

# Protocol Farms Feeding & Research Center

## Fetal Programming, Wagyu Calf & Finisher Nutrition

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**PROTOCOL FARMS**

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**P**  
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PROTOCOL FARMS





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CENTER  
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760





**MMF** 6052  
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**EJM**  
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**MMF** MIXER  
FEEDER  
BRUSH, COLORADO





















Cross section

r	<b>V+Wagyu</b>
en at	<b>2023-06-13 10:17:38</b>
y no.	<b>28111</b>
y	<b>62.94%</b>
2	<b>10.00</b>
l (in2)	<b>16.69</b>
s	<b>18.57</b>



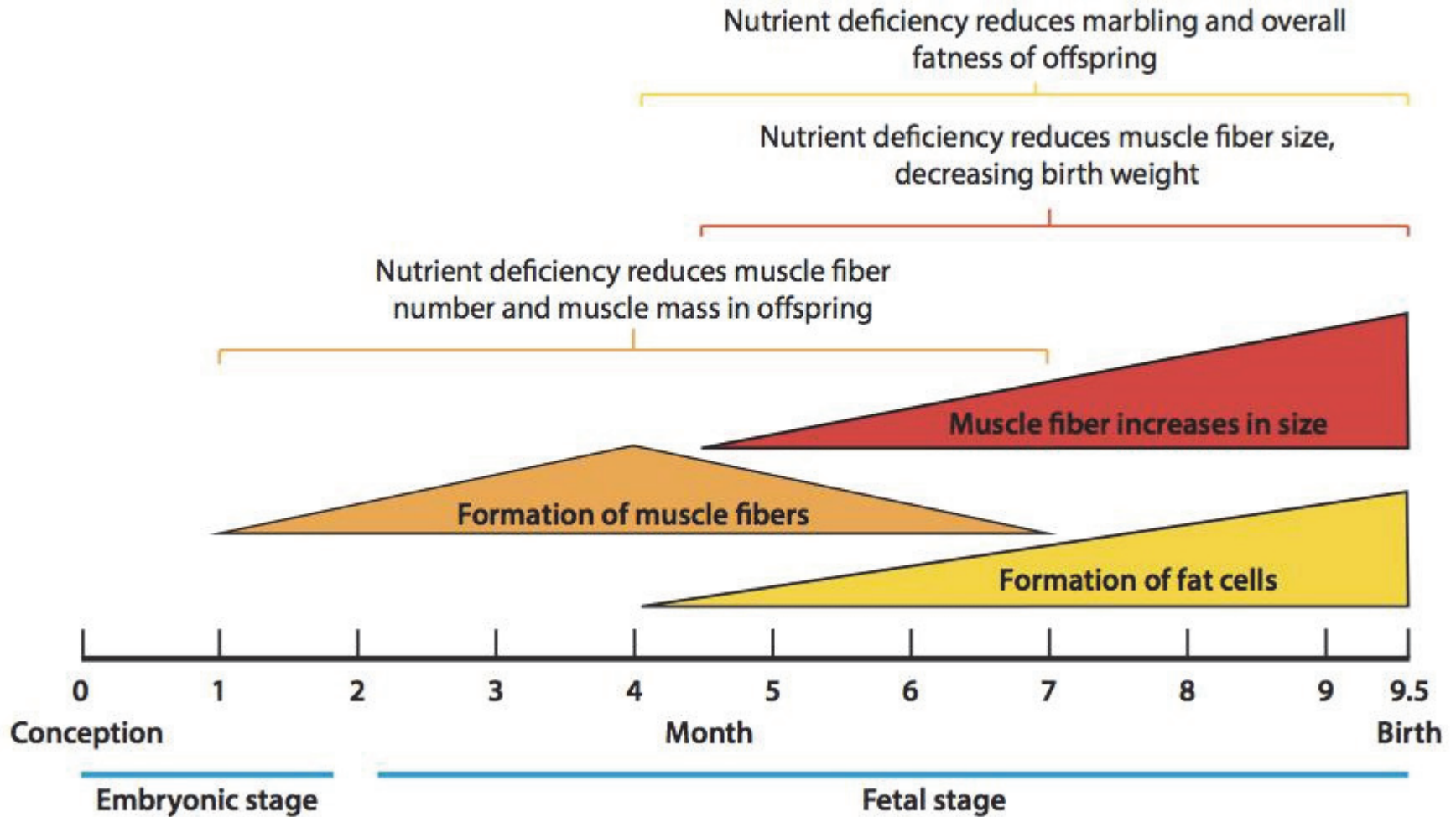




# **Fetal Programming**




## Fetal Development Timeline








Conception    Adipogenesis initiates    Birth    250 d    Slaughter

Adipocyte hypertrophy 

Adipocyte hyperplasia 



Marbling window



# Fetal Programming

- Mid-late gestation crucial for fetal skeletal muscle development, no increase in no. of muscle fibers after birth.
- Fetal life is a major stage in development of IMF cells (pre-adipocytes). These cells provide eventual sites for IMF accumulation/marbling formation.  
**\*late gestation critical for fetal marbling\***
- Last 90 days in-utero and 1<sup>st</sup> 150 days of life can impact up to 50% of final marbling score!!!
- Cow nutrition is directly related to fetal health which affects calf survivability and future growth.
- Colostrum quality is impacted by the last 5 weeks of gestation (BCS, stress, protein, mins/vits) and parity.



# **Nutritional Management**



# Wagyu Calves



# **It all starts with mom!**

She takes care of herself, then the calf on the ground, then the calf to come.





# Dam Nutritional Priorities

- Maintenance
- Lactation
- Growth (to 4 years of age)
- Reproduction



# Peak and Average Milk Production for Common Beef Breeds

<b>Breed</b>	<b>Peak milk lbs/day</b>	<b>Average milk lbs/day</b>
Angus	20.7	14.9
Charolais	21.6	15.1
Hereford	18.7	12.5
Limousin	20.9	14.1
Simmental	24.1	16.8
Avg.	21.2	14.7

Source: Meat Animal Research Center.

<b>Wagyu Cows</b>	<b>15.5</b>	<b>10.7</b>
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Source: Shingu, H. et.al., 2002; Shimada, K. et. al. 1988.



# Feeding Young Wagyu Stock

- Most efficient stage of life
- High quality and highly palatable feeds
- Wagyu calves on Wagyu dams must be creep fed (NOT OPTIONAL)
- Wean by 4 mos. or earlier if on Wagyu dams
- Steers and replacement heifers must be separated after weaning
- High protein rations critical for structural development (requirements more similar to dairy breeds)
- Avoid overfeeding & overconditioning replacement heifers
- Future finishing prospects must be pre-conditioned & taught to eat (min 1.5-2.0% of BW in grain consumption prior to finishing)
- Mineral program important here too as 1<sup>st</sup> limiting nutrient restricts growth and performance, immunity
- **Emphasize feeds with best results not best price**



# The 5 C's of a Healthy Start

**Colostrum**

**Calories**

**Cleanliness**

**Comfort**

**Consistency**



- **Colostrum**-1<sup>st</sup> 12 hours critical, provide all calves from fullblood or high percentage 1<sup>st</sup> calf heifers with colostrum replacer, vaccinate dam for E. coli pre-calving
- **Calories**-focus on milk yield of dam via both genetics & nutrition, offer high quality creep/starter within 1<sup>st</sup> 3 days, early weaning = higher quality & heavier marbled carcasses
- **Cleanliness**-clean, comfortable & dry calving conditions, good sanitation, fresh feed & water
- **Comfort**-stress impacts efficiency, growth, reproduction & carcass quality more than any other single factor. Post-weaning stress must be minimized. Wagyu have more to lose when uncomfortable.
- **Consistency**-Most challenging of the 5 C's. Top producers in both the U.S. and Japan tend to be more uniform and consistent in their daily approach to husbandry than other operations.













# **Wagyu Finishers**





# Finishing Wagyu Cattle

## Phase 1

- Start calves on finishing program at 9-12 months of age (600-700 lbs)
- Calves should be pre-conditioned or adapted to Phase 1 finisher ration (10-20 months of age)
- Feed a good quality and palatable grass or small grain hay or haylage at 1% of BW
- Feed a nutritionally balanced, palatable finisher grain at 2% of BW
- Feed a TMR at 2.5-3.0% of BW



# Finishing Wagyu Cattle

## Phase 2

- Move calves to Phase 2 Finisher at 20-21 months of age
- Feed a nutritionally balanced Phase 2 finisher grain at 2.0-2.25% Of BW
- Feed average quality grass or small grain hay or straw at 0.5-.75% of BW. Hay must be 6 months old to minimize vitamin A intake. Avoid alfalfa hay or anything green during this phase.
- Minimize activity (energy expenditure = marbling loss)
- Harvest fullblood/high percentage calves at 24-28 mos. and F-1's at 21-24 mos. of age or around 1400-1500 lbs based primarily on feed intake and days on feed, not backfat nor strictly age.
- Avoid excessive ADG to maximize quality? Depends.....

## Recommended Minimum Grain Nutrient Levels

<u>Nutrient</u>	<u>Starter</u>	<u>Grower</u>	<u>Finisher 1</u>	<u>Finisher 2</u>
<b>Crude Protein %</b>	<b>18</b>	<b>16</b>	<b>15</b>	<b>14</b>
<b>TDN %</b>	<b>72</b>	<b>74</b>	<b>75</b>	<b>76</b>
<b>NEg, Mcal/lb</b>	<b>.50</b>	<b>.52</b>	<b>.54</b>	<b>.56</b>
<b>IU Vit A per day</b>	<b>40,000</b>	<b>30,000</b>	<b>25,000</b>	<b>0</b>
<b>IU Vit E per day</b>	<b>150</b>	<b>300</b>	<b>500</b>	<b>1000</b>

**\*NOTE: Crude Protein and TDN need to be slightly higher for heifers fed out for beef as they are less efficient converting these nutrients to weight gain than steers.**

<u>Nutrient</u>	<u>Alfalfa Hay</u>	<u>Grass Hay</u>
<b>Dry Matter %</b>	<b>90</b>	<b>90</b>
<b>Crude Protein %</b>	<b>20</b>	<b>10</b>
<b>ADF %, max</b>	<b>30</b>	<b>45</b>
<b>NDF %, max</b>	<b>40</b>	<b>75</b>
<b>RFV</b>	<b>150</b>	<b>75</b>



# Marbling

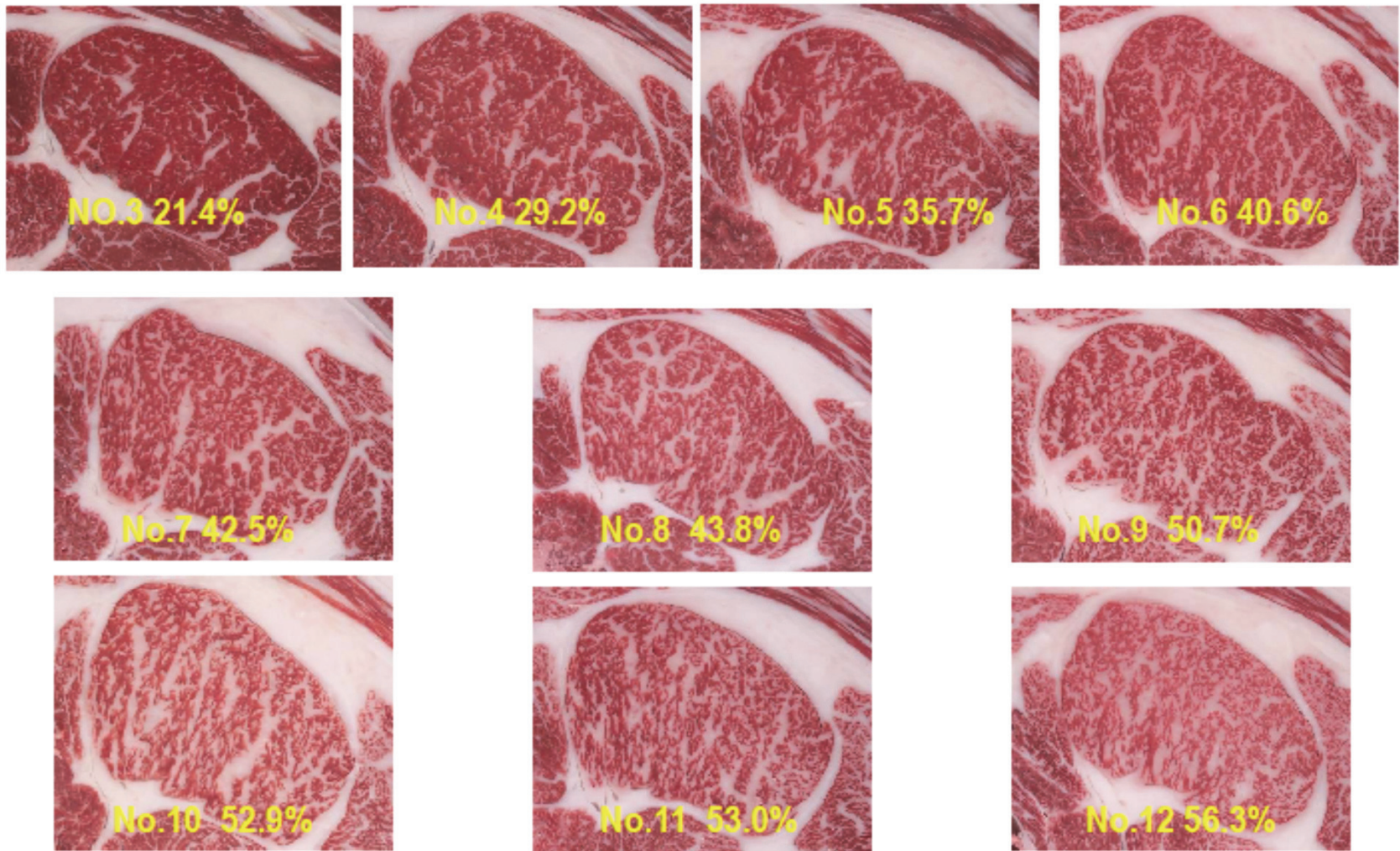
- Marbling is a lifelong process starting 180d post-conception
- Hyperplasia (number) and Hypertrophy (size)
- Marbling window 90d prior to 150d after birth (pre-adipocytes)
- This 240d window impacts up to 50% of lifetime marbling potential
- Adipocyte proliferation (differentiation) begins at 24-25 mos of age in FB Japanese Blacks which results in finer texture
- Wagyu maintain a higher rate and duration of marbling than other breeds
- There is a point of diminishing returns in which IMF deposition is less than that of subcutaneous and internal fat (>1500 lbs & 30+ mos. in Japanese blacks)
- If fed and managed properly, harvest fullbloods at 24-28 mos. and F-1's at 21-24 mos. for optimal quality and yield

# Vitamin A and Marbling

- A common feeding practice of Japanese finishers is removal of vitamin A after 18 mos., restricted at 13-18 mos.
- Removal should occur no later than 23 mos. of age
- Studies in Japan (Hashimoto) and U.S. (Flaherty) have shown as much as 30% difference in marbling with vitamin A removal
- 3 out of 4 studies done since 2003 indicate no vitamin A supplementation for min. of 90d pre-harvest improved quality grade significantly
- Feeding vitamin A restricted diets requires good mgmt and should not exceed 10-12 mos. in most cases
- Avoid alfalfa and lush pasture during vitamin A devoid phase
- High vit E and natural vasodilators help maintain immunity and efficiency during vitamin A devoid phase



# New Beef Marbling Standard from 2008 - JMGA



Each marbling chip shows the **minimum IMF%** required to achieve each **BMS** number

# Summary

- Take advantage of fetal programming
- Start your calves off right with the 5 C's: Colostrum, Calories, Cleanliness, Comfort, and Consistency.
- Pre-condition meat prospects prior to finishing.
- Variety of ways to enhance carcass quality ie. breeding, taking care of mom (last trimester critical), creep feeding, early weaning, properly-balanced diet, restricting vitamin A, adding vitamin E, use of vasodilators, minimizing stress.



