The Value of a Ram

Selection and Purchasing Rams
Genetic Transmission in Sheep

54 chromosomes (27 pairs)

Diploid

Ram 54

27 sperm

Egg 27

Diploid

Ewe 54

54 chromosomes (27 pairs)

Haploid

Zygote 27

Fertilization

1/2 of the genetic information comes from each parent!

New Individual

Diploid
The rams you select this year

Provide \( \frac{1}{2} \) of the genetics for next year’s lambcrop
What do you want from a ram?

- **A pregnancy**
  - Able to settle a large number of ewes in a short period of time
  - Dependent on:
    - Ram’s reproductive soundness
    - Time of year
    - Environmental conditions
    - Management
What do you want from a ram?

- Influence genetic makeup of the lamb
  - Which traits?
    - Lambing rate
    - Lamb survival
    - Pounds of lamb weaned
    - Growth rate
    - Carcass traits
    - Wool quantity as well as quality
    - Longevity
    - Ability to breed out of season
    - Early puberty
    - Moderate ewe size

The more traits selected for the less progress made
Selection Goals

Terminal Sire Production
- Rapid growth rate
- Muscular carcasses
- Lean at heavier slaughter weights

Maternal Sire Production
- Moderate frame size
- High lambing rate
- Mothering ability
- High pounds of lamb weaned.
- Longevity
- Fleece
- Early puberty
Selecting for Growth
Phenotype

THE EXTERNAL APPEARANCE OR SOME OTHER OBSERVABLE OR MEASURABLE CHARACTERISTIC OF AN INDIVIDUAL
Genotype

THE GENETIC CONSTITUTION OF AN INDIVIDUAL
Most performance traits affected by the influence of more than one pair of genes

Performance traits are measured by observing phenotypes

Phenotypic values are also affected by environmental influences

The above conditions make selection accuracy for trait improvement very difficult
HERITABILITY

- Is defined as the percentage of the variance in observed performance *(phenotype)* between individuals due to the genetic makeup *(genotype)* of the individuals.

- Can range from 0 to 1.0 in value
  - *Environment is 0% heritable!*

- The higher the value the higher the heritability of a trait.
<table>
<thead>
<tr>
<th>TRAIT</th>
<th>HERITABILITY</th>
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</thead>
<tbody>
<tr>
<td>LAMBING RATE</td>
<td>0.13</td>
</tr>
<tr>
<td>MILKING ABILITY</td>
<td>0.25</td>
</tr>
<tr>
<td>WEANING WGT (90 DAY)</td>
<td>0.30</td>
</tr>
<tr>
<td>YEARLING WGT</td>
<td>0.40</td>
</tr>
<tr>
<td>POST WEANING DAILY GAIN</td>
<td>0.40</td>
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<tr>
<td>LOIN EYE AREA</td>
<td>0.45</td>
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</table>
Most of the measured difference in performance is not due to genetics!
“My biggest challenge when selecting bulls is to avoid buying environment”

Roy Wallace - sire selection specialist for Select Sires
Estimated Breeding value for trait (EBV) =

(performance measured of individual - avg of contemporaries) x heritability

**EXAMPLE**

INDIVIDUAL WEANING WGT = 90 LBS

CONTEMPORARY GROUP AVG = 60 LBS

HERITABILITY OF WEANING WGT = 0.30
APPLICATION OF GENETIC SELECTION FOR WEANING WGT

- SELECTED - GROUP AVG
- SELECTION DIFFERENTIAL = SELECTED - GROUP AVG
- BREEDING VALUE = SELECTION DIFFERENTIAL x HERITABILITY
- 1/2 OF BREEDING VALUE

Pounds
COMPARISON OF EBVs FOR WEANING WGT

While actual lamb weights may vary in different environments, progeny performance differences should be similar.

<table>
<thead>
<tr>
<th></th>
<th>EBV (LBS)</th>
<th>EPD (LBS)</th>
<th>AVG Wean. WGT (LBS)</th>
<th>AVG Wean. WGT (LBS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ram</td>
<td></td>
<td></td>
<td>Flock X</td>
<td>Flock Y</td>
</tr>
<tr>
<td>A</td>
<td>+8.0</td>
<td>+4.0</td>
<td>64.0</td>
<td>58.7</td>
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<tr>
<td>B</td>
<td>-2.6</td>
<td>-1.3</td>
<td>58.7</td>
<td>53.4</td>
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<tr>
<td>Difference</td>
<td>10.6</td>
<td>5.3</td>
<td>5.3</td>
<td>5.3</td>
</tr>
</tbody>
</table>
NSIP Postweaning WT EPD Distributions for Suffolk Sires

Which animals can improve postweaning growth the most?

“The Bell Curve”
NSIP Postweaning WT EPD Distributions for Suffolk Sires

"The Bell Curve"
Selecting by visual appraisal = no change
NSIP Suffolk Post Weaning Growth Trend

Year of birth

Postweaning wt EPD

1st across flock EPD run
NSIP Postweaning WT EPD
Distributions for Suffolk Sires

"The Bell Curve"
Extra $ on 5000 lambs

$259,710
$418,550
$678,260
Questions?

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