

Crossbreeding Opportunities

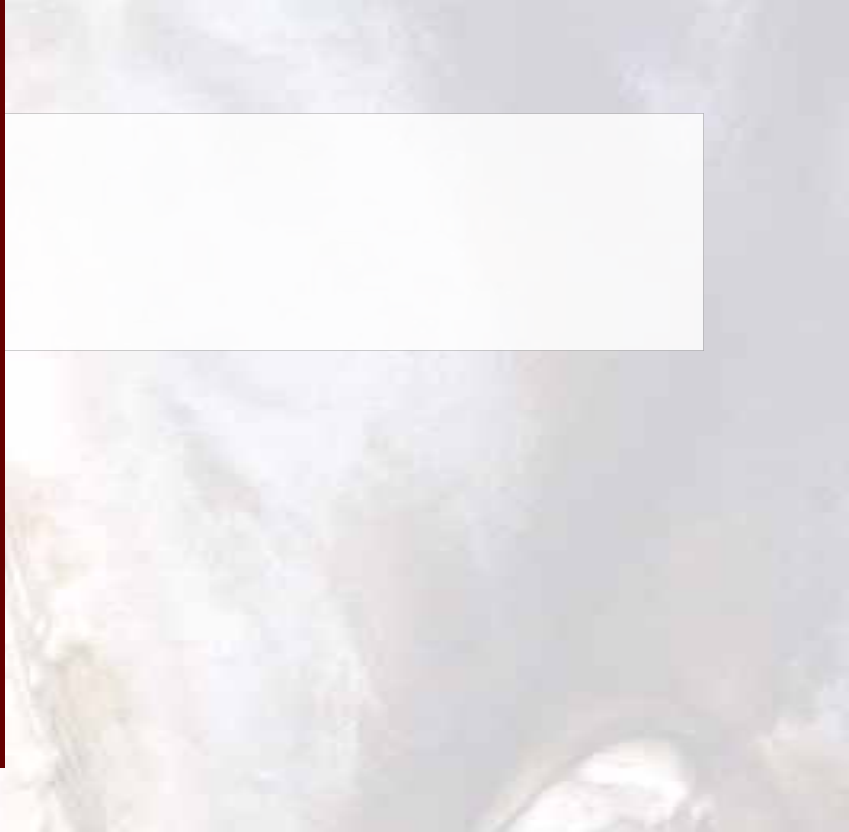
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Dairy and Animal Science

Kathy DeBraun





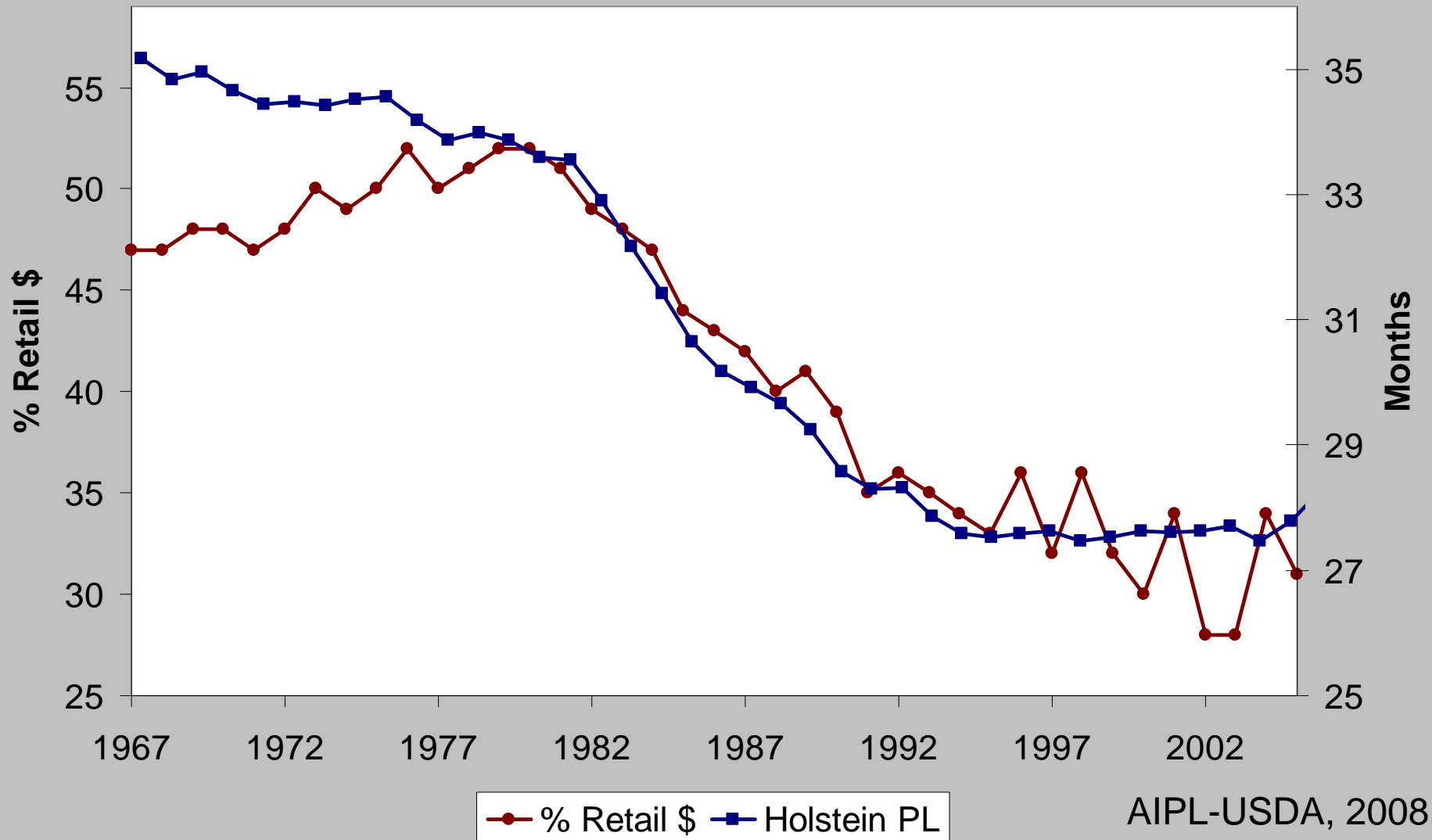


Daughter photo of a top ranked bull from a major cross-breeding company

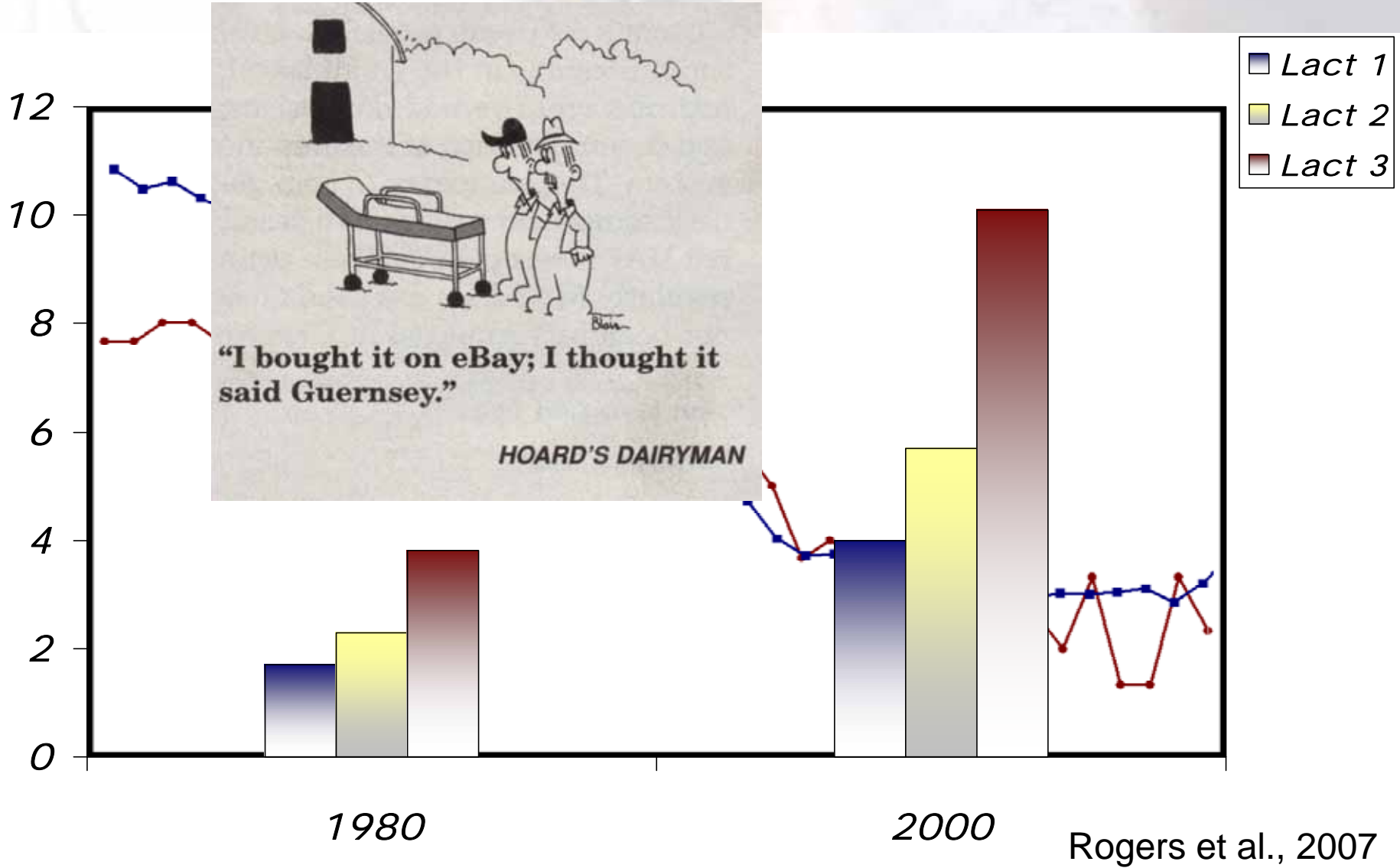
Management Considerations?



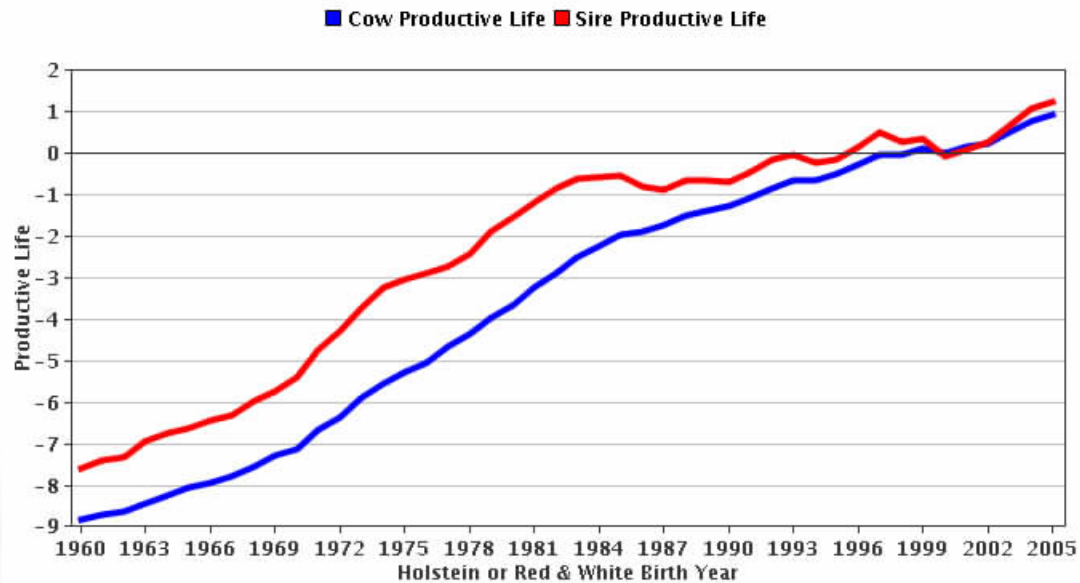
Phenotypic Trend: Productive Life



Holstein Mortality Rate

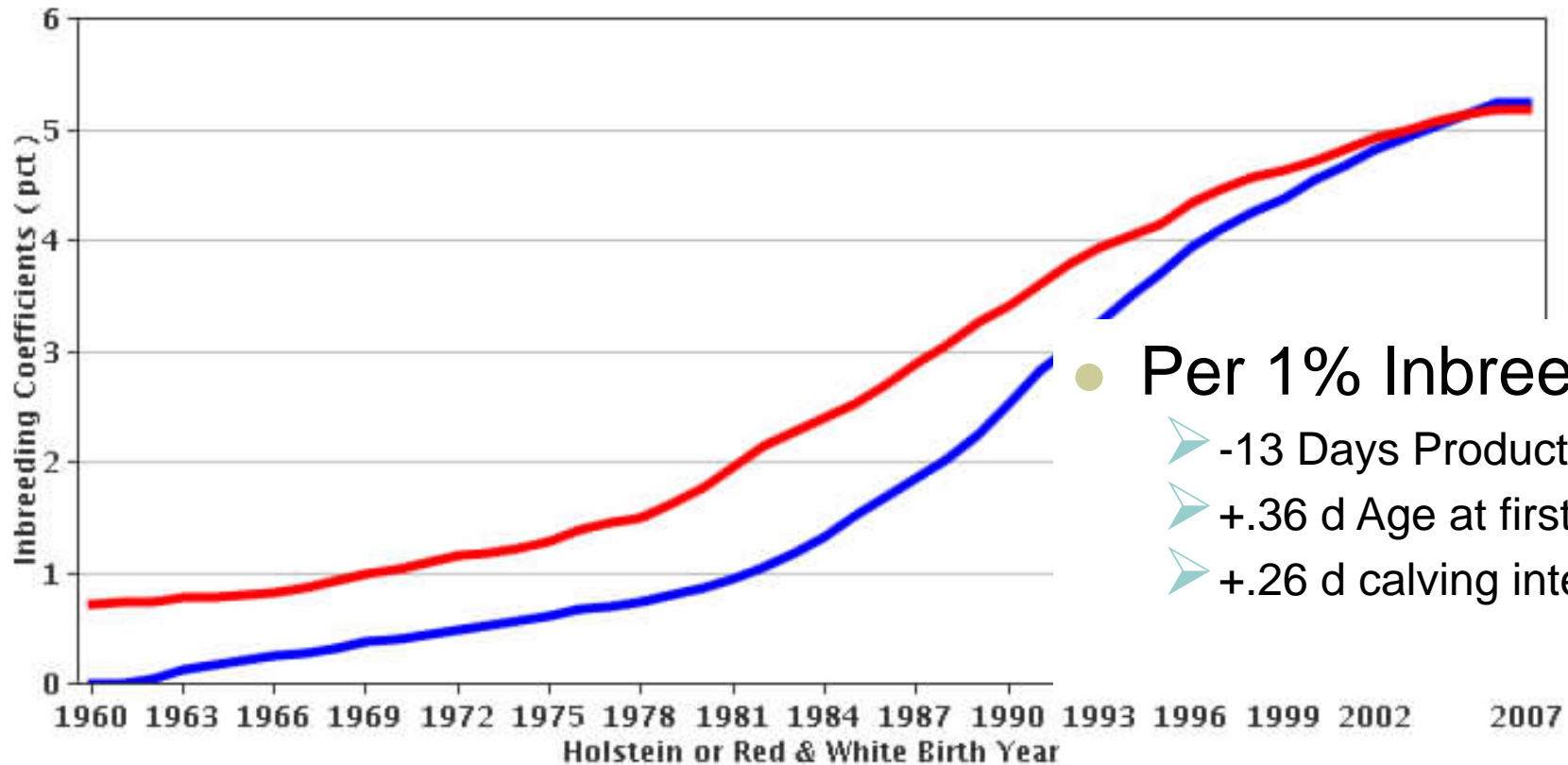


Genetic Trends: Productive Life



Holstein Inbreeding

■ Inbreeding Coefficients ■ Expected Future Inbreeding



- Per 1% Inbreeding
 - -13 Days Productive Life
 - +.36 d Age at first calving
 - +.26 d calving interval

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What is the Problem?

- Economics Dictate that Farms Maximize “Efficiency”
- Holsteins Selected for High Production
 - Extreme production stresses reproductive and health systems
 - The best environment for health / repro may not be the most “efficient”
- Genotype by Environment Mismatch

Matching G to E

1. Maximize reproductive and health environments at extreme levels of production
2. Select within breed for cows that will perform in a “less optimal” environment
3. Crossbreed



Jersey and Brown Swiss

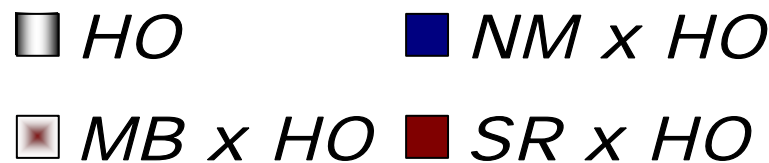
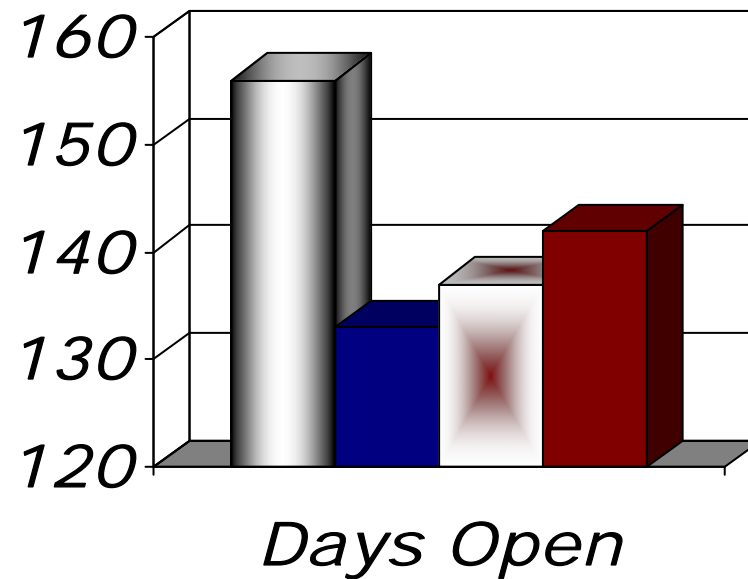
Average merit of F₁ Holstein crosses on the Holstein scale.

Second breed	Net merit (\$)	Cheese merit (\$)	Fluid merit (\$)
Ayrshire	-58	-27	-201
Brown Swiss	18	79	-241
Guernsey	-184	-138	-395
Jersey	44	113	-269
Milking Shorthorn	-249	-223	-373



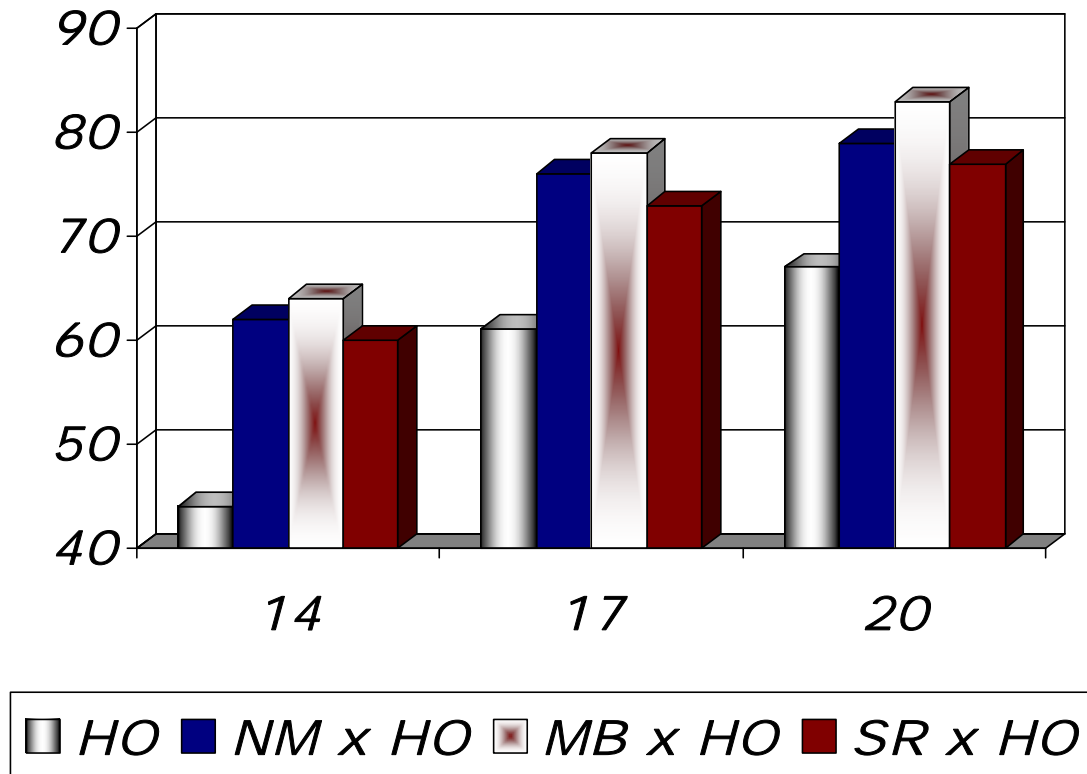
Planned Crossbreeding

Foreign Breeds: Days Open



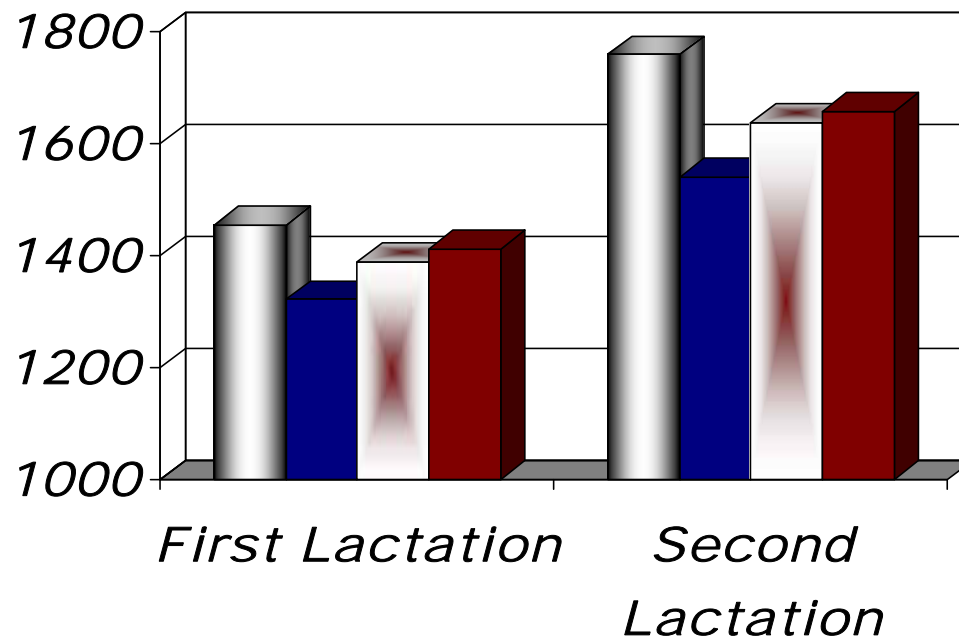
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Foreign Breeds: Survival



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Foreign Breeds: Production



■ HO ■ NM x HO ■ MB x HO ■ SR x HO

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Foreign Breeds

- Meet expectations
 - Improved fertility
 - Reduced calving difficulties
 - Increased survival
 - Lowered yield
- Have the advantage of being unique / new & exciting
 - Folks also don't know their faults!
- What about familiar US breeds?



Jersey x Holstein

	Jersey x Holstein	Holstein	Dif.
Milk (lbs)	15,752	16,982	-1230
Fat (lbs)	604	611	-7
Protein (lbs)	491	525	-33
Days Open	127	150	-23

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Jersey x Holstein

	Jersey x Holstein	Holstein	Dif.
Stature	133.6	142.5	-8.9
Udder Clearance	47.7	54.6	-6.9
Front Teat Distance	15.8	14.0	1.8
SCS	3.22	2.95	0.27

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Brown Swiss x Holstein

Breed	Days Open	SCS	AFC
Holstein	156	2.73	25.85
Brown Swiss	156	2.78	26.58
BS x HO	144	2.54	25.68
BS x (BS/HO)	153	2.66	26.58

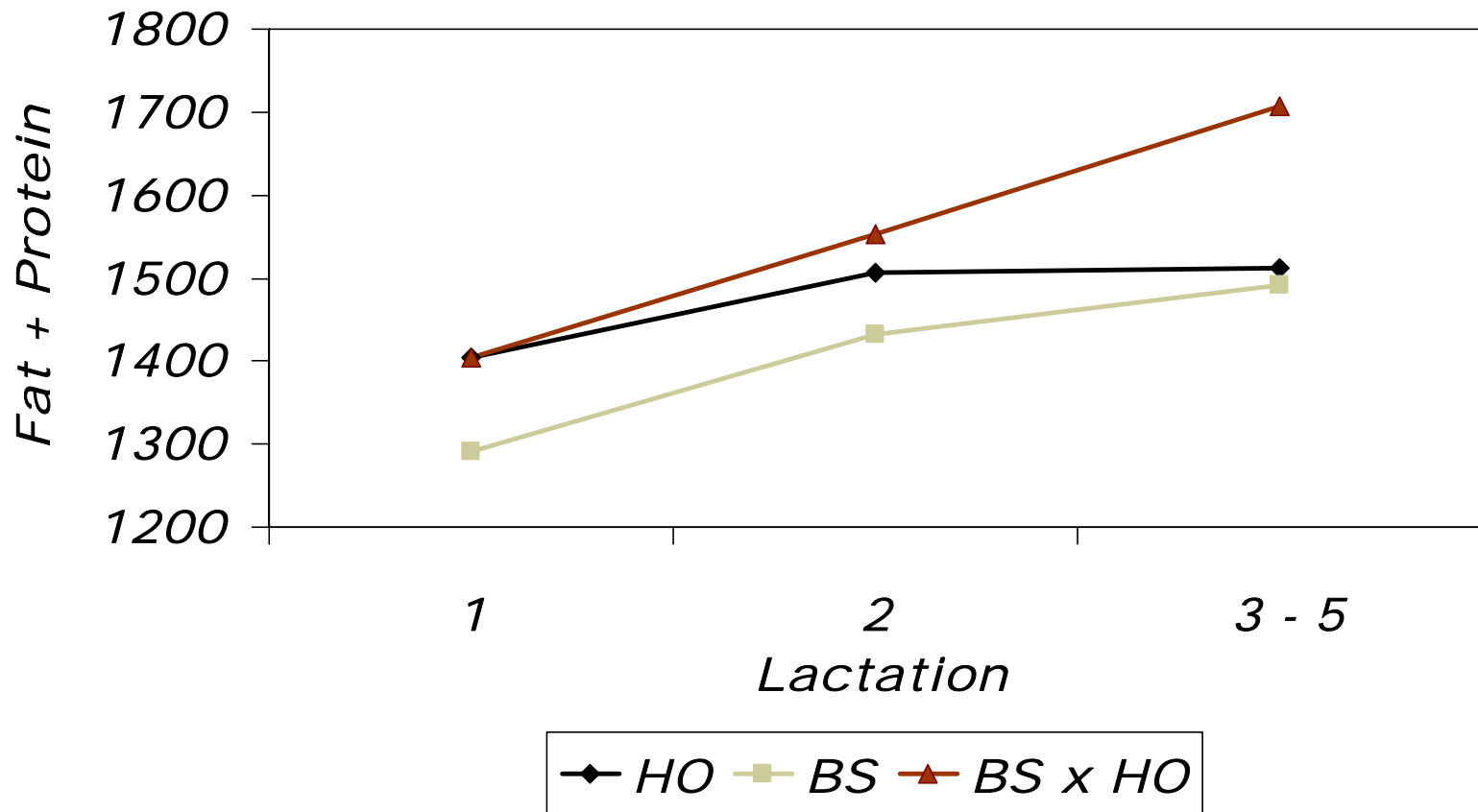
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Brown Swiss x Holstein: Yield

Breed	Daily Milk	Daily Fat	Daily Pro.
Holstein	73.31	2.67	2.20
Brown Swiss	62.35	2.53	2.05
BS x HO	71.21	2.80	2.25
BS x (BS/HO)	64.47	2.56	2.09

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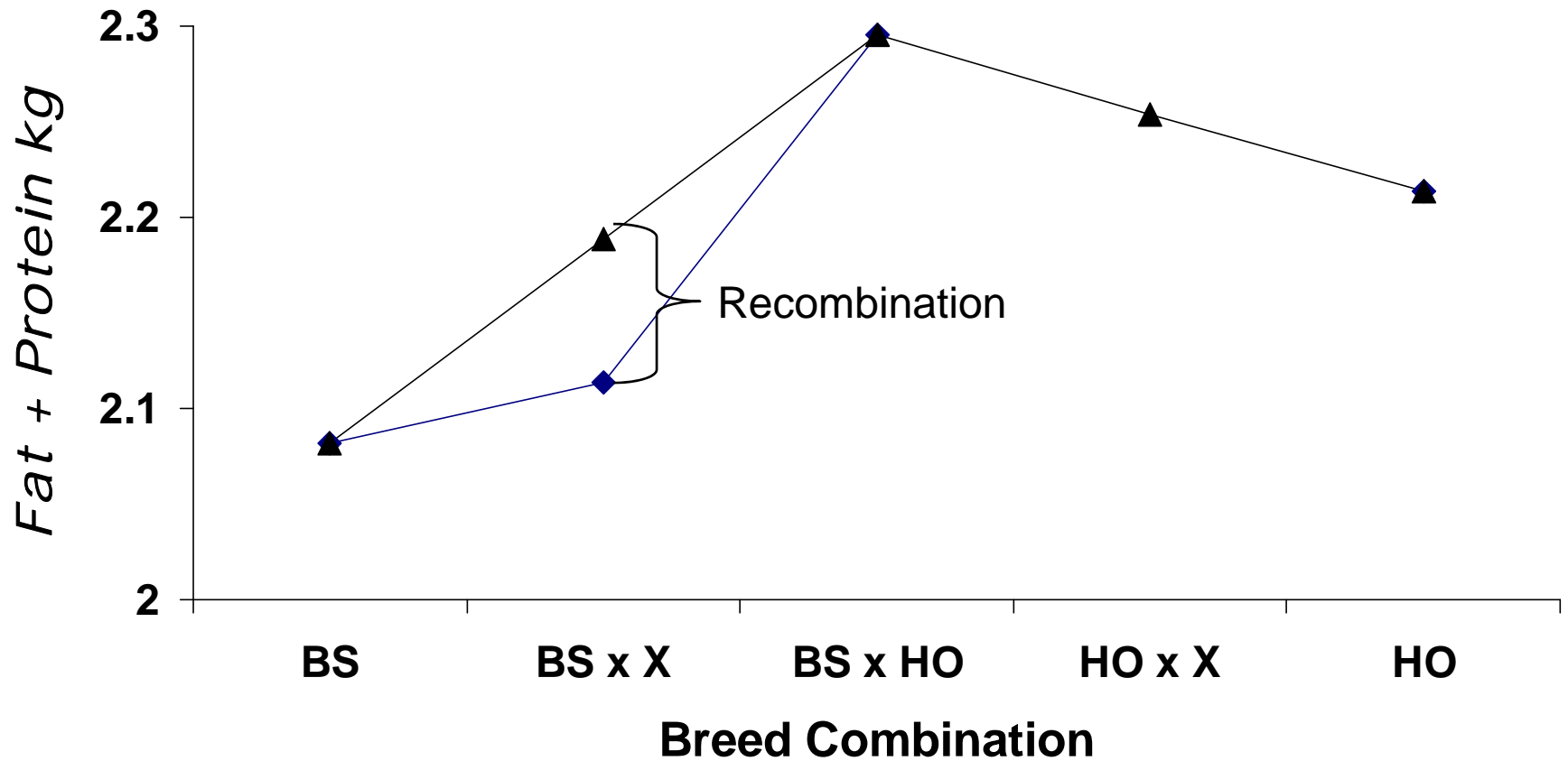
Healthy cows age gracefully



What about the next generation?

- Crossbreeding will **FAIL** if poor sires used
- Many geneticists recommending 3-breed rotation
 - 2-breed rotation = 67% heterosis
 - 3-breed rotation = 86% heterosis
 - HO x BS x JE?
 - HO x BS x SR?
- Will high production genes be diluted too much
 - HO x BS x HO x JE?
- First generation likely the best

Recombination



Heterosis Perspective

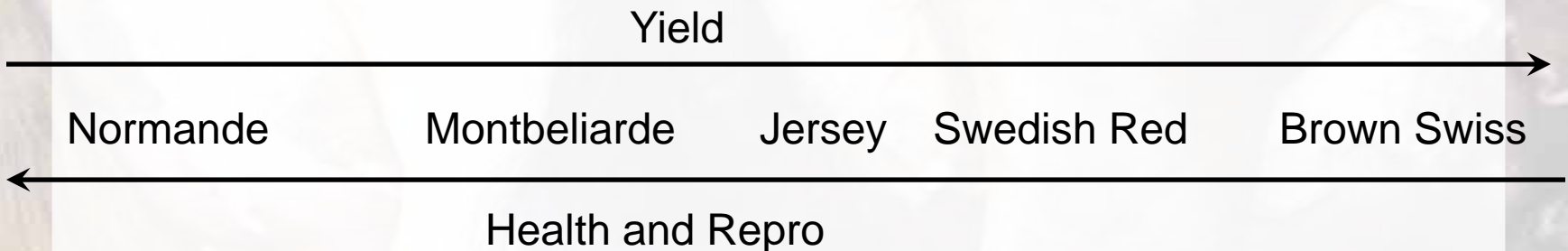
- It's not all about heterosis
 - Holstein x Angus would have a high level of heterosis!
 - May be overestimated due to recombination loss
- Economically viable dairy breeds
 - Complement each other
 - Added bonus of heterosis

It doesn't take much skill to feed a Holstein Calf



Crossbreeding

- First generation meets expectations
 - Less production
 - Higher fitness levels
- Expectations for crosses with HO



- What happens next?

Understand the Trade-Off

- You will improve
 - Fertility
 - Survival } Partly offset production/lactation losses
- You WILL STILL reduce production
- Trade off economical in some herds – not for others

Possible Breed Rotations

- Large breeds
 - Holstein
 - Brown Swiss
 - Swedish Red
 - Montbéliarde?
- Can mix sizes

- Small breed
 - Holstein
 - Jersey
 - Swedish Red
 - Normande?



A close-up photograph of a horse's hindquarters, focusing on the tail and the area around the anus. The horse has a dark coat with a white blaze on its face. The tail is dark and appears to be docked. The perineal area is visible, showing the skin and underlying structures. The background is a plain, light-colored wall.

Questions?

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