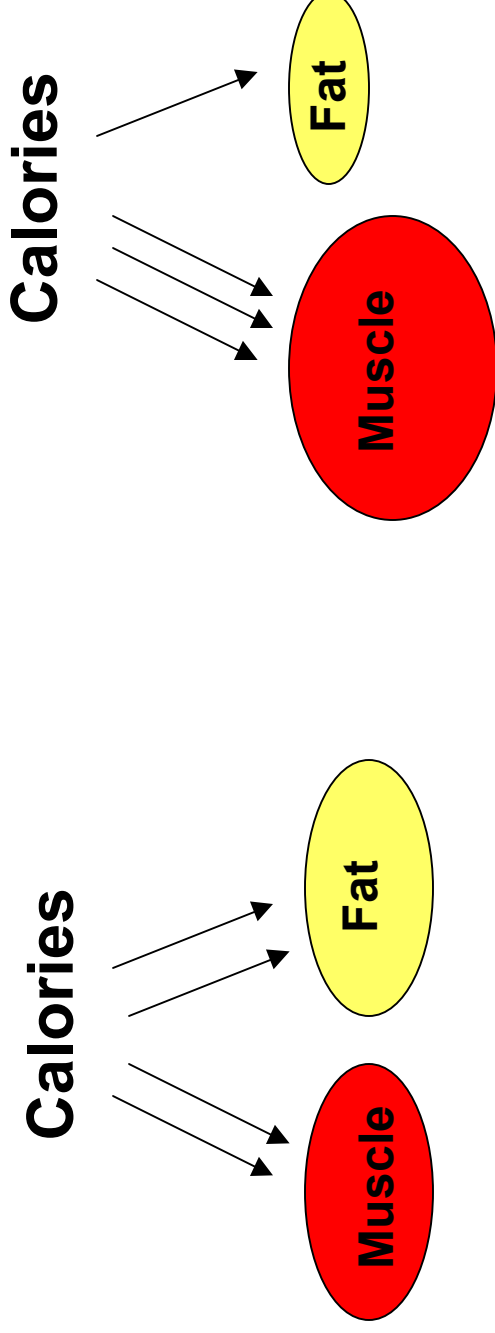
Take calories for Muscle rather than Fat



Beta Agonists:

- Repartitioning Agents

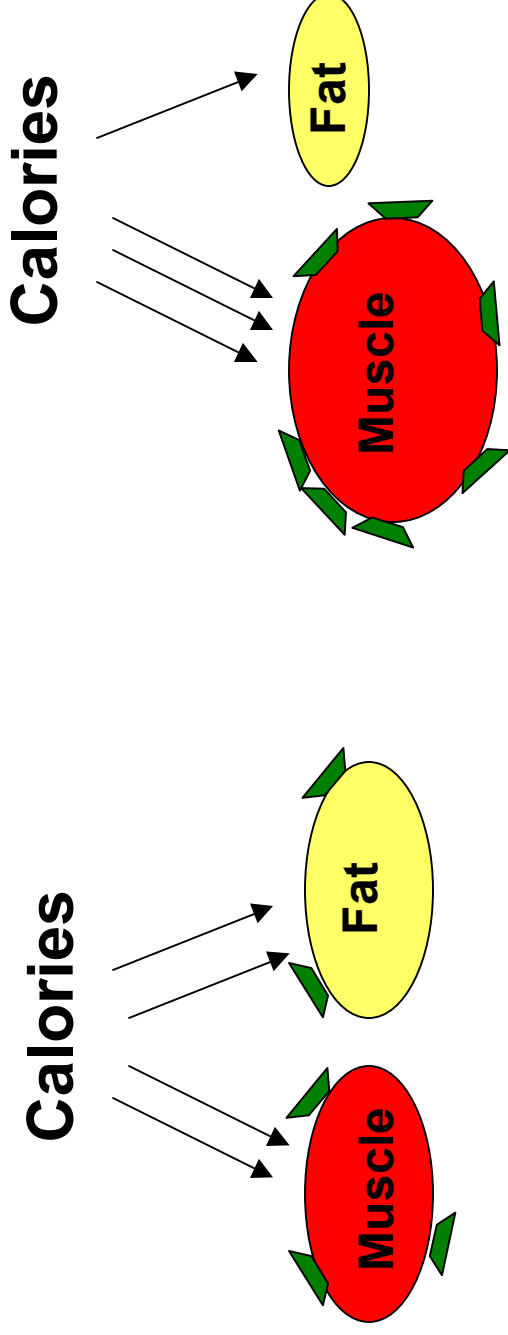
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Beta Agonists:

- Repartitioning Agents

Take calories for Muscle rather than Fat



Beta Agonists:

Ractomamine ~

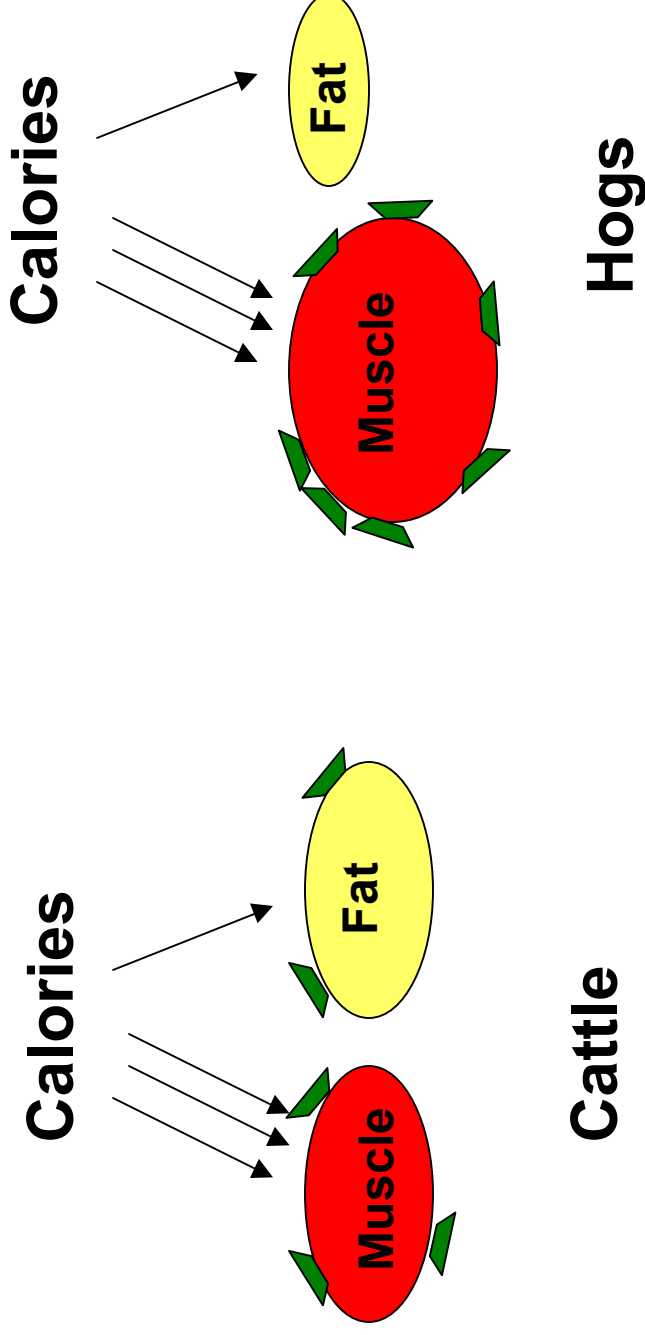
Hogs ~ Paylean

Cattle ~ Optaflex

Beta Agonists:

- Repartitioning Agents

Take calories for Muscle rather than Fat



Beta Agonists:

Ractamamine ~

Hogs ~ Paylean

Last 14 - 21 days

Improvement: 1) Percent lean
2) Performance

F/G, ADG, DMI

Cattle ~ Optaflex

Fed last 28-42 days 100 – 300 mg / day

Improvement: 1) Performance

F/G, ADG same DMI

2) Dressing Percent

3) Carcass wt

4) No adverse affect on Marbling

5) Tenderness affected at 300 mg

Implant vs. Optaflexx:

Implanting ~ cost .50 – 1.50 per dose
dollar chute charge
2.50 gets you 40-60 (1 implant)

Optaflex

200 mg dose cost 25 cents per day
Fed 28 day is 7 dollars
Increase in carcass weight ~ 3-5%
Improvement in F/G 16%

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