


Making Genetics Work for You


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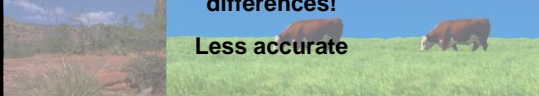

Selection Decisions



Phenotypic Selection




Does NOT account for environmental differences!
Less accurate


EPDs Defined

- Expected
 - Future, average, mean
- Progeny
 - Offspring
- Difference
 - Implies comparison between animals
 - NOT phenotypic performance


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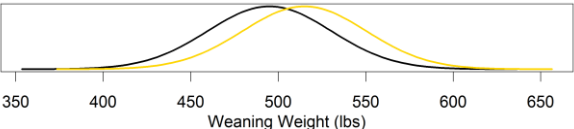

EPDs in Practice




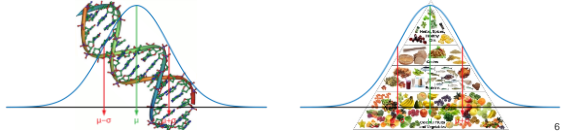
Weaning Weight EPD = 50 Weaning Weight EPD = 70



Average Weaning Weight = 495 Average Weaning Weight = 515

Relatedness is the key

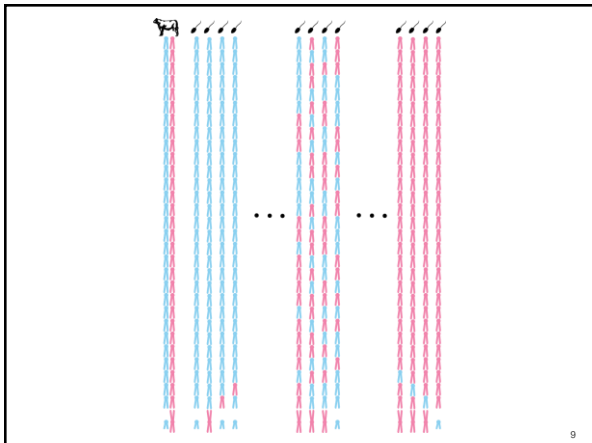



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M Random Shuffle

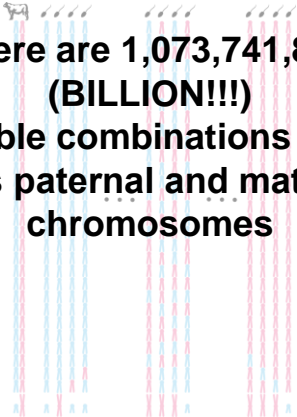


M Random Shuffle

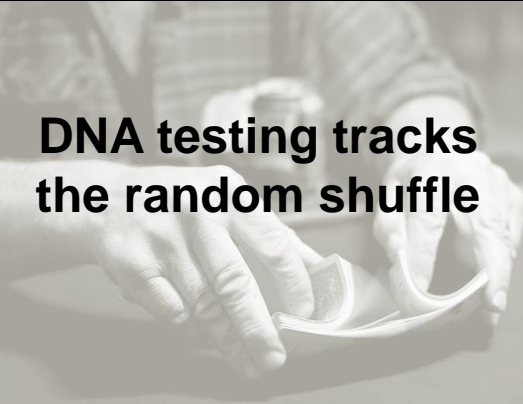



M

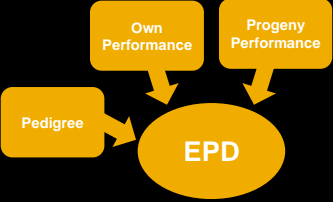
There are 1,073,741,824 (BILLION!!!) possible combinations of the sire's paternal and maternal chromosomes

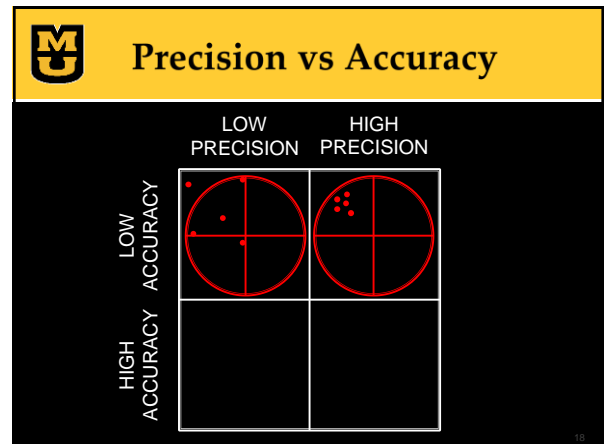
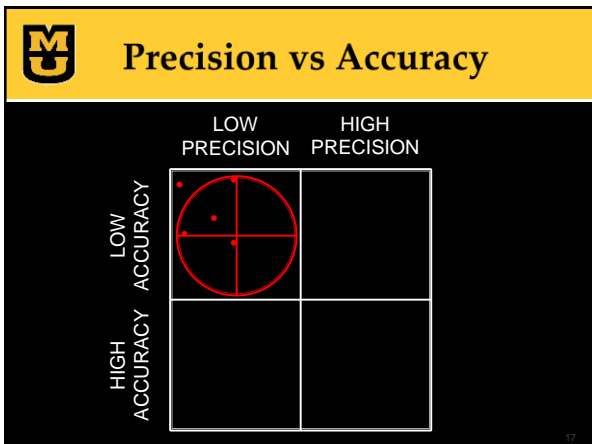
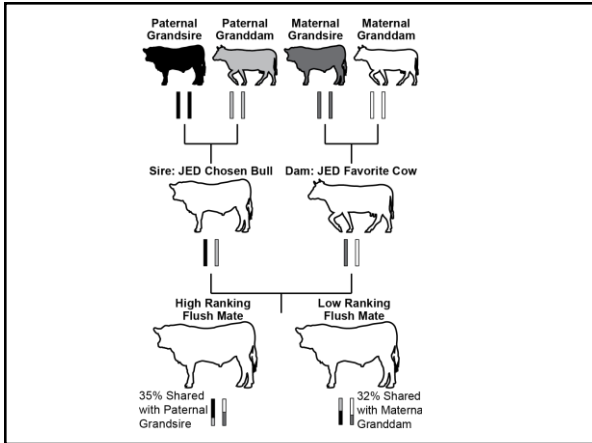
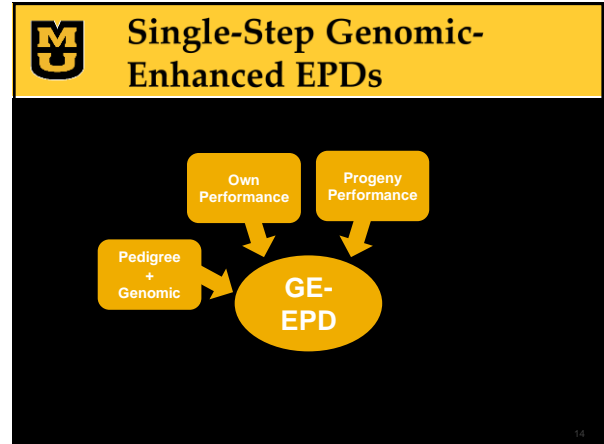
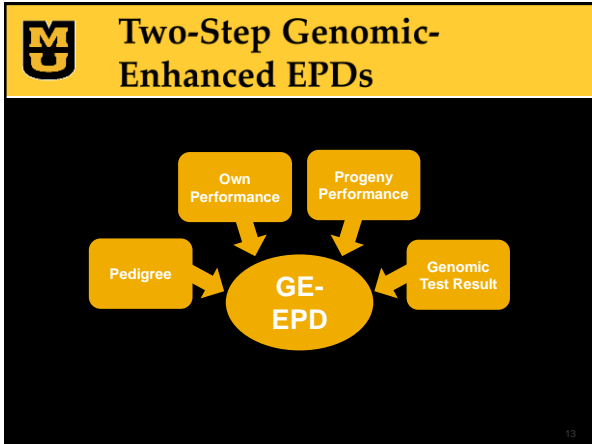


DNA testing tracks the random shuffle



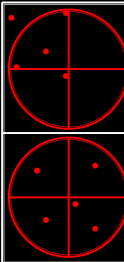
M Traditional EPDs



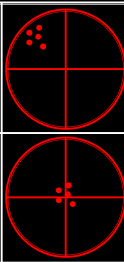


M Precision vs Accuracy

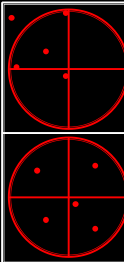
LOW PRECISION



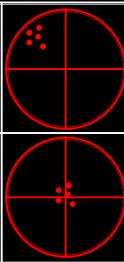
HIGH PRECISION



LOW ACCURACY



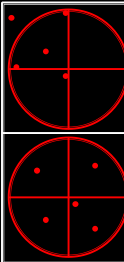
HIGH ACCURACY



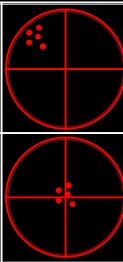
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M Precision vs Accuracy

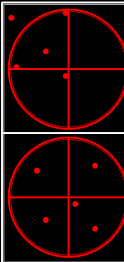
LOW PRECISION



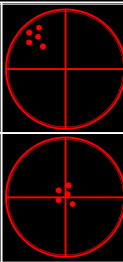
HIGH PRECISION



LOW ACCURACY



HIGH ACCURACY



EPD ACC
= Reliability
or Precision

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M Uncertainty

These are a measure of uncertainty


Production												Maternal				Contamin				Stature																					
EPD	Acc	Acc	Acc	Acc	Acc	Acc	Acc	Acc	Acc	Acc	Acc	EPD	Acc	Acc	Acc	Acc	Acc	Acc	Acc	Acc	Acc	EPD	Acc	Acc	Acc	Acc	Acc	Acc	Acc	Acc	Acc	EPD	Acc	Acc	Acc	Acc	Acc	Acc	Acc	Acc	Acc
13.0	+0.02	+0.01	+0.01	+0.01	+0.01	+0.01	+0.01	+0.01	+0.01	+0.01	+0.01	13.0	+0.02	+0.01	+0.01	+0.01	+0.01	+0.01	+0.01	+0.01	+0.01	13.0	+0.02	+0.01	+0.01	+0.01	+0.01	+0.01	+0.01	+0.01	+0.01	13.0	+0.02	+0.01	+0.01	+0.01	+0.01	+0.01	+0.01	+0.01	+0.01

* EPD Acc as of 5/27/14


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M Possible Change

CED: 13 CED Acc: 0.40



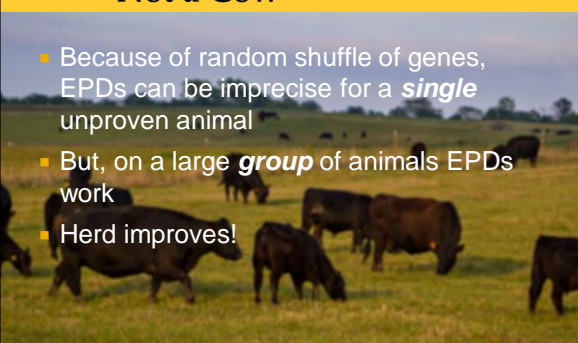
CED: 13 CED Acc: 0.80



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M Change a Herd, Not a Cow

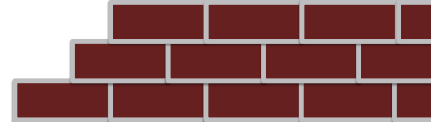
- Because of random shuffle of genes, EPDs can be imprecise for a *single* unproven animal
- But, on a large *group* of animals EPDs work
- Herd improves!



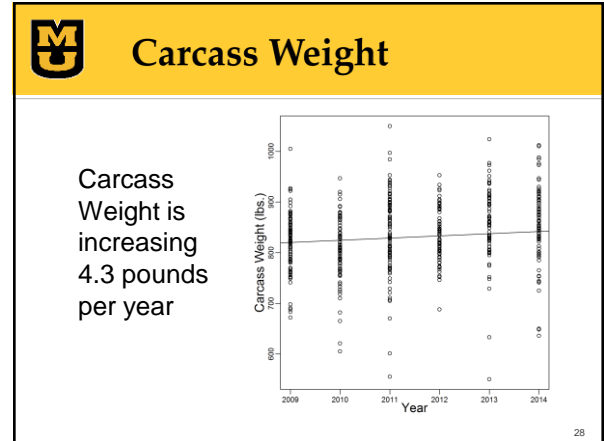
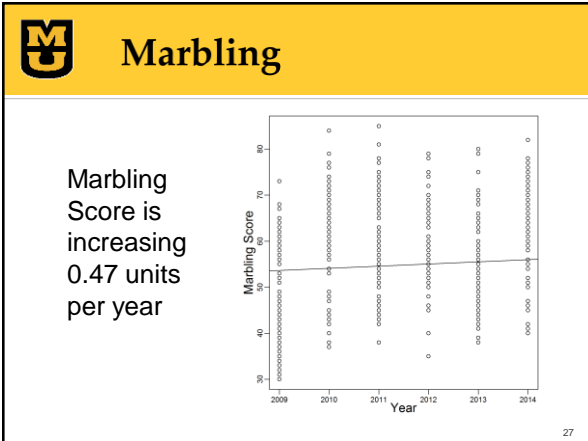
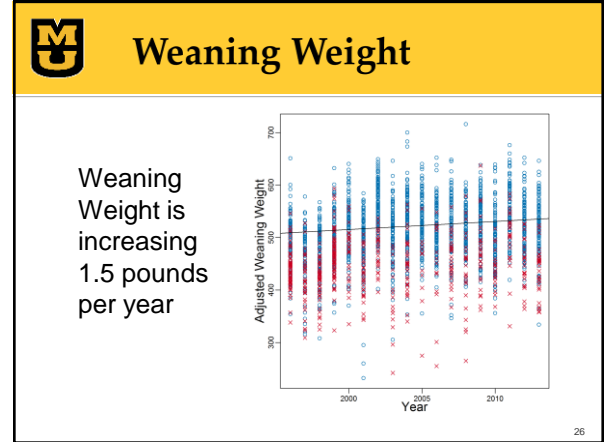
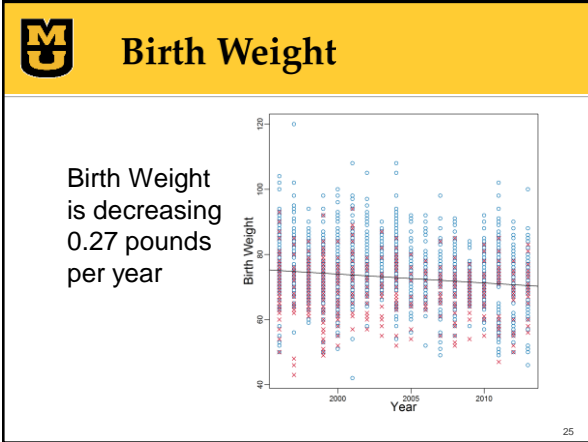
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M Genetic improvement is semi-permanent

- Increase equity in herd
- Long term investment



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- ### M DOs and DON'Ts
- DON'T double count information
 - Actual birth weight, birth weight EPD, calving ease EPD
 - Reduces accuracy of selection
 - Limits ability to accomplish goal!!!
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- ### M DOs and DON'Ts
- Do select using economically relevant traits
 - DON'T select using indicator traits
 - Limits ability to accomplish goal!!!
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M What would you do...

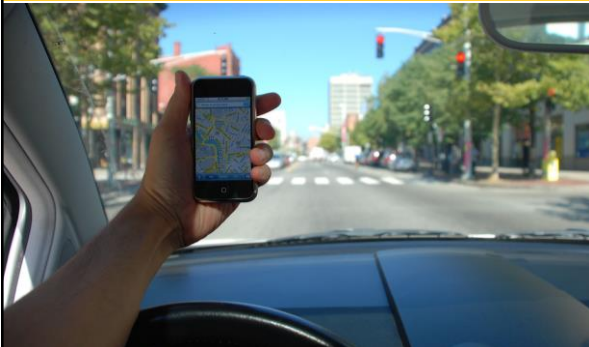
If you were driving from Columbia, Missouri to Ft Worth, Texas?

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M Have a Plan



M Have a Plan



M Have a Plan



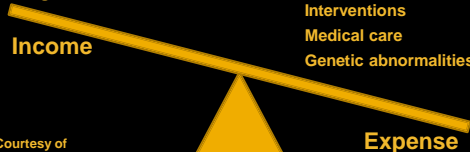
M Have a Plan

- Why would I want to develop a plan (a.k.a. breeding objective)?
- Focus** selection decisions on our economic well being
- Make selection decisions more **accurately** and **consistently**
- Simplifies** evaluation of candidates for selection

Courtesy of Michael MacNeil

M Economically relevant traits

Number of calves	Nutrients required
Weight of calves	Number of replacements
Body composition	Interventions
Product quality	Medical care
Number of cull cows	Genetic abnormalities
Weight of cull cows	

Income  Expense

Courtesy of Michael MacNeil

M Questions

- That is a lot of EPD to consider at one time – genetic improvement would be faster if I considered few traits, right?
- That depends on how you define “genetic improvement”
- Individual traits would change more quickly by considering fewer of them
- But, what trait should we be maximizing?

Courtesy of Michael MacNeil

M What trait should we be maximizing?

Profit

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M Factors to consider in Selection Decisions

Income

- Number of calves
- Weight of calves
- Body composition
- Product quality
- Number of cull cows
- Weight of cull cows

Expense

- Nutrients required
- Number of replacements
- Interventions
- Medical care
- Genetic load

Courtesy of Michael MacNeil

M What is an economic index?

- Combination of EPDs weighted according to their economic importance
- Expressed as a dollar value
- Breeds have different indexes
- Different indexes for different marketing endpoints

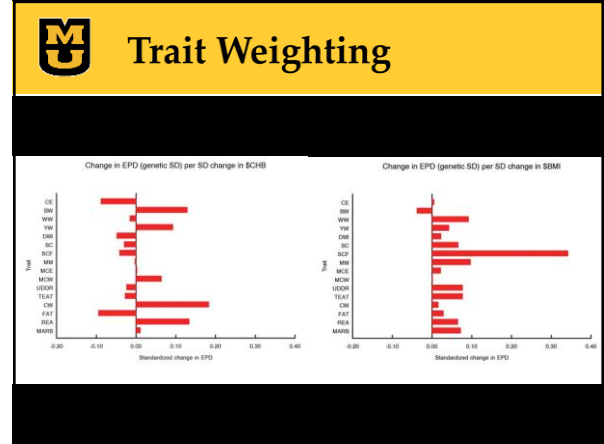
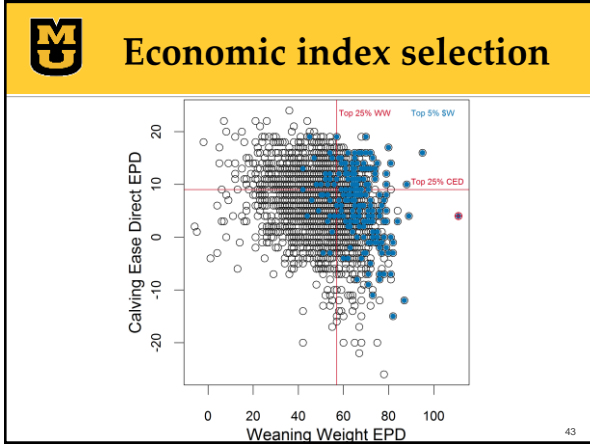
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M Why Selection Indices?

- Profit Motivated
- Breeding Objectives Compatible
- Multi-trait Selection
- Simple

M Truncation selection

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Indexes are Robust

HerdBuilder versus tweaks of HerdBuilder

- HB vs HB w/o CED = 0.97
- HB vs HB w/o WW & ADG = 0.93
- HB vs HB w/o Carcass = 0.99
- HB vs HB w/o Carcass & Feedyard = 0.89
- HB vs HB w/o Stayability = 0.74

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NCBA PRODUCER EDUCATION
Cattlemen's GENETICS WEBINAR SERIES

JANUARY 18
FAKE NEWS: EPDS DON'T WORK
| Alison Van Eenennaam & Matt Spangler
REGISTRATION OPEN AT WWW.NCBA.ORG

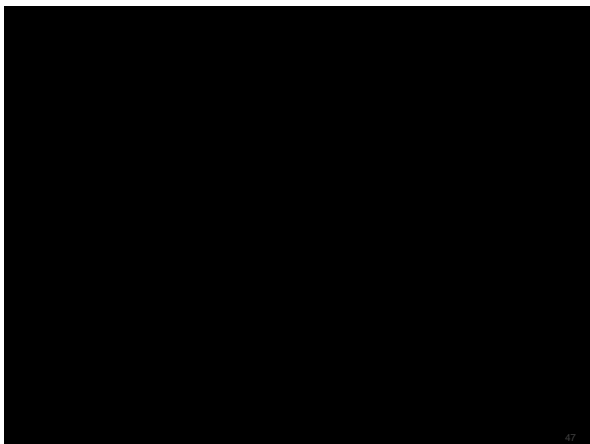
FEBRUARY 22
SHOW ME THE MONEY! ARE THERE EPDS FOR PROFIT?
| Cliff Suback & Jared Decker

MARCH 22
THE 4 S'S OF CROSSBREEDING: SIMPLE, STRUCTURED, SUCCESSFUL, AND SUSTAINABLE
| Bob Weimer & Megan Rott

APRIL 19
PUTTING THE TOOLS TO USE: BUYING YOUR NEXT BULL
| eBEEF Team

The series produced in partnership with the eBEEF team

FOR MORE INFO WWW.NCBA.ORG



Take Home:

Economic indexes simplify and improve selection decisions

EPDs work and provide information on genetics!

UNIVERSITY OF MISSOURI Extension <http://blog.steakgenomics.org/>

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