

Meeting Growth and Body Weight Targets for Post-Weaning Heifers

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What's the Appropriate Endpoint for Growth Targets?

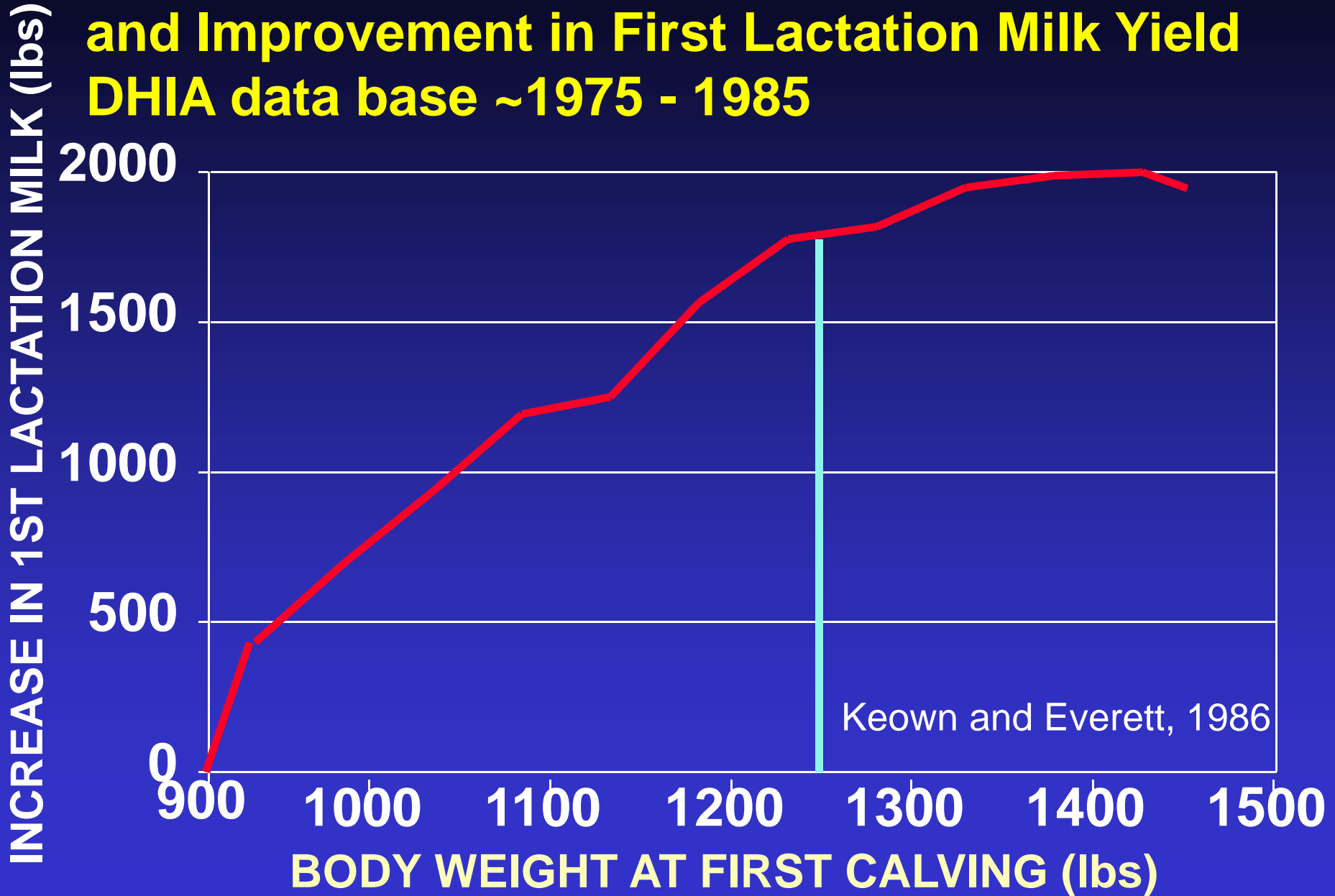
- **Have used ~ 1,250 lb post partum as a “Rule of Thumb”**
- **Should be a function of the herd mature body weight:**

Is a herd or region specific variable due to breeding and management decisions

- **“Unofficial” measured range in NY state for Holsteins: 1,375 to 1,800 lb**

Relationship Between Post Calving Body Weight and Improvement in First Lactation Milk Yield

DHIA data base ~1975 - 1985



Post Weaning Heifer Management and Nutrition

Need to be systematic – goals should reflect performance and management

Age at first calving is a conscious management decision

- should be made in early life
- should be based on optimum performance under herd management conditions
- younger is more profitable on a lifetime basis

~ Growth rate during pre-pubertal period should reflect AFC goals – nutrient requirements and supply should reflect those values

New Approach - Target Growth

Nutrient Requirements for Dairy Cattle (2001 NRC) publication updated growth model – new concept:

Target growth rates – purpose was to integrate management factors such as age at first calving (age at pregnancy), post-calving BW and mature weight with nutrient requirements and supply

Use mature body size of cows in a particular herd – scale nutrient requirements

Assumption – requirements are not the same for all cows at a constant weight

Target Growth Rates – Integrates Management and Biology

Approach determined by: Mature body weight (3rd and greater parity cattle – not cull cows)

Concept of physiologic maturity - puberty occurs at a given percentage of mature size (45% to 50%)

Pregnancy should occur by 55% mature body weight

Herd goals for age at first calving

Target Growth Rates – Integrates Management and Biology – Use of Mature Size

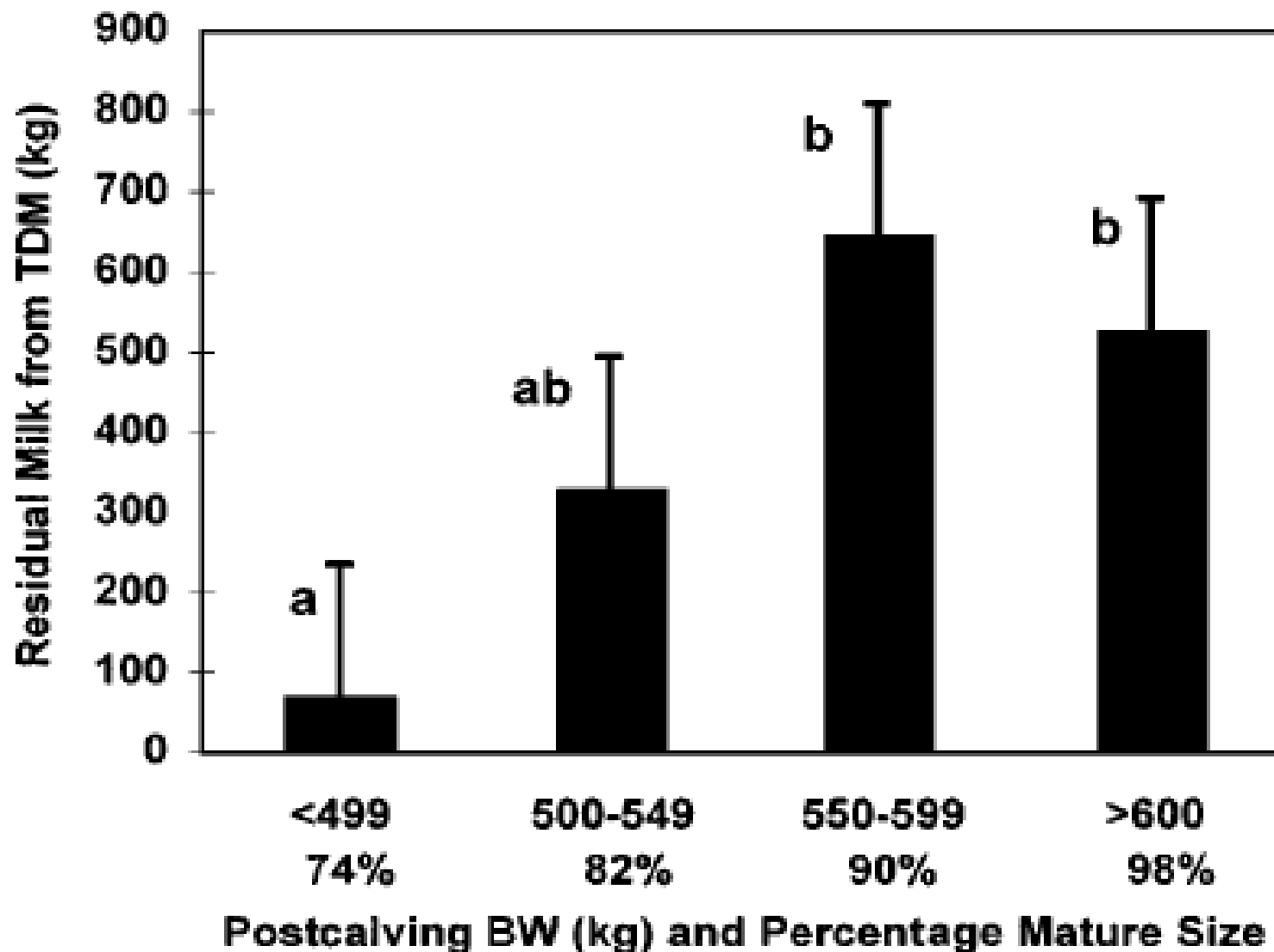
- **Based on the available data percent mature size where first lactation milk yield is optimized:
82 to 85%**
- **Alters the “one size fits all” recommendation**

Growth & Puberty Data

Variable	H	L	SE
n	36	36	
Preweaning ADG, g	960^a	640^b	15
Postweaning ADG, g	929^a	657^b	7
Number reaching puberty	9	7	-
Age at puberty	8.25^a	11.7^b	0.26
BW at puberty, kg	274	289	7.4

^{a,b}Means with uncommon letters differ ($p < 0.05$)

Milk Yield Residuals Compared to Post Calving Body Weight as a Percent Mature Size



What if Mature Size is Not Known? (the pot belly trailer shows up with a couple loads and no data

Optimum Body Size of Holsteins - from Pat Hoffman, 1996

Suggested a Minimum and Maximum Range based on literature values

First calving 7d post-partum weight

Mature weight (calc.)

Minimum: 1,182 lb

1,442 lb

1,500 lb

Maximum: 1,280 lb

1,561 lb

Target weights

		Mature weight, lb		
		900	1,300	1,760
	% mature wt.	Target weight, lb		
pregnancy	55%	495	715	968
1 st post calf	85%	765	1,105	1,496
2 nd post calf	92%	828	1,196	1,619
3 rd post calf	96%	864	1,248	1,690

Input AFC – sets breeding age for you and breeding weight is a function of the mature size. Requirements are then calculated to meet the targets.

Applying targets to the Cornell herd

Cornell Dairy Herd

Mature size ~ 1,474 ± 120 lb

Target AFC – 22 months

Target post-calving BW (82% of mature weight ~ 1,209 lb)

Therefore the target pregnant weight is 55% of the mature size (811 lb) – breeding is initiated at 750 lb to achieve the target - independent of age

Pre-pubertal growth rate, AFC, BW at calving, days in milk and 3.5% FCM yield of Holstein heifers fed a control diet or diet containing a FA supplement

	Control	Sunflower oil	EnerGII	CaCLA	Std. Dev.
n	16	16	17	16	
Pre-pubertal ADG, lb	1.90	1.92	1.96	1.87	0.15
AFC, mo	21.8	21.6	22.3	22.3	1.5
BW at calving, lb	1,227	1,199	1,241	1,267	76
Days in milk	299	294	294	290	10
Milk yield, 3.5% FCM, lb	25,057	24,599	25,538	25,344	2,450

Post-hoc analysis of the management and production characteristics of Holstein heifers ranked by age at first calving, independent of dietary treatment

Age at Calving	< 21	22-23	>23	Std. Dev.	<i>P</i>
n	19	27	19		
Pre-pubertal ADG, lb	2.16	2.03	1.96	0.09	0.05
AFC, mo	20.2	21.8	24.2	0.6	0.01
BW at calving, lb	1,179	1,219	1,313	92	0.01
Days in milk	298	299	285	14.0	0.7
Milk yield, 3.5% FCM, lb	24,817	25,484	24,976	2,405	0.6

What is an Acceptable Standard Deviation for AFC

Part of the variation is due to management:

Heat Detection Rate and Conception Rate

Good heat detection rates are $> 70\%$ but range from 60 to 80%

Ranges in conception rate for heifers 50 to 74%

Therefore ranges in pregnancy rate would be 30 to 58%

What is an Acceptable Standard Deviation for AFC - Management

If you started breeding 100 heifers at 14 months:

- At the lower end of HDR and CR, the AFC would be 26.1 ± 2.6 mo**
- At the higher end of HDR and CR the AFC would be 24.3 ± 1.7 mo**

Nail Biological Growth Targets

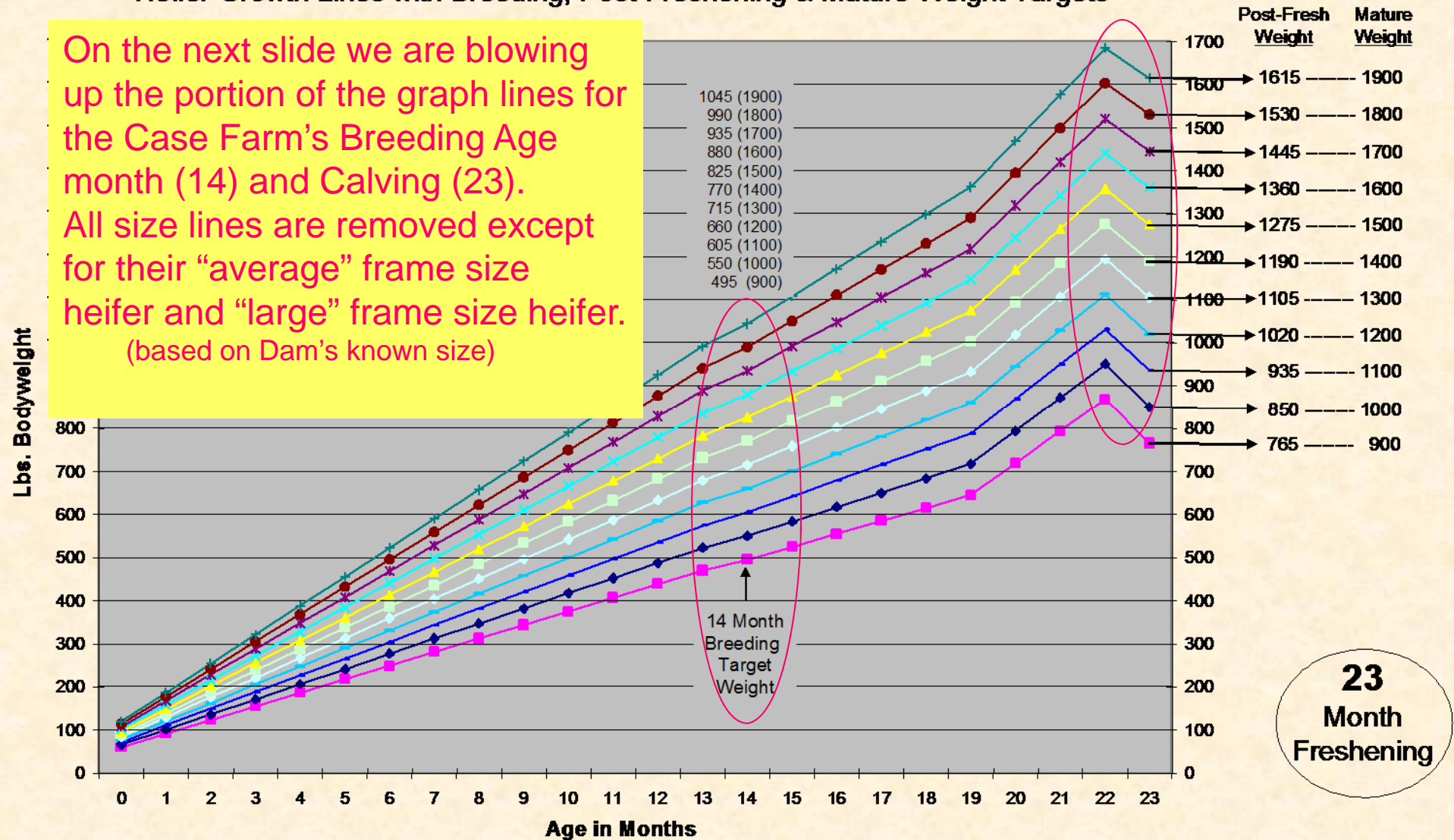
- 55% mature weight @ breeding
- 82 - 85% mature weight
@ 1st calving
≥90% achieving
- *Breeding: Avg. 56% MW
(67% Achieving)
- *Calving: Avg. 79% MW
(67% Achieving)
(Koval)

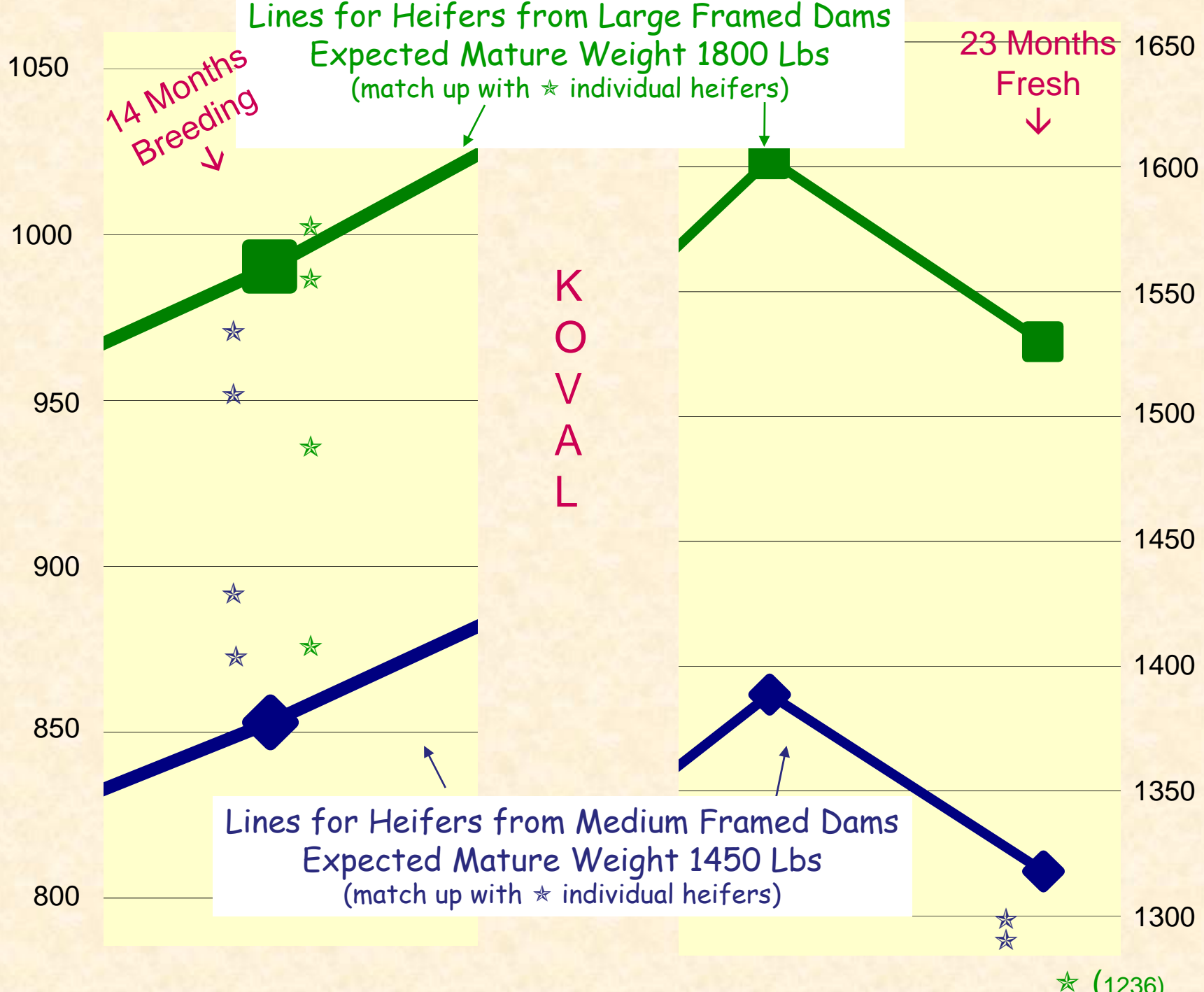
What Makes a “Quality Heifer” -- (Koval) Maintaining Management Momentum

- 1st Calf “Treated” as Calf/Heifer* ≤ 30% ?
24 hrs. → 3 mos. _____ 4 mos. → fresh _____
- DOAs in first calf heifers ≤ 9% 7.5%
Male DOAs 7% Female DOAs 8%
- 1st Calf avg. peak ≥ 80% of Mature 77%
or total lactation ≥ 80% of Mature 85%
- 1st Calf Culls ≤ 60 Days in Milk ≤ 5% 3%
- 1st Calf ME’s ≥ Mature > (+601)
- 1st Calf “Treated” in Lactation* ≤ 15% ?
- ≥ 85% retention (any herd) to 2nd lactation 88%
- Reduce #1 reason for 1st lactation culls
(continuous improvement) Mastitis

Heifer Growth Lines with Breeding, Post-Freshening & Mature Weight Targets

On the next slide we are blowing up the portion of the graph lines for the Case Farm's Breeding Age month (14) and Calving (23). All size lines are removed except for their "average" frame size heifer and "large" frame size heifer. (based on Dam's known size)





Questions

