Breeding Worth explained

This guide is brought to you by New Zealand Animal Evaluation Ltd (NZAEL), a wholly owned subsidiary of DairyNZ, which is owned by you, the New Zealand dairy farmer. NZAEL sets the National Breeding Objective and determines the traits included in Breeding Worth.

Seven traits of a highly efficient cow

- Somatic cell
- Milkfat
- Milk volume
- Residual survival
- Live-weight
- Fertility
- Protein

How to use Breeding Worth, Production Worth and Lactation Worth

- **BW**: Genetic ability for breeding replacements
- **PW**: Lifetime performance
- **LW**: Current season performance

**Meaning**
- BW
- PW
- LW

**Use for**
- Selecting bulls and replacements and purchasing heifers
- Culling and purchasing cows
- Culling

**$ terms**
- +68 = expected to breed daughters that are $34 more profitable than daughters of a 0 BW cow
- +78 = expected to generate $78 more profit, in each of her lactations, than a cow with a PW of 0
- +98 = expected to generate $98 more profit, in the current season, than a cow with a LW of 0

**Traits**
- Milkfat, protein, milk volume, liveweight, fertility, somatic cell and residual survival
- Milkfat, protein, milk volume, liveweight
- Milkfat, protein, milk volume, liveweight

Genetic gain contributes $45 million annually to the national economy which compounds over time.

For the best bulls consult the RAS list.

nzael.co.nz

National breeding objective (BW):

“Animals whose progeny will be the most efficient converters of feed into farmer profit.”

- The Breeding Worth ranks male and female animals for their genetic ability for breeding replacements
- The Production Worth ranks female animals for their lifetime performance
- The Lactation Worth ranks female animals for their current season performance

For the best bulls consult the RAS list.

nzael.co.nz

Genetic gain contributes $45 million annually to the national economy which compounds over time.
**Calculating breeding worth**

Expressed as: $ net farm income/5 tonne of dry matter

BW ranks bulls and cows on their expected ability to breed profitable and efficient replacements as it includes the economically important traits.

**Genetic base**

The genetic base, also referred to as the Base Cow, is the average of a group of animals whose evaluation is set at zero for all traits to form a reference point for comparison.

The Base Cow is currently the average of 2000 born cows.

For more info: nzael.co.nz/animal-data/genetic-base-cow

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**How to read breeding values**

**BW**

_Breeding values (BVs)_

Breeding values are the genetic merit of an animal for the individual traits relative to the Base Cow.

**Protein (kg)** – indicates that Sample Sam is expected to produce daughters on average that will produce 10 kg (half of 20 kg) more protein per lactation than the Base Cow.

Likewise for **Milkfat (kg)** and **Milk Volume (litres)** where half of Sample Sam’s genetic merit, on average, is expressed in his daughters.

**Liveweight (kg)** – indicates that Sample Sam on average will produce daughters that are 5 kg (half of 10 kg) heavier than the Base Cow.

**Fertility (%)** – indicates that 2% (half of 4%) more of Sample Sam’s daughters will calve in the first 42 days of the herds calving period compared to the Base Cow.

**Somatic Cell (score)** – indicates that Sample Sam on average, will produce daughters with a lower Somatic Cell score of -0.1 (half of -0.2) than the Base Cow. The lower the Somatic Cell BV the better.

**Residual Survival (days)** – indicates that Sample Sam is expected to produce daughters that will last on average in the herd 50 days longer (half of 100) than the Base Cow after separately accounting for the genetic effects of production, fertility, liveweight and somatic cell score on longevity.

There are 25 additional breeding values for you to explore such as; Body Condition Score, Gestation Length, Calving Difficulty, Udder Overall, Milking Speed, Capacity and Overall Opinion. These additional BVs can be used to further narrow down farmer’s selections of high BW bulls.

**Economic values (EVs)**

Economic values are calculated using farm economic models which take into account milk production, historical, current and forecast milk prices, income from culls, surplus cows and bobbies, cost of generating replacements and dairy farm expenses.

These are updated in February every year.

**EVs as at Feb 2013:**

<table>
<thead>
<tr>
<th>Protein ($/kg)</th>
<th>Milkfat ($/kg)</th>
<th>Milk volume ($/kg)</th>
<th>Liveweight ($/kg)</th>
<th>Fertility ($/%)</th>
<th>SCS ($/unit SCS)</th>
<th>Residual survival ($/days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.63</td>
<td>1.79</td>
<td>-0.091</td>
<td>-1.52</td>
<td>7.35</td>
<td>-38.57</td>
<td>0.148</td>
</tr>
</tbody>
</table>

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**Introducing the example bull — Sample Sam**

**RANKING OF ACTIVE SIRES**

**EVALUATION DATE 17/08/2013**

**CROSSBRED**

| Breeding values |
|-----------------|-----------------|-----------------|-----------------|-----------------|-------------------|------------------------|
| Bull name       | BW/Rel          | Protein (kg)    | Milkfat (kg)    | Milk (l)        | Lwt (kg)         | Fert (%)             | SC (score)            | Resid Surv (days) |
| Sample Sam      | 200/75          | 20              | 20              | 500             | 10               | 4                     | -0.2                  | 100              |
Delving deeper — no two bulls are the same

Two bulls can have exactly the same BW but will have reached that through very different strengths.

Which bull is best?

<table>
<thead>
<tr>
<th>BV Traits</th>
<th>BULL A</th>
<th>BULL B</th>
</tr>
</thead>
<tbody>
<tr>
<td>BV EV BW</td>
<td>32 x $8.63</td>
<td>43 x $8.63</td>
</tr>
<tr>
<td>BV EV BW</td>
<td>14 x $1.79</td>
<td>24 x $1.79</td>
</tr>
<tr>
<td>Protein</td>
<td>32 x $8.63</td>
<td>43 x $8.63</td>
</tr>
<tr>
<td>Milkfat 14</td>
<td>14 x $1.79</td>
<td>24 x $1.79</td>
</tr>
<tr>
<td>Milk 14</td>
<td>14 x $1.79</td>
<td>24 x $1.79</td>
</tr>
<tr>
<td>Liveweight</td>
<td>38 x $1.52</td>
<td>27 x $1.52</td>
</tr>
<tr>
<td>Milkfat 14</td>
<td>14 x $1.79</td>
<td>24 x $1.79</td>
</tr>
<tr>
<td>Milk 14</td>
<td>14 x $1.79</td>
<td>24 x $1.79</td>
</tr>
<tr>
<td>Liveweight</td>
<td>38 x $1.52</td>
<td>27 x $1.52</td>
</tr>
<tr>
<td>Fertility 5</td>
<td>5 x $7.35</td>
<td>5 x $7.35</td>
</tr>
<tr>
<td>Somatic Cell -0.41</td>
<td>-0.41 x $-38.57</td>
<td>0.11 x $-38.57</td>
</tr>
<tr>
<td>Resid Surv (days) 5</td>
<td>5 x $0.148</td>
<td>140 x $0.148</td>
</tr>
</tbody>
</table>

• Bull A has superior Somatic Cell and Fertility traits.
• Bull B has superior Production traits.

The best bull is the bull that fits your herd breeding objective.

Reliability, which is shown on a scale of 0 to 100, measures how much information has contributed to the trait evaluation for the animal. It indicates confidence that the BV is a good indication of the animal’s true genetic merit.

Reliability explained

How is ancestry/progeny information weighted in a bull’s BW?

Reliability explained

RAS list threshold

How is ancestry/progeny information weighted in a bull’s BW?

• Progeny information
• Ancestry information

The best bull is the bull that fits your herd breeding objective.
Did you know that DairyNZ has an economic index for perennial ryegrass cultivars? Check it out...

dairynzfvi.co.nz

Rule of thumb...
Reduce cow numbers by one cow per 300 each year to fully exploit genetic gains
OR
Increase feed supply by 5 t DM per 300 cows per year.

The NZAEL RAS list is updated every 3-4 weeks.