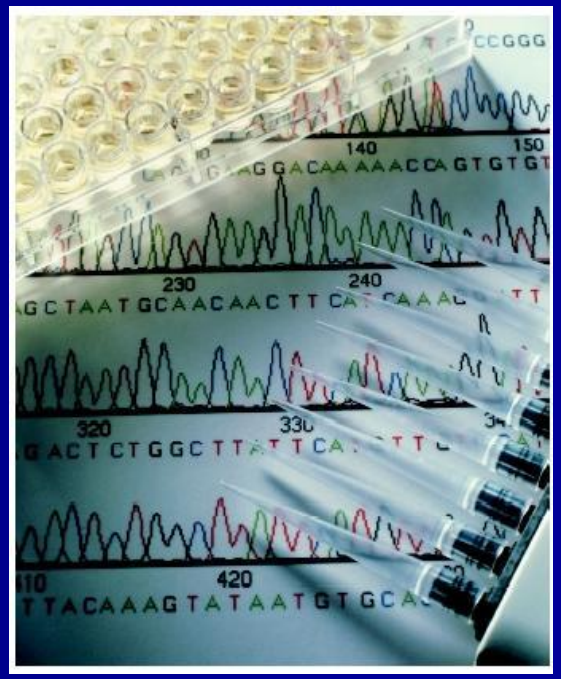
Bull Performance and contribution to ranch income

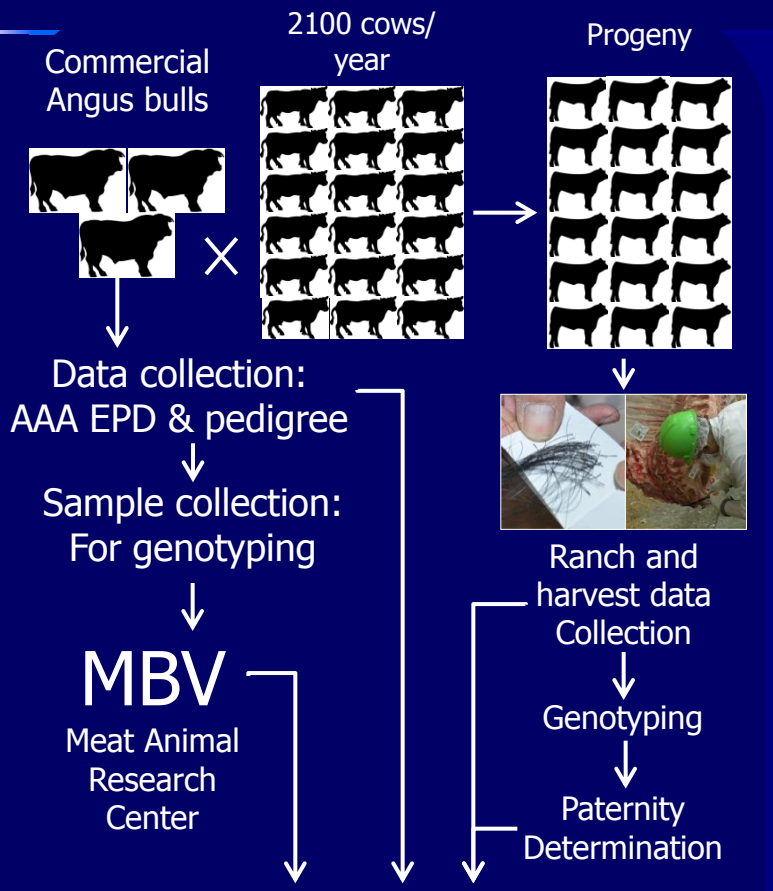
Alison Van Eenennaam
Animal Genomics and Biotechnology
Cooperative Extension Specialist
Department of Animal Science
University of California, Davis, CA
Ph: (530) 752-7942
alvaneenennaam@ucdavis.edu
Daniel Drake, UC Cooperative Extension, CA
Kristina Weber, graduate student, UC Davis, CA
D. Scott Brown, University of Missouri, MO



Outline

- Overview of CA commercial ranch project
- Prolificacy of commercial sires
- Feeder calf and retained ownership value of calves
- EPDs, prolificacy and total income
- Effect of calving distribution on income
- Practical implications and take homes

California Commercial Ranch Project



Three ranches:

- Cowley (900 cows)
- Kuck (500 cows)
- Mole-Richardson (700 cows)

Approximately 150 Angus bulls, and 6000 calves on project

United States Department of Agriculture
National Institute of Food and Agriculture

Average bull age at the beginning of the breeding season, and number of calves produced per bull that sired at least one calf on 3 commercial ranches in Northern California in 2009 and 2010.

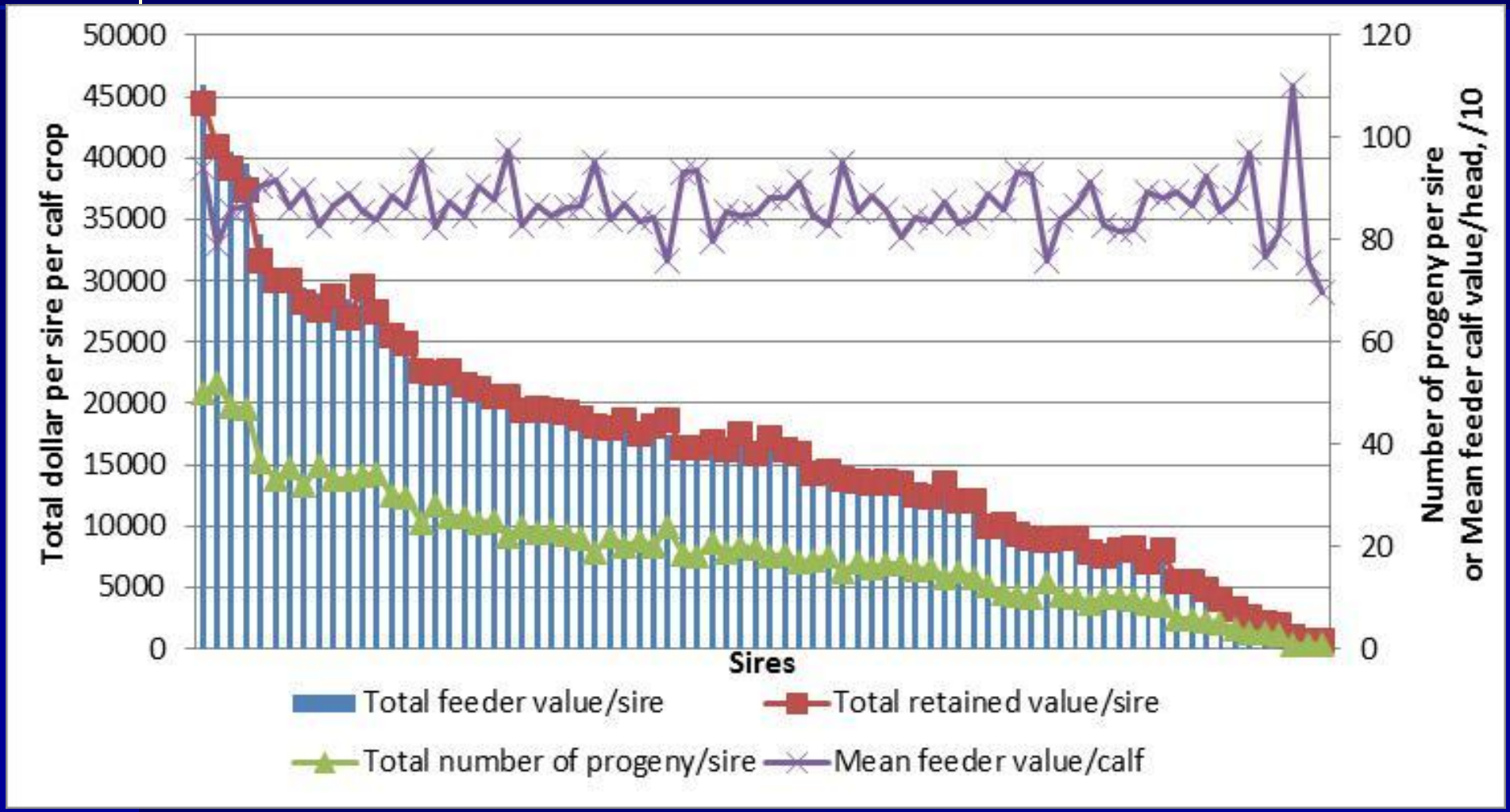
Ranch	Year	Season	# of sires	Mean bull age	Total # of calves	Number of calves per bull		Aver # of calves per bull/season
						Min	Max	
A	2009	Spring	13	2.5 ± 0.6	246	6	40	**18.9** ± 12.5
A	2009	Fall	19	2.9 ± 0.9	345	1	47	**18.2** ± 13.9
A	2010	Spring	19	3.4 ± 0.9	366	5	36	**19.3** ± 10.7
B	2009	Spring	8	3.5 ± 2.7	139	1	44	**17.4** ± 16.6
B	2009	Fall	9	4.4 ± 2.2	196	10	48	**21.8** ± 11.4
B	2010	Spring	8	2.9 ± 1.2	129	3	28	**16.1** ± 9.1
C	2009	Fall	30	3.3 ± 10	639	2	54	**21.3** ± 13.8
C	2010	Fall	27	3.7 ± 1.3	568	1	52	**21.0** ± 13.1
MEAN				**3.3**	**2628**			**19** ± 2

Additionally, 7.3% sires failed completely (i.e. no calves sired) in any given breeding season.

Feeder calf and retained ownership value of calves.

- We compared the projected income that would have been derived per bull from 1) selling calves as feeders (cash load) or 2) using a retained ownership marketing system (going to the grid) was calculated using the production data from the California commercial ranch project (Scott Brown, MO)
- A total of 2,241 calves from 3 commercial northern California cow/calf ranches were evaluated.
- Feeder calf prices were calculated using feedlot in weights and market prices based on a single day (Green City, MO 11/23/10), and may not be representative of general trends.
- Feedlot in weights averaged 706 pounds, and the average feeding period was 152 days. Average carcass traits were: carcass weight: 743 lb; Choice: 84.5%; Prime: 1.3%; YG: 3.2; fat thickness: 0.62 inches; and ribeye area: 12.8 sq. inches.

Figure 4. Total income as feeder calves per sire or total retained ownership varied by sire (Total dollar per sire per calf crop, left axis), and the number of progeny per sire (right axis) and the mean individual feeder value/calf (right axis, $/10)



EPDs, prolificacy and total income.

- Scrotal circumference (SC) and cow energy value index ($EN) EPDs were positively correlated to total feeder calf income per sire, total retained ownership value per sire and sire prolificacy.
- Generally at least 5% of the total variation (as measured by R^2) in each trait was explained by SC EPD. Cow Energy Value Index ($EN) EPD also tended to be positively related to those traits but typically explained only about 3% of the variation.
- Four EPDs were linearly related to percent grading Choice plus or better: $G, MARB, $QG, and $B

Effect of calving distribution

- Calving distribution was categorized into 4 periods based on day of calving: 1) days 1-21; 2) days 22-42; 3) days 43-64; 4) days past 64 with the first calf born in a calf crop being day 1.
- If the genetic potential of sires differs by day of calving, then the impact of days of calving will be confounded by sire effects.
- DNA paternity testing has the added advantage in that it allows sire effects to be teased apart from day of calving effects in multisire herds.

Figure 7. Conceptions per week were greater (P<.02) during each week of the breeding season for the first 10 weeks of the breeding seasons for the two most prolific bulls (from each calf crop) compared to the two least prolific bulls.

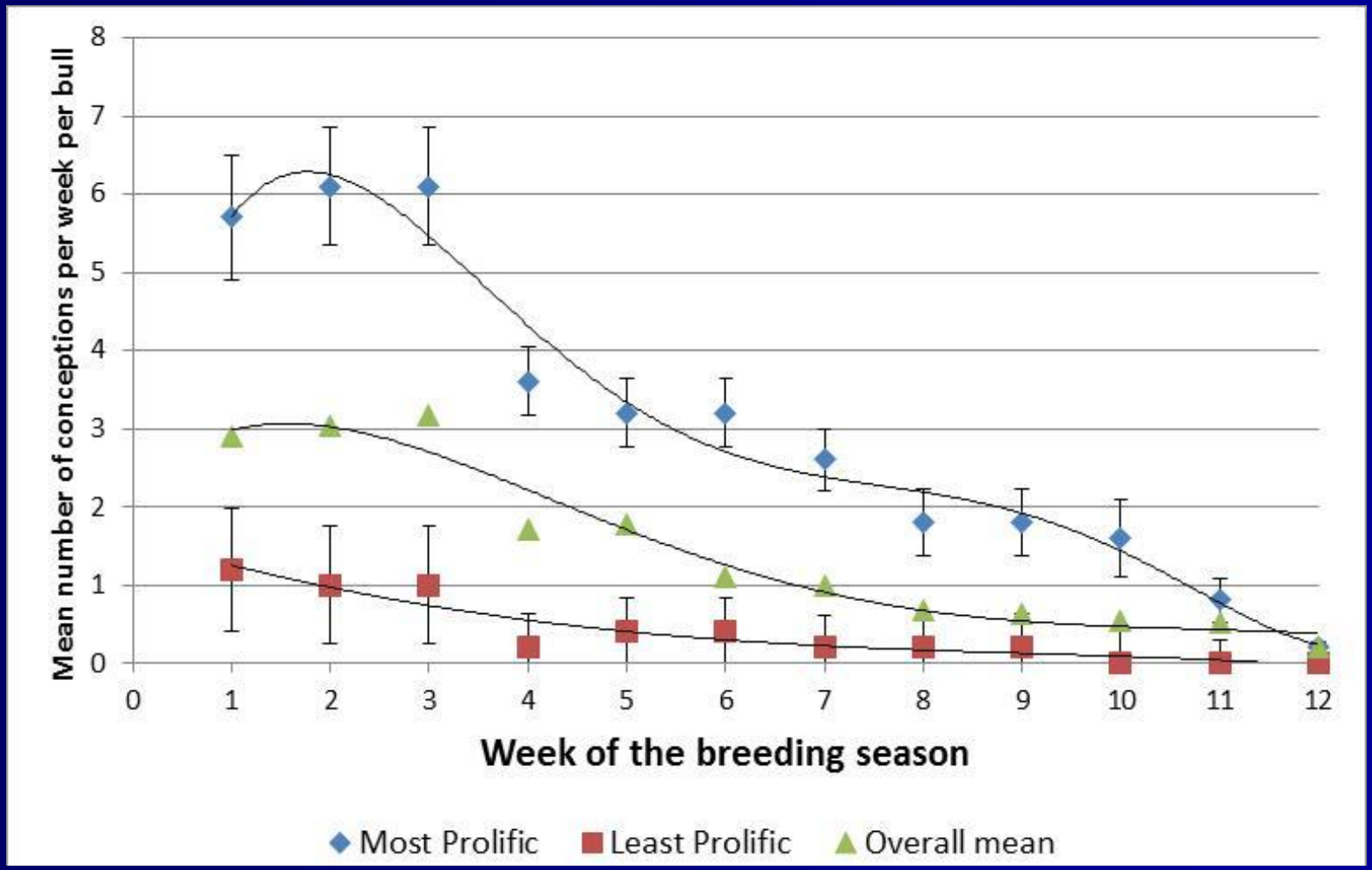


Table 2. Calving distribution categorized as 21-d periods impact on feeder calf and retained ownership value. Periods were evaluated without removing sire effects (left), and with sire effects removed (right).

TRAIT	Calving Period	Without Sire Effects Removed		With Sire Effects Removed	
		Mean		Mean	
Feeder calf value, $/hd	**1**	**878.93**	**a**	**877.60**	**a**
	2	**870.91**	**b**	**865.25**	**b**
	3	**850.06**	**c**	**846.60**	**c**
	4	**829.22**	**d**	**821.60**	**d**
Calf age into feedlot,d	1	353.6	a	356.6	a
	2	336.8	b	340.0	b
	3	316.5	c	319.9	c
	4	280.3	d	283.4	d
Carcass grid value,$/hd	1	1244.89	a	1250.39	a
	2	1244.62	a	1247.52	a
	3	1213.31	b	1219.61	b
	4	1200.06	b	1200.34	b
Retained value, $/hd (Carcass grid value minus feed cost)	**1**	**859.00**	**a**	**852.80**	**a**
	2	**855.59**	**a**	**846.72**	**a**
	3	**826.98**	**b**	**822.30**	**b**
	4	**806.91**	**c**	**796.21**	**c**

Summary and practical implications

- The number of calves born per sire per calf crop varied from 0 to 54.
- The number of progeny per sire explained most (98.4%) of the variation in the sires' total income, whereas the individual calf value explained only another 0.88% of the variation. **This clearly supports the old adage that any calf is better than no calf.**
- Scrotal circumference (SC) and cow energy value ($EN) EPDs were positively correlated with herd sire prolificacy (number of calves), and both total feeder calf and retained ownership value per sire.
- Four EPDs were linearly related to percent grading Choice plus or prime: $G, MARB, $QG, and $B
- Calves from the first 21d of the calving season returned about 40% of ranch income, and those from the first 42d of the accounted for 72%
- These data suggest inclusion of SC EPDs might be useful as selection criteria in commercial herd sire selection, & emphasize the importance of management approaches to increase the proportion of calves born in the first 21 or at most 42 days of the calving season

Costs of natural service sire averaged $92 per live calf born

- Costs for natural service breeding continue to rise. The major factors involved are original purchase price, annual costs of feeding and maintaining bulls, often high injury and death rates, along with potential facility repairs associated with bulls.
- A range of potential cost per calf can be estimated for either a 10 or 20% bull death loss rate, purchase price ranging from $3,000 to $6,000 and annual feed and maintenance costs of $500 to $900 per bull gives a range of $48-$136/calf born. e.g. An average bull costing $4,500 with annual costs of $700 and 15% death loss siring 20 calves per year results in a cost per live calf born of $92.

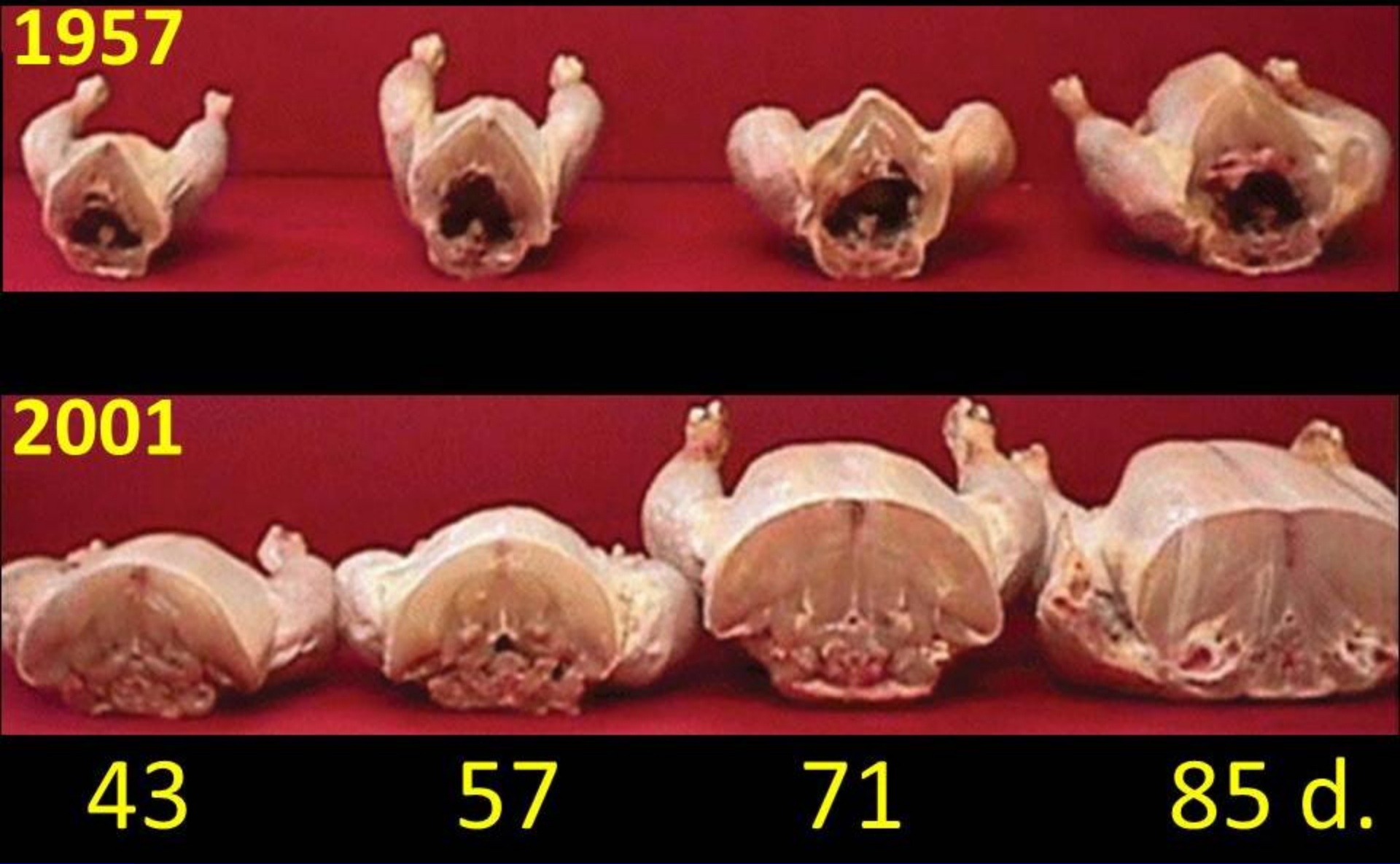
D.J. Drake. 2012., **Artificial insemination for beef cattle — Costs and Benefits.** Presented at Yreka, Feb 23, Willows, Feb 24, Cottonwood, Feb 24 and Eureka, CA Feb 25, 2012.

Results of spring calving timed single insemination and natural service on predominantly black cows.

Table 2. Results of spring calving timed single insemination and natural service on predominantly black cows.

	No. of calves	Age at wean	Actual wean wt	Adj. 205d wt	WDA	Value at $1.25	Breeding cost/calf	Income – Breed $
AI Polled Hereford sired calves	**26**	**189**	**556**	**606**	**2.95**	**$695**	**97**	**$598**
Angus sired calves	**135**	**179**	**496**	**576**	**2.78**	**$620**	**79**	**$541**
Advantage for AI		**10**	**60**	**30**	**0.17**	**$75**	**-$18**	**$57**
P value		0.001	<.001	0.009	0.003	<.001		<.0001

1957 vs. 2001 chickens



Annual Production Derived from 1 Pedigree Broiler Female

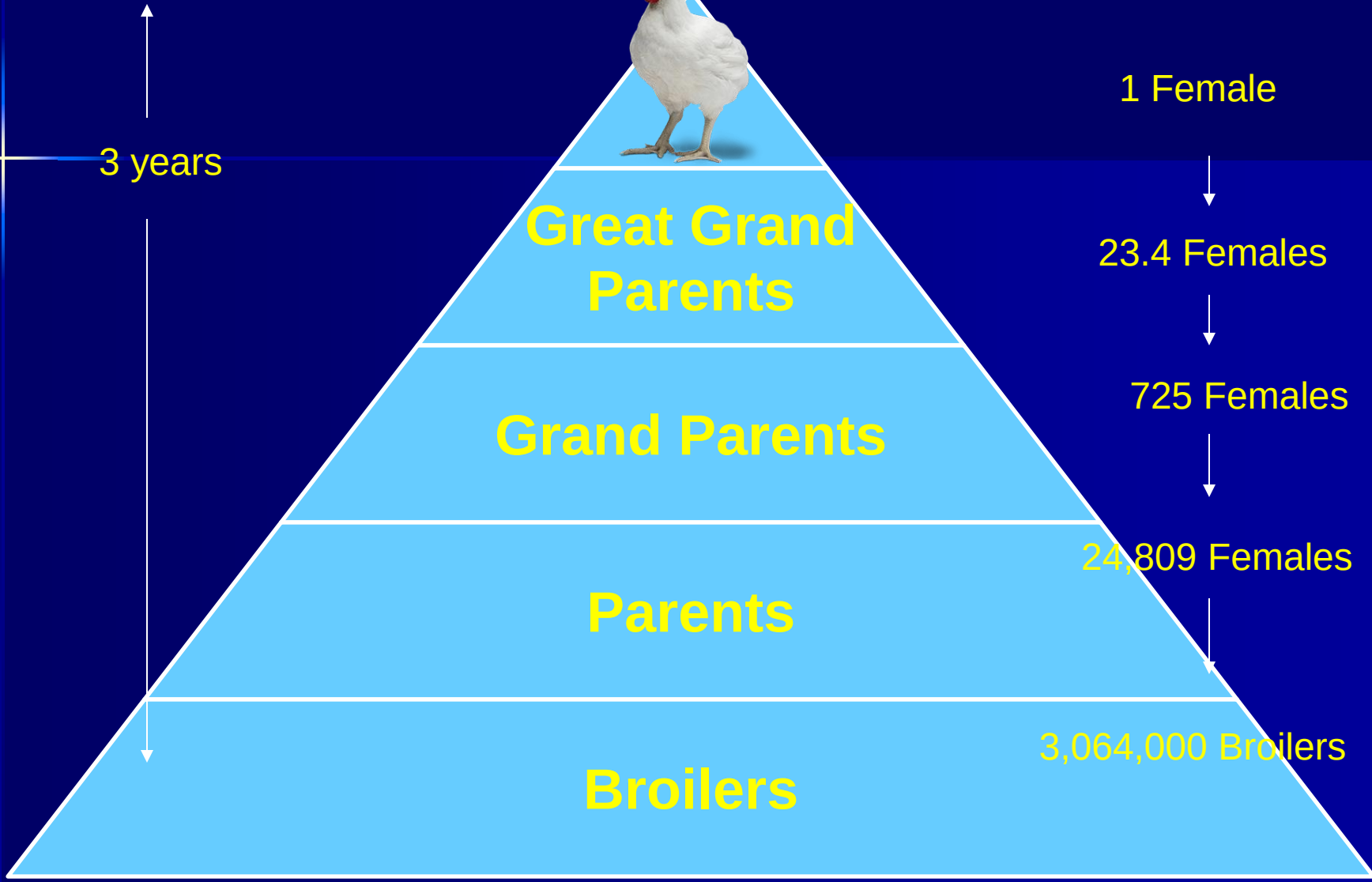


Image kindly provided by Dr. Rachel Hawkin, Cobb-Vantress

Breeding Objective

"*A breeding objective need not be economic. For example, in many companion animal species it is tempting to believe that the breeding objective must be the maintenance of a ridiculous appearance and congenital abnormalities*!"

(John Gibson, UNE)

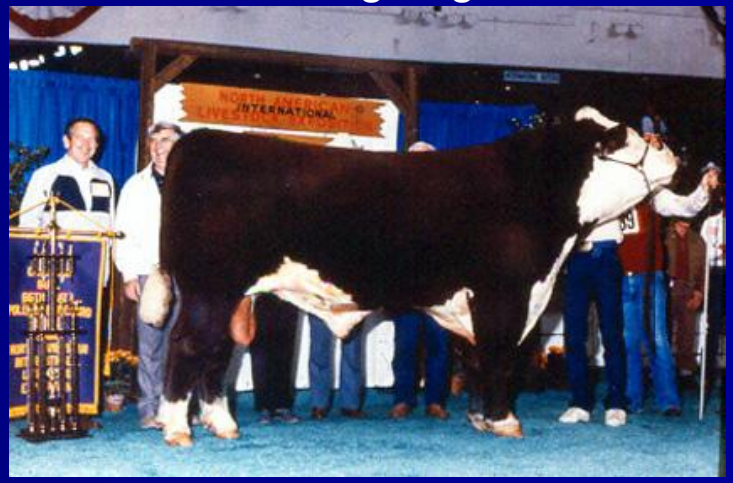
Historically not all beef cattle breeding objectives have been economic

Photo taken in 1949 at Red Bluff Bull Sale, CA.
Kindly provided by Cathy Maas from Crowe Hereford Ranch, Millville, CA.

1953. Grand Champion Angus Female, International, 1953

1950. Grand Champion Steer, International, weighing 1025 lbs

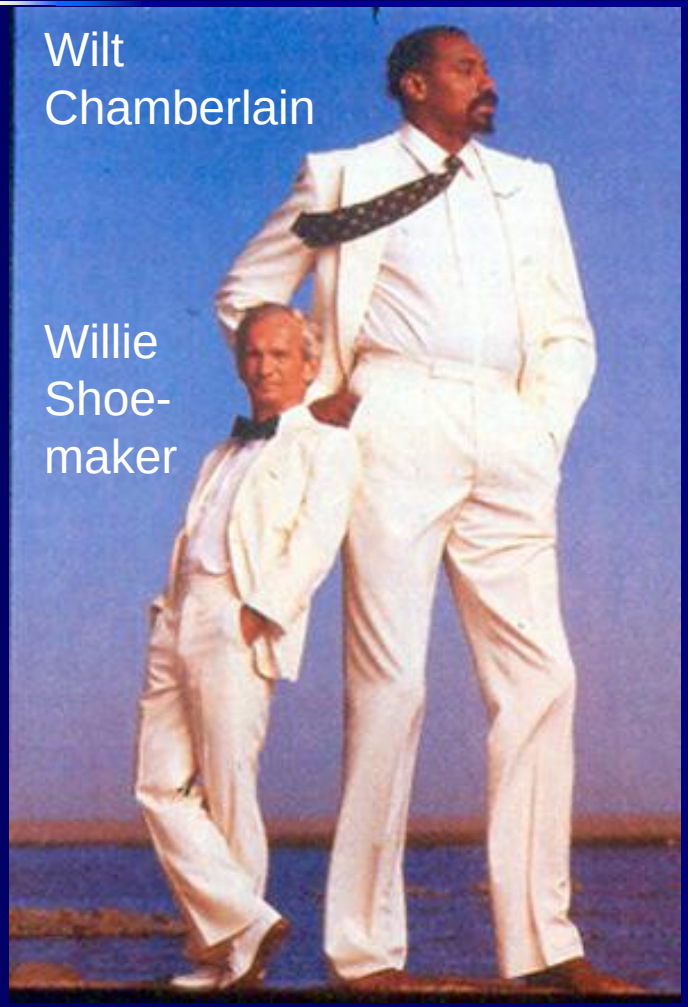
1986. "Coblepond New Yorker" weighed 2529 lbs and measured 65 inches tall at 35 mos. (Frame 10) when he was Denver Champion.



1988 Grand Champion Bull, National Polled Hereford Show (frame 10).

Images from Harlan Ritchie's historical review of type
https://www.msu.edu/~ritchieh/historical/cattletype.html

We can make genetic changes in our cattle (and our dogs) - the question is are we making profitable change?



Killed same day at IBP in Iowa:
The small female weighed 835 lbs and was extremely fat. The large male weighed 1900 lbs and was very lean.

Images from Harlan Ritchie's historical review of type
https://www.msu.edu/~ritchieh/historical/cattletype.html

Genetic composition of the herd:

87% of genetic composition of calf crop is determined by the sires used over the last 3 generations

Maternal great-grand sires (12.5%)

Maternal grand sires (25%)

Sires (50%)

Image adapted from "***More Beef from Breeding***" workshop (2007). Meat and Livestock (MLA), Australia

Time line for beef breeding

Bull purchase/selection

Image adapted from "***More Beef from Breeding***" Workshop (2007). Meat and Livestock (MLA), Australia

Progeny born

Progeny slaughtered

Female progeny used for breeding

2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023

Happy California Cow

Questions?

Happy California Bulls

United States Department of Agriculture

National Institute of Food and Agriculture

"This project was supported by National Research Initiative Grant no. 2009-55205-05057 to AVE from the USDA National Institute of Food and Agriculture."