Improving the bottom line – Balancing Growth and Fertility.

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The bull sales are over for another year so it is a good time to reflect on how and why you selected your bull purchases. It is important to ask “what traits did I select in the bulls so to improve my bottom line?” Assuming you are retaining females for breeding, the bulls you selected will have an impact on your profitability for, at least, the next 10 years.

Two traits of major economic importance in a beef breeding enterprise are:

1. **Fertility**: The fertility of a breeding herd has a significant impact on the profitability of a beef breeding business. Basically, more calves from a set number of breeders or area over a defined 12 month production cycle equals more dollars. The bulls you purchase is one factor that will impact on the fertility of your breeding herd. This will arise from retaining a selection of his daughters as replacement breeders. The question to ask is “how do I know that the bull(s) I am selecting will have the genetic package to make a positive contribution to female fertility?”

2. **Growth**: Weight for age or how fast animals are able to reach a specific weight also impacts on the bottom line. More profitable animals reach a given weight earlier or similarly are heavier at a given age, assuming all other factors being equal. The Bulls you select will have a significant impact on this trait.

Tropical Beef Technology Services has analysed the economic importance of a number of traits for a typical grass fed Jap Ox, self replacing herd production system in Northern Australia. This analysis was undertaken using the BreedObject program. The weightings on a number of key performance traits are shown in figure 1.

![Figure 1. Weightings on key performance traits.](image-url)
The analysis showed that when selecting breeding animals for a typical Jap Ox production system most weighting (46%) should be placed on fertility traits (or increasing weaning rate). It also showed that a lesser, but still significant amount of weighting should be placed on increasing sale liveweight (17%) and cow survival rate (13%).

To improve profitably for this particular production system, breeders need to be selecting bulls that improve both fertility in their daughters (weaning rate) and growth in their sale progeny (sale liveweight). A problem that arises is that the relationship between fertility and growth is antagonistic. That is, if you only focus on increasing growth your herd will most likely become genetically less fertile (reduced weaning rate). The saving grace is, with the right information, you can find breeding animals that will genetically increase weight of sale progeny and produce more fertile daughters.

Most bull buyers take growth into account in their bull selections through visual appraisal, growth rates and weight EBVs (200, 400, 600 day and mature cow weight). Improving breeder herd fertility is an important factor that generally gets overlooked in bull selection. There is a range of information potentially available to use as a guide when selecting a bull to improve breeder herd fertility. This includes:

**Dam Information**
Age at first calf and calving interval are two pieces of information that seedstock producers can supply on the dams of bulls as an indicator of female fertility. Bulls that have dams with a younger age at first calf and shorter calving interval are more favorable. Age at first calf and calving interval are “raw” pieces of information and should only be compared within a herd. They are affected by environmental factors such as season, management and artificial breeding programs.

**Scrotal Size**
Scrotal Size (SS) EBVs are estimates of the genetic differences between animals in scrotal circumference (cm) at 400 days of age. Larger, more positive, SS EBVs are generally more favorable. For example, a bull with a SS EBV of +1.7 cm would be expected to produce sons with larger testicles at yearling age and daughters that reach puberty earlier than the progeny of a bull with an SS EBV of +0.4 cm.

**Days to Calving**
Days to Calving (DC) EBVs are estimates of genetic differences between animals for the female fertility trait, expressed as the number of days from the start of the joining period (ie. when the female is introduced to a bull) until subsequent calving (Figure 2).
DC identifies those cows that calve earlier in the season compared to those that calve later, while penalising those cows that do not calve. Negative DC EBVs indicate a shorter interval from the start of joining season until calving.

![Figure 2. Measure of Days to Calving](image)

Lower or negative DC EBVs are generally more favorable and indicate sires or future sires that will produce daughters with shorter number of days to calving and this effect will be cumulative over the life of those daughters. For example, a bull with a DC EBV of -10 days would be expected to produce daughters that conceive earlier in the joining period than the daughters of a bull with a DC EBV of +10 days.

There is only a small favorable relationship between SS and DC. Therefore it is strongly recommended that breeder select for the DC trait directly if they want to improve female fertility.

Tabled below is growth and fertility information on two bulls that were up for sale this year.

<table>
<thead>
<tr>
<th>Growth information</th>
<th>Dam Information</th>
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<tbody>
<tr>
<td>Bull Tag WW EBV YW EBV FW EBV MCW EBV Dam Id No Prog Age (Yrs) Age 1st Calf CI DC+ EBV</td>
<td></td>
</tr>
<tr>
<td>Z42 -5 0 +4 +10 R. Deidre 8 12 3 414 -1.8</td>
<td></td>
</tr>
<tr>
<td>Z46 +7 +14 +17 +11 R. Gemstone 6 9 2.7 369 -4.3</td>
<td></td>
</tr>
<tr>
<td>Breed Av +3 +5 +5 +4</td>
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*No days to calving EBV currently available in Droughtmaster BREEDPLAN.

Based on the information tabled, and assuming both bulls passed their vet assessment and visual appraisal, Z46 would be the best selection to increase sale liveweight and produce the more fertile daughters.

**Conclusion**

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Bull selection needs to be balanced across a number of traits such as growth and fertility. Breeder fertility plays an important role in production and profitability and should be taken into account in bull selection. Online catalogues and breed association databases are a good way of researching female fertility information. Other traits such as temperament, carcass attributes and structure should also be taken into account in bull selection.